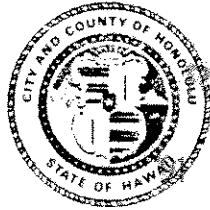


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DEPARTMENT OF GENERAL PLANNING
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR



DONALD A. CLEGG
CHIEF PLANNING OFFICER

RECEIVED
JAN 10 9:33

WM/DGP 12/89-I-998

DEC. 28, 1989
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

Mr. William E. Wanket
William E. Wanket, Inc.
Pacific Tower, Suite 1010
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Wanket:

Final Environmental Impact Statement
Royal Kunia Phase II
Tax Map Keys: 9-4-02: Portion of 1
9-4-03: Portion of 1 and 9

This is to confirm that the Final Environmental Impact Statement (FEIS) referenced above was accepted on September 23, 1989. The acceptance of this FEIS in no way implies a favorable recommendation on any request for approvals required by the Department of General Planning.

Should you have questions, please contact Bill Medeiros at 527-6089.

Sincerely,

A handwritten signature in cursive script that reads "Donald A. Clegg".

DONALD A. CLEGG
Chief Planning Officer

DAC:lh

DEDC LIBRARY

Final

Environmental Impact Statement

**ROYAL KUNIA
PHASE II**

Hoaeae, Ewa, Oahu

**HALEKUA DEVELOPMENT
CORPORATION**

Tax Map Keys:
9-4-02: Portion of 1
9-4-03: Portion of 1 and 9

Prepared By:
William E. Wanket, Inc.

July 1989



Office of Environmental Quality Control
235 S. Beretania #702
Honolulu HI 96813
586-4185

DATE DUE

~~Aug 9 2002~~

Aug. 11, 2003

FINAL
ENVIRONMENTAL IMPACT STATEMENT

**ROYAL KUNIA
PHASE II**


Hoaeae, Ewa, Oahu

July 1989

Submitted pursuant to Chapter 343, Hawaii
Revised Statutes, Environmental Impact
Statement Regulations.

Prepared For: **HALEKUA DEVELOPMENT CORPORATION**
For Submittal To: **DEPARTMENT OF GENERAL PLANNING**

Prepared by: **WILLIAM E. WANKET, INC.**



William E. Wanket, President
Pacific Tower 1010
1001 Bishop Street
Honolulu, Hawaii 96813

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**ROYAL KUNIA
PHASE II**

Environmental Impact Statement

SUMMARY

INTRODUCTION

The purpose of this environmental impact statement (EIS) is to: (1) describe the proposed Royal Kunia Phase II development; (2) disclose the probable environmental effects of the proposed development; (3) describe measures proposed to minimize adverse effects; and, (4) discuss alternatives to the proposed development.

The need for this EIS was determined by the Department of General Planning after its review of the Development Plan amendment that was submitted by Halekua Development Corporation

DEVELOPMENT SUMMARY

Applicant:	Halekua Development Corporation 2024 North King Street Honolulu, Hawaii 96819
EIS Consultant:	William Wanket, Inc. Pacific Tower 1010 1001 Bishop Street Honolulu, Hawaii 96813
Accepting Authority:	Department of General Planning City and County of Honolulu Municipal Office Building, 8th Floor 650 South King Street Honolulu, Hawaii 96813
Proposed Action:	Applicant requests the Department of General Planning to approve proposed changes to the Central Oahu Development Plan Land Use Map.
Project Name:	Royal Kunia, Phase II

*Royal Kunia, Phase II
Environmental Impact Statement*

Project Location:	Hoaeae, Ewa, Oahu
Tax Map Key:	9-4-02: Portion of 1 9-4-03: Portion of 1 and 9
Project Area:	669.9 ±
Existing Use:	Agriculture, growing of sugarcane.
Proposed Uses:	Residential, Low Density Apartments, Industrial, Recreation, and Public Facilities.
State Land Use District:	Agriculture
Development Plan Designation:	Agriculture
Zoning:	Ag-1 Restricted Agriculture

SUMMARY OF IMPACTS - BENEFICIAL

Housing:	Increased availability of affordably priced housing, development of rental housing, and a variety of housing types of attract a mix of income groups and family sizes.
Environmental:	Physical characteristics of the land are suitable for urban development, for example, level topography, deep, non-stony soils. Absence of endangered species and archaeological sites Absence of flood hazards and no significant degradation of air or water quality.
Socio-Economic:	Employment opportunities generated by construction and industrial areas and golf course. Enhancement of the area as a full-service community.
Public Facilities:	Public Facilities and services are available or can be made available at reasonable cost.
Fiscal:	Favorable to the public— projected revenues exceed public expenditures.

*Royal Kunia, Phase II
Environmental Impact Statement*

SUMMARY OF IMPACTS - ADVERSE

<u>IMPACT</u>	<u>MITIGATING MEASURES</u>
<u>Loss of Agricultural Lands:</u>	<p>The project area is presently under sugarcane cultivation by the Oahu Sugar Company (OSCo). Study prepared for this report indicate that the project is not expected to threaten the economic viability of OSCo nor the growth of diversified agriculture.</p> <p>The developer will bear the cost of existing Ag infrastructure and will coordinate with OSCo on the phasing of the project.</p>
<u>Traffic:</u> Increased vehicular traffic will be generated on Kunia Road, Kunia Interchange and H-1 Freeway.	<p>Kunia Road will be improved. Kunia interchange will require improvement with or without the project. Interchange improvement alternatives will require consideration of all proposed developments in the area. A coordinated effort between developers and the State Department of Transportation to develop a Regional Traffic Master Plan is underway.</p> <p>The capacity of H-1 is a regional problem shared by existing and proposed communities from Moanalua to Ewa. State and City transportation system will require improvements, including the State's phased program that maximizes the use of existing facilities.</p> <p>To help alleviate traffic congestion, park and ride facilities and ridesharing programs will be considered.</p> <p>Also, employment opportunities and economic activity within the proposed industrial area will help mitigate regional traffic impacts.</p>
<u>Construction:</u> Clearing and construction work will result in temporary dust, noise and some traffic disruption.	<p>The developer and its contractors will comply with local grading and subdivision ordinances, and with the regulations of the Department of Health.</p>

*Royal Kunia, Phase II
Environmental Impact Statement*

IMPACT

MITIGATING MEASURES

Utilities:

Increased need for utility services, including city supplied water and sewer.

Water consumption would be less than current agricultural use. Both water and sewer plans must be approved by public agencies.

Services:

Increased need for public services such as police, fire, schools and recreational facilities.

A study impact on state and County finances indicates that the project will generate revenues exceeding expenditures by \$6.2 million per year.

Air Quality:

Under "worst-case" conditions some exceedances of the State's ambient air quality standards for carbon monoxide are predicted.

Encouraging mass transit use and carpooling.

ALTERNATIVES CONSIDERED

In *Chapter 5*, three (3) alternatives were considered to the proposed project: (1) alternate land uses; (2) continued agricultural use; and, (3) no action. The first examined the redistribution of the various land use components of the proposed plan to either more or less acreage. The second considered the continuation of sugarcane production, or the use of the site for diversified agriculture, or developing the site for uses permitted in the Land Use Ordinance. The third no action alternative assumed that the land for the present time would remain in sugar cane production.

The findings of the alternatives considered supports the proposed project as the most viable and beneficial alternative for the property, the immediate community and the people of Oahu that need housing and opportunities for employment.

UNRESOLVED ISSUES

Regional traffic and the improvements to Kunia interchange are unresolved issues. Improvement to these transportation systems will require consideration on all developments in the Central Oahu and Ewa area. The need for improving the system is necessary with or without the project. These issues will require continuing discussion and assessment through the legislative process of approving the various developments proposed for Central Oahu and Ewa area in order to arrive at the most appropriate method of mitigation. In addition, efforts are underway between developers and the State Department of Transportation to develop a Regional Traffic Master Plan that will identify need roadway improvements, timing of the improvements, who should pay for the improvements, and what their fair share should be. One of the improvements that will be identified in the Master Plan is the needed improvements to Kunia Interchange. The Master Plan could be prepared as early as the end of 1989.

*Royal Kunia, Phase II
Environmental Impact Statement*

COMPATIBILITY WITH LAND USE PLANS AND POLICIES

A thorough discussion of the relationship of the proposed development to land use plans and policies is presented in *Chapter 3*. The proposed development is consistent with all the relevant public goals, objectives, policies, plan and controls, with the exception of the necessary approvals for a State land use boundary change, City and County General Plan and development plan amendment and change in zoning as listed below.

NECESSARY PERMITS AND APPROVALS

A number of permits and approvals must be secured before development of the site can begin. Major permits and approvals still outstanding include:

<u>PERMIT/APPROVAL</u>	<u>APPROVING AUTHORITY</u>	<u>STATUS</u>
Land Use District Boundary Amendment	Land Use Commission	Petition to be filed
General Plan Amendment	City Council	Awaiting 1990 U.S. Census
Development Plan Amendment	City Council	Application deferred to 1990
Zone Change	City Council	Will be filed following approval of DP Amendment
EIS	Department of General Planning	In process
Water Master Plan	Board of Water	In process
Subdivision	Department of Land Utilization	Application to be filed following zone change
Grading/Drainage	Department of Public Works	To be submitted during subdivision process
Building Permit	Building Department	To be filed following subdivision process

Royal Kunia, Phase II Environmental Impact Statement

1.0 PROJECT DESCRIPTION

1.1 LOCATION AND SIZE

The proposed development site is located at Waikele and Hoaeae, Ewa, Oahu, Tax Map Key: 9-4-02: Por. 01 and 9-4-03: Por. of 1 and 9. The Parcel is located approximately 1.2 miles north of Kunia Interchange of Interstate Route H-1. The site is bounded on the south by the Royal Kunia Phase I (currently under consideration for a development plan amendment by the City Council of the City and County of Honolulu); on the west by Kunia Road; on the east by Waikele Gulch and on the north by Overhead Electrical Transmission Lines on sugar cane crop land, currently leased by Oahu Sugar Company. Limited of the project site and its relationship to adjacent communities is delineated in *Exhibit 1*.

The project site is about 670 acres in size. It is rectangularly shaped, running lengthwise along the northwestern boundary of the existing Royal Kunia Phase I between Kunia Road and Waikele Gulch. The area is approximately 4700 feet wide and 6500 feet long.

1.2 LAND USE PLAN

The proposed project, the land use plan of which is illustrated in *Exhibit 2*, would comprise of the following land use components:

LAND USE	ACRES	UNITS
Single Family	272.8	1,500
Low Density Apt.	56.0	900
Light Industrial	130.0	
Golf Course	171.7	
Public Park	16.0	
School	6.0	
Circulation	17.4	
TOTALS	<u>669.9</u>	<u>2,400</u>

*Royal Kunia, Phase II
Environmental Impact Statement*

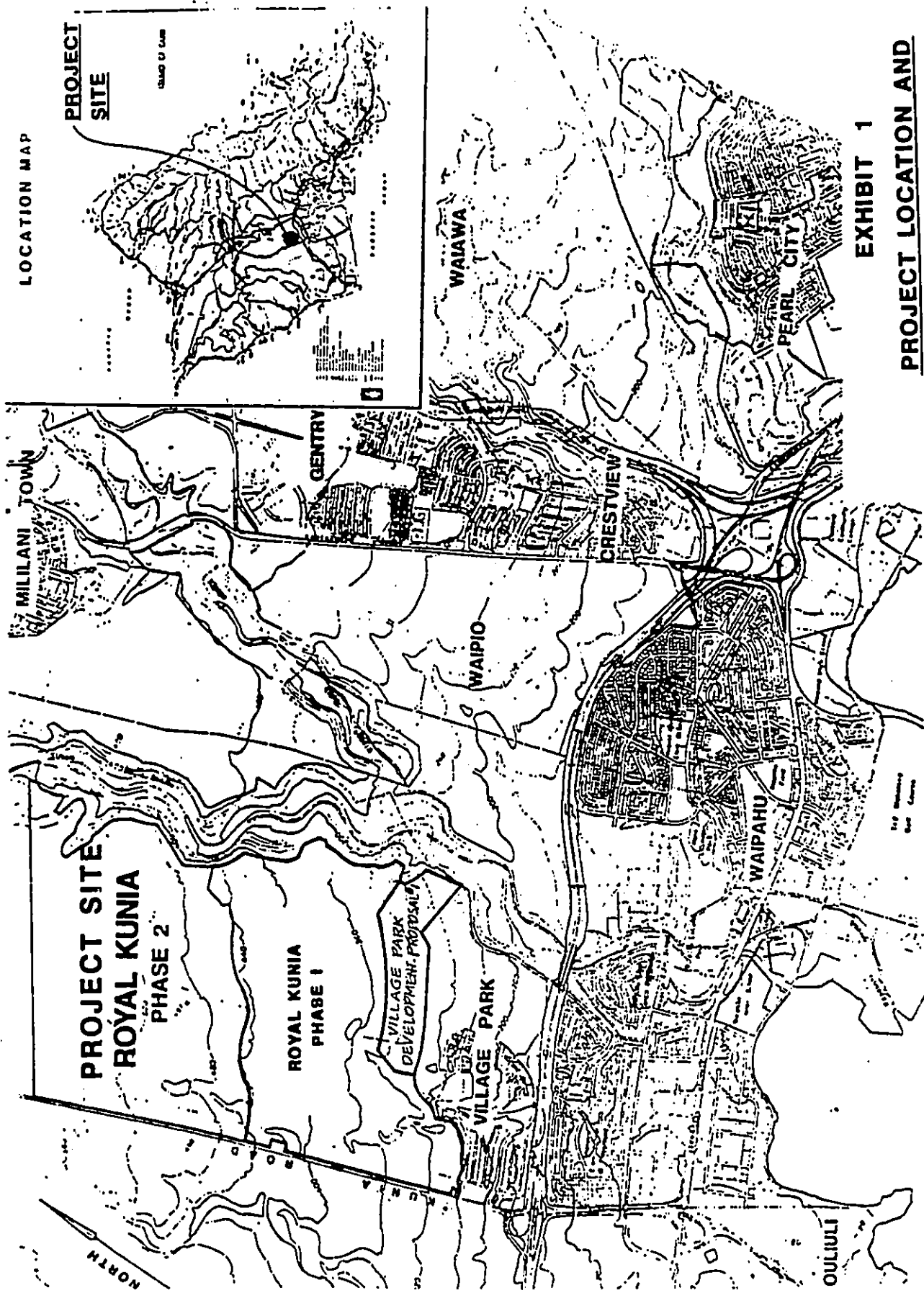
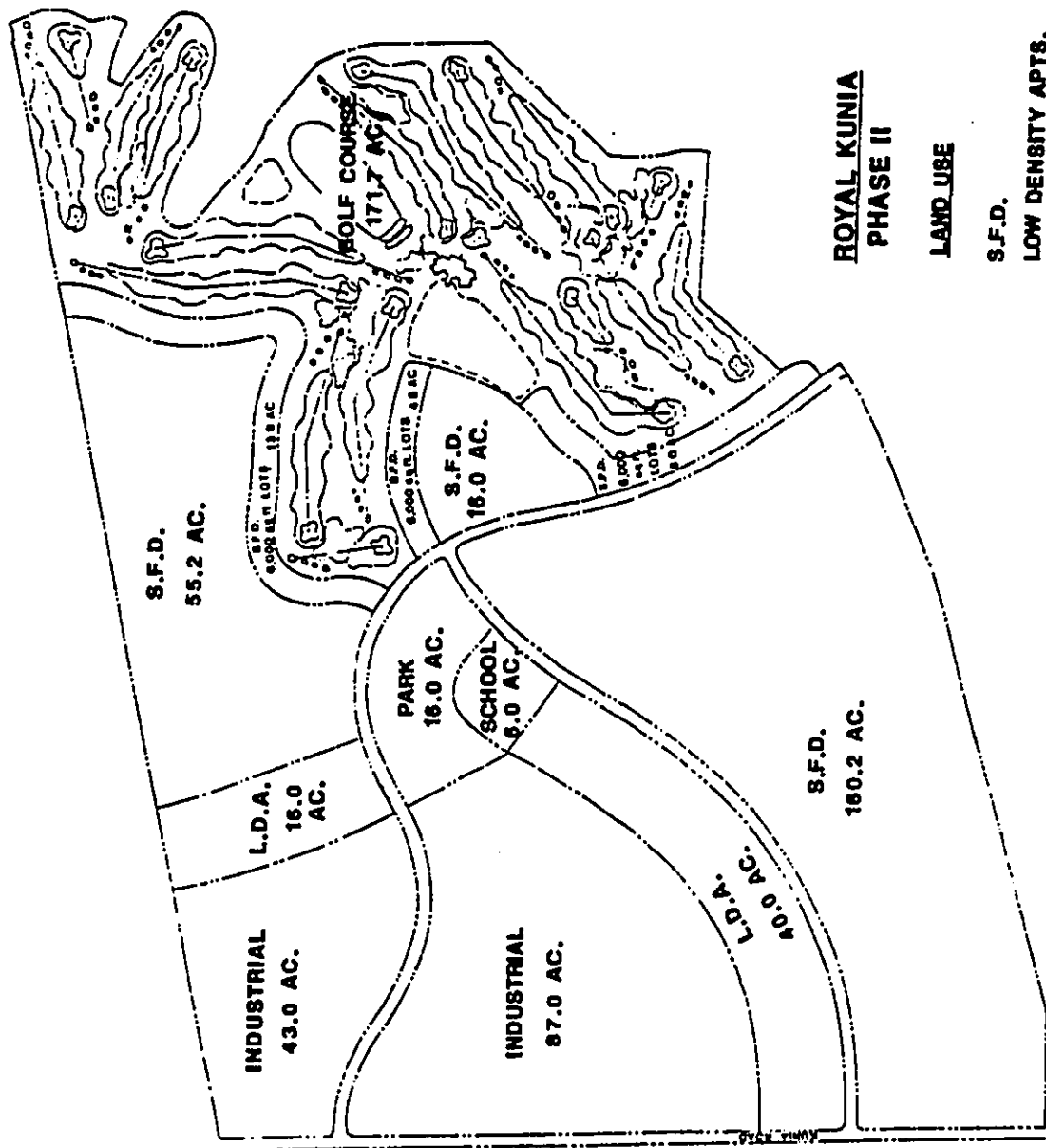


EXHIBIT 1

**PROJECT LOCATION AND
ADJACENT URBAN AREAS**

Royal Kunia, Phase II Environmental Impact Statement



ROYAL KUNIA PHASE II

LAND USE	ACRES	UNITS
S.F.D.	257.8	1500
LOW DENSITY APTS.	56.0	900
INDUSTRIAL	130.0	
GOLF COURSE	171.7	
PUBLIC PARK	16.0	
SCHOOL	6.0	
CIRCULATION	17.5	
TOTAL	655.0	2400

EXHIBIT 2 LAND USE MAP ROYAL KUNIA PHASE II



Sept. 1988

Royal Kunia, Phase II

Environmental Impact Statement

1.2.1 Residential/Apartment

The single-family residential area is the largest and most predominant characteristic of Royal Kunia II. The project proposes 1,500 single-family units, which is approximately 5.5 units per residential acre. The low-density apartment area consists of 900 units and will average 16.07 units per apartment.

The intent is to offer a variety of homes to people of different income levels and to families of various sizes. The majority of the units will be targeted for people in the middle income range of \$30,000 to \$60,000, with 50 percent of the units affordable to households earning below 140 percent of median income. Some of the units may be developed as low-income rental units. As the project advances through the development plan stage and other land use approvals, the affordable housing requirements, including the exact amount, type, distribution and pricing of units will be refined. Higher priced market units are intended along the perimeter of the golf course.

Please refer to *Section 1.6* for a further discussion on the housing component of the plan, as well as *APPENDIX I* the Market Assessment by John Zapotocky.

1.2.2 Industrial

The industrial component is expected to serve the needs of a wide range of businesses. While its primary function is to serve the needs of business for land in close proximity and with excellent access to the Primary Urban Center, it is also intended to serve a specialized market for small industrial sites.

A portion of the lots developed within the proposed subdivision will be of the minimum permitted size (7,500 sq. ft.) in order to provide small businesses with affordable lots. By developing lots of minimum permitted size, small businesses will have the opportunity to purchase industrial land in fee simple in order to control this business cost on a long term basis. At the present time approximately 10-percent of the industrial acreage is expected to be developed in this manner. However, actual market experience will determine the ultimate percentage of the development that is dedicated to this product type.

The industrial development is expected to generate about 1,950 permanent jobs, at an average of about 15 jobs per acre.

Additional discussion on the industrial component can be found in *Section 1.6* and *Appendix I*.

Royal Kunia, Phase II Environmental Impact Statement

1.2.3 Golf Course

The proposed golf course development consists of a single 18-hole championship golf course, clubhouse, maintenance building, driving range and parking. The course is expected to meet a demand for new golf facilities on Oahu through the year 2010. The open space provided is expected to increase values throughout the development, but primarily on the golf front lots. The golf course development is expected to generate about 50 jobs.

Additional discussion on the golf course component can be found in *Section 1.6* and *APPENDIX I*.

1.2.4 Parks

The project includes a 16-acre public park. The 16-acre park site will be dedicated to the City and County of Honolulu to meet the requirements of the Park Dedication Ordinance. The specific location, size and configuration will be coordinated with the City's Department of Parks and Recreation and resolved prior to submittals of applications to amend the General Plan and Development Plan.

1.2.5 Schools

A 6-acre school site is proposed for the project. With the opening of a new elementary school in existing Village Park in 1989 and a proposed school site in Royal Kunia Phase I, the developments in this area could have as many as 3-elementary schools to serve the projected student enrollment.

1.3 PUBLIC FACILITIES

Following is a brief description of the facility improvements for the project. Please refer to appropriate Sections of this document under *Section 2.3* for additional discussion, as well as *APPENDICES E* and *K*.

1.3.1 Water

The development of the project site will require approximately 1.718 MGD (average flow) of water. The flow requirements was computed according to the Board of Water Supply Standards as follows:

Residential:	500 gallons per unit per day
Apartment:	400 gallons per unit per day
Commercial:	3,000 gallons per acre per day
Business Park:	3,000 gallons per acre per day
Parks & Schools:	4,000 gallons per acre per day

Royal Kunia, Phase II
Environmental Impact Statement

Improvements proposed are:

PHASE I: Construct one deepwell, construct a booster station with two 1,900 gpm pump at the Kunia II site, install 9,000 LF of 20" transmission main from existing Kunia "400" Reservoir to the new "675" Reservoir, and construct a 1.0 MG Kunia "675" concrete reservoir.

PHASE II: Construct one deepwell, install one 1,900 gpm pump in the existing pump station and construct a 3.0 MG concrete reservoir.

1.3.2 Wastewater

Average daily wastewater flow generated by the development of the project site will be approximately 1.8 MGD. The flow requirement was computed according to the City and County Wastewater Standards as follows:

Residential:	320 gallons per unit per day
Apartment:	224 gallons per unit per day
Industrial:	8,000 gallons per unit per day
Schools:	50,000 gallons per unit per day

Wastewater from the development will be collected by a network of pipes flowing through Royal Kunia Phase I and flowing to the 21" trunk line to be installed from the Royal Kunia Phase I to the Waipahu Sewage Pump Station.

The implementation schedule of the project is being coordinated with the Division of Wastewater Management who is in the process of expanding the existing Waipahu Sewage Pump Station and Honouliuli Wastewater Treatment Plant.

All improvements will be designed to current City and County Department of Public Works wastewater design standards.

1.3.3 Solid Waste and Disposal

Fully developed, the proposed project would generate approximately 32 tons of mixed industrial, institutional, and residential solid waste per day. The proposed industrial component of the plan would not generate any heavy industrial or otherwise hazardous wastes.

It is expected that collection will be provided by both government and private work forces. The implementation of the City and County's H-POWER project within 2-years, as well as the proposed landfill at Waimanalo Gulch, together with the operation of the Waipahu incinerator should be able to accommodate the proposed development and other future growth in the Leeward Area.

*Royal Kunia, Phase II
Environmental Impact Statement*

1.3.4 Drainage/Grading

DRAINAGE

Approximately 40% of the storm runoff (1500 cfs) generated by the new development will discharge through the existing Village Park Subdivision. The drainage improvements within the existing Village Park Subdivision was designed according to the standards of the City and County of Honolulu and have been installed to handle this additional storm runoff. The system consists of various sizes of Reinforced Concrete Pipes, Metal Pipe Arches, and Lined Drainage Ways. The runoff then flows into improved drainage facilities that are maintained by the City and County of Honolulu and discharges into Pearl Harbor.

Approximately 60% of the storm runoff (2000 cfs) generated by the new development will be diverted into the golf course ponding areas and will be used to irrigate the golf course. The preliminary plans for the golf course ponding areas are calculated to be approximately five million gallons. Emergency overflow will follow the existing drainage patterns and flow into Waikele Stream. The golf course is planned to be constructed at the beginning of the project.

A Drainage Master Plan has been submitted to the Department of Public Works for approval. All drainage improvements will be designed to City and County Department of Public Works standards.

GRADING

Grading will be performed in accordance with Chapter 23, Grading, Soil Erosion and Sediment Control, of the revised Ordinances of Honolulu, 1978 as amended. Grading is expected to encompass the entire site. Erosion control measures will be implemented as outlined in the City and County Grading Ordinance. Strict compliance to City ordinances should minimize any potential environmental impact.

1.3.5 Electric/Telephone

ELECTRICAL

Existing Hawaiian Electric Company overhead 46KV line routed along Kunia Road fronting the project site must be relocated to accommodate the Kunia Road widening.

12 KV distribution feeders will be extended from the Royal Kunia Phase I substation and will be connected to service transformers located adjacent to project facilities via switching vaults provided along the 12 KV distribution feeder routes.

Royal Kunia, Phase II *Environmental Impact Statement*

Except for the 46 KV overhead lines and structures, the electrical system will be underground facility.

All planned improvements will be coordinated with HECO.

COMMUNICATIONS

Telephone facilities must be extended to the project site from the Hawaiian Telephone Company Remote Office provided for Royal Kunia Phase I. Total land area within Royal Kunia Phase I for this facility is estimated to be about 6,000 square feet. Cross-connect pedestals will be provided by the telephone company at various locations to permit access and telephone service to the project facilities.

The telephone system will be an underground facility with the only exceptions being the cross-connected pedestals.

Also, CATV facilities must be extended from Royal Kunia Phase I to the project site.

1.3.6 CIRCULATION

The primary access to the development will be via two intersections at Kunia Road, to be located approximately 1.4 miles and 2.0 miles north of the existing Kunia Interchange of Interstate Route H-1.

The proposed collectors will each connect to Kunia Road in a T-intersection, 4-lanes wide. Separate turning lanes, as necessary, will be controlled by a three-phase signal providing for protected southbound left turns.

Access to major roadways will be limited to cross streets. Access to house lots will be from interior road. There will be no driveways fronting the major streets.

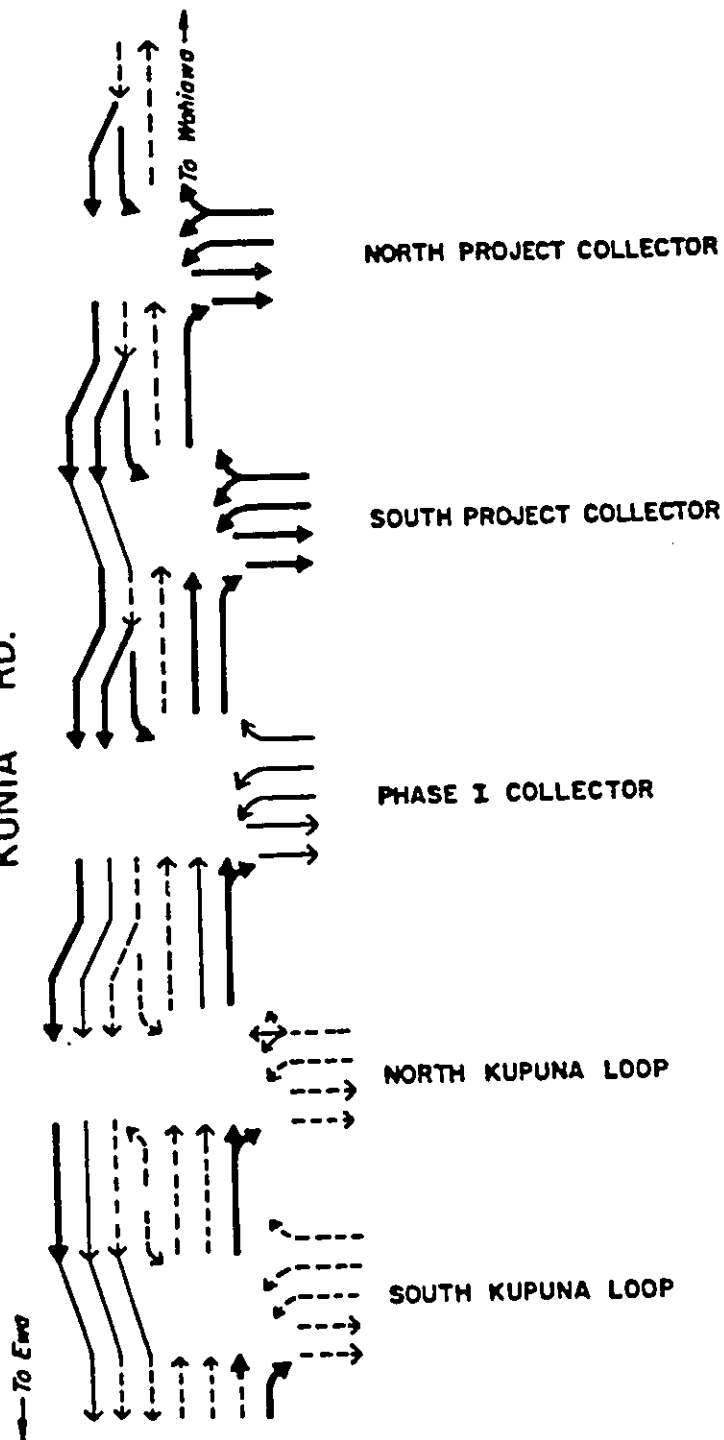
Access to the proposed golf course has not been finalized. Access will be from a cross street intersection with the major roadway.

All interior roadways will be designated in accordance with all applicable City standards. Construction drawings will be submitted to the Department of Transportation Services for review.

The increased traffic volumes generated by the project will require additional lanes on Kunia Road to serve these volumes. The recommended laneage on Kunia Road is illustrated on *Exhibit 3*. The laneage requirements associated with both Royal Kunia Phase I and Phase II are shown.



KUNIA RD.



LEGEND

- > EXISTING LANE
- > ADDITIONAL LANE (PHASE I)
- > ADDITIONAL LANE (PHASE II)

EXHIBIT 3
RECOMMENDED LANEAGE
KUNIA ROAD

Royal Kunia, Phase II
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To help alleviate regional traffic impacts, the project will consider ridesharing programs, park and ride facilities, and other incentives to help minimize the traffic impacts. Furthermore, employment opportunities and economic activity within the proposed industrial area will help to mitigate regional traffic impacts by diverting a portion of the traffic generated by the project that would otherwise have to travel downtown Honolulu-direction. Also, the project will be part of a Regional Traffic Master Planning effort by private developers in the area together with the State Department of Transportation to determine regional impacts and appropriate mitigative measures.

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1.4 CHANGES IN LAND USE DESIGNATIONS REQUIRED TO IMPLEMENT THE PROJECT

Amendments to the State Land Use District, General Plan, Development Plan, and zoning will be required.

STATE LAND USE DISTRICT

Existing: Agriculture
Proposed: Urban

GENERAL PLAN

The General Plan Population Policies will require amendment to increase the population allocations for Central Oahu to accommodate the resident population of the project.

DEVELOPMENT PLAN

Existing: Agriculture
Proposed: Residential, Low Density Apartment, Industrial, Recreation and Park

ZONING

Existing: Agriculture
Proposed: R-5 Residential, A-1 Low Density Apartment, I-1 and/or I-2 Industrial, and P-2 Preservation.

1.5 TIMETABLE/ESTIMATED COSTS

The project is expected to be under initial construction by 1994. Following is the estimated absorption schedule for the project.

YEAR	RESIDENTIAL	INDUSTRIAL	GOLF
1995	500	40	1
1996	500		
1997	500	30	
1998	500		
1999	400	30	
2001		30	

Estimated total project costs amount to about 75-100 million. No public funds will be involved.

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1.6 FEASIBILITY

1.6.1. Market Analysis - Residential (See Appendix D)

EXISTING CONDITIONS

The existing housing shortage on Oahu has been summarized in the "Hawaii State Plan Housing (Draft) released for public comment in November 1988. According to this document, "In 1986, Hawaii experienced America's highest housing costs for both owner occupied and rental housing". The report estimates an existing statewide shortfall of 20,000 units with that need growing to 86,000 units by the year 2000. Rental vacancy rates are far below the 5% level which indicates a healthy housing market. Forty-five thousand families are living in overcrowded units, while sixty five hundred are living in substandard units.

FUTURE DEMAND FOR HOUSING

The demand for housing on Oahu is expected to increase significantly between 1987 and 2010 for the following reasons.

1. Population Increase

The Oahu resident population of approximately 830,000 in 1987 is expected to increase to 999,500 (according to the final Department of Business and Economic Development M-K Series Projections) by the year 2010. The housing stock will have to increase to accommodate the shelter needs of this increase in the population.

2. Decrease in Household Size

Household sizes have decreased statewide from 4.46 in 1940, to 3.87 in 1960, to 3.59 in 1970, and to 3.15 in 1980. This trend reflects the sharply reduced birth rates, fewer families with several generations sharing the same living quarters and the replacement of larger single-family homes by smaller homes or apartments, caused by the inability of most buyers and renters to pay for more spacious housing. In addition, smaller household sizes are also influenced by cultural and social developments, including greater numbers of single-member households, among the young and elderly, higher ages at marriage; delayed childbearing and lower birth rates; higher incidences of divorce and single parent households; and a general aging of the population. These trends are expected to continue.

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MOMENTUM

A study prepared by Belt, Collins & Associates indicated that it took on the average 6 years from the time a project was proposed until the first units were delivered. In the case of the original Village Park the process took an incredible 13 years. Any large new development faces the problems of getting approvals and developing product for its target market as well as assembling the staff necessary to carry out the development. All of this takes time. In the case of the Royal Kunia, Phase II the development team is in existence and has a track record of being financially able and technically competent in production and marketing. Continuation of the Royal Kunia development will enable this development team to continue the momentum gained through years of experience and deliver units sooner than other projects.

INFRASTRUCTURE

Other major developments proposed for the Central Oahu area including: Mililani Mauka; Waikele and Gentry Waiawa will to one degree or another require that major infrastructure developments such as new water systems, freeway connections, and pump stations be developed. The details of these improvements often require negotiations between the developer and respective government agencies which will add to the time necessary for product to be delivered. By contrast the infrastructure improvements needed at Royal Kunia, Phase II are primarily evolutionary in nature generally requiring that incremental additions be made.

TRACK RECORD IN PRODUCTION AND SALES OF AFFORDABLE HOUSING

The developer of the Royal Kunia Project has demonstrated the capability of delivering homes at its predecessor development (Village Park). With the exception of 1981 - 1983 when extremely high interest rates disrupted the home building industry and construction industry strikes in 1984 and 1986, the developer consistently delivered affordable units. A survey of the buyers of the last 200 units in the Village Park development indicated that 61% of the units were sold to first time home buyers. This is consistent with a survey conducted in 1985 which indicated that 62% of the buyers at Village Park were first time homebuyers. Royal Kunia and predecessor development (Village Park) have consistently delivered single family housing at or near the lowest unit price offered for sale in the Central Oahu development plan area and proposes to continue this program in the Royal Kunia, Phase II development.

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TABLE 1-2

Royal Kunia Phase II
Income Requirements
 Criteria Per HFDC Admin. Memo 1
 In 1988 Dollars

RANGE OF AFFORDABLE PRODUCT TO BE OFFERED

Affordable Units (1)

	Apartments	TH/Zero Lot Line
	Low	High
Price	\$89,000	\$150,000
90% Mortgage	\$80,100	\$135,000
Debt Service (2)	\$702	\$1,184
CTF (3)	\$100	\$100
Total	\$802	\$1,284
Required Monthly Income (4)	\$2,432	\$3,891
Annual Income Range	\$29,181	\$46,689

Market Units (1)

	Zero Lot Line/SFD	Golf Course Single Family Dwelling
	Low	High
Price	\$150,000	\$275,000
90% Mortgage	\$135,000	\$247,500
Debt Service (2)	\$1,184	\$2,171
CTF (3)	\$125	\$229
Total	\$1,309	\$2,400
Required Monthly Income (4)	\$3,967	\$7,273
Annual Income Range	\$47,598	\$87,263

- (1) Fee Simple
- (2) Thirty Year Mortgage @ 10% Interest
- (3) Customer Trust Fund (Real Property Tax, Insurance)
 Affordable Units \$100 per month
 Market Units @ 1% of Sales Price / 12
- (4) Based on 33% of Income

NOTE: HFDC criteria assume 10% down payments. Traditionally, buyers of market priced units have larger down payments and hence lower qualifying requirements.

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DELIVERY OF QUALITY PRODUCT

Royal Kunia and predecessor development (Village Park) have demonstrated that it can produce a quality product and deliver value for the money. The developer knows its costs and can speak authoritatively base on real life experience.

MOBILIZATION

Royal Kunia, Phase II does not require a mobilization of development disciplines but is the continuation of a successful long term development project.

In summary, the Royal Kunia, Phase II offers an opportunity to continue an existing project which has been providing moderately priced housing to local families over the past ten years. It will maintain the momentum of an ongoing project with a successful development team and a proven product. Approval of the project will assure the product will be available on a continuous basis in the moderately priced range for the next ten years.

Target Market and Absorption Rate

The Royal Kunia, Phase II has been planned to offer a variety of housing types and prices. The bulk of the product is expected to be affordable to the traditional Royal Kunia/Village Park buyer, the family with incomes ranging between \$30,000 and \$60,000 (See *Exhibit 1-2*). It is anticipated that first time homebuyers will continue to comprise approximately 60% of the product offered at Royal Kunia.

There absorption of the residential product proposed for the Royal Kunia, Phase II development is shown on *Table 1-3* and more fully discussed below.

NOTE: Pricing and income levels described below are in 1988 dollars will be adjusted over time to reflect changes in incomes and costs.

Affordable Units (80% to 140% of Median) - Twelve hundred affordable residential units are planned for Royal Kunia Phase II. These units will include one and two bedroom apartments, one, two and three bedroom townhouses and zero lot line single family product. The units will be priced from \$89,000 to \$150,000 and are meant for a wide range of households. According to *Table 1-2* qualifying incomes for the affordable product would range from \$29,181 to \$46,689. Information developed by the consultant indicates that approximately 33,000 Oahu rental households have income levels which would qualify them to purchase units starting at prices of \$89,000. Units priced in this range should appeal to a wide variety of buyers. The units are expected to be absorbed over a five year period. *Table 1-3* shows the absorption of 240 units per year. This is likely to be a conservative figure given the pent up demand for

TABLE 1-3

Royal Kunia, Phase II
Residential Absorption Schedule
Years 1995 thru 1999

Unit Type	1995	1996	1997	1998	1999	Total
<i>Price (\$1988)</i>						
AFFORDABLE UNITS:						
Apartments, Townhouses, & Zero Lot Homes \$89,000 - \$150,000	240	240	240	240	240	1,200
MARKET UNITS:						
Single Family Homes, Zero Lot Homes & Single Family Golf Course Homes \$150,000 - \$275,000	240	240	240	240	240	1,200
Affordable and Market Total	480	480	480	480	480	2,400

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affordable units and is likely to be even more likely if the developer is able to offer the lowest priced units as rental units. According to the Hawaii Housing Authority staff, there were approximately 8,000 families on the waiting list for public housing as well as 3,200 on the waiting list for Section 8 certificates, as of August 1987.

Market Units - Twelve hundred market housing units are planned for the Royal Kunia Phase II development. A range of product will be offered including zero lot line homes, single family homes and single family golf frontage homes. These homes will appeal to persons with incomes ranging from \$47,500 to \$87,000. While a number of the buyers are expected to be first time homebuyers there will also be a number of buyers who are selling smaller residential units or less well located units in order to purchase at Royal Kunia Phase II. This is expected to be especially true of the larger golf course frontage homes. For persons who are trading up income levels necessary to qualify for the market homes are expected to be substantially lower as the down payments are expected to be much larger. Downpayments of \$30,000 to \$60,000 are common in upscale developments where a previous residence has been sold. Market units are expected to sell briskly over a five year period. *Table 1-3* shows the absorption at 240 units per year. This is a reasonable level of absorption given the experience of market product in Royal Kunia Phase I and of other market product currently on the market.

In summary, the product proposed for the Royal Kunia, Phase II development will be affordable by the intended target market. The developer of the Royal Kunia, Phase II has demonstrated its ability to produce a product that is acceptable and affordable to the target market.

1.6.2 Market Analysis - Industrial Development (See *Appendix I*)

Demand for industrial land in close proximity to the Primary Urban Center (PUC) has increased substantially in the past two years while supply has remained relatively constant. The manifestation of this situation has been rapidly increasing rental rates within the Primary Urban Center and rapidly escalating industrial land prices. The last significant industrial development in the PUC occurred in 1979 when the Bouganville and Central Parks were developed along with the Gentry Business Park in Central Oahu. Since then the only new development in the area is the Halawa Valley Industrial park currently under construction. According to the owner/developer of the project all of the lots have been sold and actual transfer of title is awaiting acceptance of the subdivision work by the City and County of Honolulu.

During the past thirty years industrial land in close proximity to the PUC has been absorbed at the rate of approximately 25.5 acres per year. More recently government policies aimed at redevelopment of the Kalihi and Kakaako areas has resulted in the conversion of well located industrial lands into higher and better uses, i.e., residential,

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office and commercial in Kakaako and commercial and office in the Iwilei area. It is estimated that industrial users in these areas are being displaced at a rate of approximately 7.5 acres per year. Thus there is estimated to be a total demand of 33 acres per year for industrial land in close proximity to the PUC.

A survey of proposed future industrial developments indicates that while there are 900 acres of land proposed for industrial development approximately 60% of the land is either expansion of Campbell Industrial Park or limited to High Tech uses in the Mililani Area. Of the remaining 326 acres proposed for industrial development only 40% is in close proximity to the PUC or has the access afforded by the Central Oahu location. The 134 acres remaining includes the 43 acre Halawa Valley Industrial Park previously discussed as being sold out. Thus only about a three year supply of the more desirable industrial land remains 20 acres in the Royal Kunia, Phase I and 70 acres in the proposed Gentry Wahiawa development. (NOTE: Neither Gentry Wahiawa or Royal Kunia Phase I have industrial zoning at this time.)

A survey of small industrial lots conducted using the Department of General Planning data base indicates that very few small industrial lots (1/2 acre or less) exist outside the PUC.

It is estimated that the Royal Kunia, Phase II development could capture approximately 50% of the annual demand for industrial land or 16 acres per year beginning in 1995. The major reason for projecting such a large market share is the lack of competitive product. New industrial areas within the PUC are unlikely given the limited land availability and the alternate uses for land in the PUC.

In summary continued economic growth will insure continued demand for industrial land. Government policies for Kakaako and Kalihi will insure that many existing industrial uses will be encouraged to move from these areas. There is a lack of new sites for industrial development in the PUC. Royal Kunia, Phase II is expected to attract both new business and relocating businesses. The Royal Kunia, Phase II project also intends to provide small industrial lots as this market appears to have been overlooked by other developers.

1.6.3 Market Demand - Recreational Development - Golf Course (See Appendix I)

The sport of golf nationwide has been growing in popularity, due primarily to the level of economic prosperity as well as the ageing of the population.

Golf demand in the State of Hawaii has grown dramatically due to the growth of destination resorts which have fostered a golf industry. The same demographic trends which are driving the growth in the popularity of golf nationally are at work in Hawaii.

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While the ratio of golf holes to population in Hawaii compares respectably with other states (21st), if Oahu were to be considered alone it would rank 46th. Oahu has lagged the other islands in the development of resort courses and with the increase in demand among Oahu tourists for golf, local golfers have found themselves facing increasing greens fees and a shortage of starting times.

Based on calculations made by the consultant thirty five new courses could be required by the year 2010. At the present time two new courses are under construction and another 42 equivalent courses have been discussed. The status of the courses discussed ranges from approved for development at Waikale to simple inquiries as to the possibility of developing a course.

In the Ewa, Central Oahu and Waianae areas the demand for new courses is estimated at twenty five while the number discussed is twenty four.

Bills have been introduced at the City Council to place a moratorium on the development of golf courses on agricultural lands and to review public concerns over this issue. Under these circumstances and given the numerous approval and development hurdles which must be overcome prior to development it is unlikely that more than 50 to 75% of the sites and courses discussed will actually be developed.

The market study indicates that the strong demand for golf development in the Ewa, Central Oahu and Waianae area is made up of a wide range of market segments, including, daily fee play for residents and tourists and membership from residents and tourists.

It is difficult to determine the phasing of the various courses being discussed. No golf courses have been developed on Oahu in over ten years although two courses are currently under construction. The proposed golf development at Royal Kunia, Phase II would result in an increase in golf opportunities to both resident and tourist golfers.

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1.7 STATEMENT OF OBJECTIVES

Royal Kunia Phase II is envisioned as a planned community which will complement Royal Kunia Phase I and the existing Village Park development. It is being proposed as a response to an acknowledged shortage of and a future need for housing, a demand for industrial land, and a need for expanding the recreational opportunities within the region. Generally, the objectives of the plan are:

To Expand the Housing Opportunities for Oahu Residents

The development will provide 2,400 primary residential units which will help to meet a projected shortfall of 78,00 primary residential units by the year 2010. The intent is to provide a broad range of unit types and unit prices which will appeal to a wide range of home buyers and a wide range of family sizes.

To Provide Affordable Housing Units

The Royal Kunia Phase II units will be affordable. Fifty percent of the units proposed will be priced to be affordable to buyers with incomes identified by the State Housing Finance and Development Corporation as requiring affordable housing.

To Accommodate the Demand for Industrial Land

There is an existing unmet need for industrial land in close proximity to the Primary Urban Center for small and large businesses. The plan proposes 130 acres to meet this industrial demand, and the project will include minimum sized industrial lots within a portion of the development.

To Provide Employment Opportunities

The 130 acre industrial development is expected to provide for approximately 1,950 permanent jobs. These employment opportunities will help to mitigate regional traffic impacts by diverting a portion of the traffic generated by the residential developments in the area that would otherwise have to travel towards downtown Honolulu. In addition, about 300 full-time jobs will be available for construction and sales personnel involved in the development of the project. Furthermore, the proposed golf course is expected to generate about 50 permanent jobs.

To Increase Recreational Opportunities

The project includes a 16-acre public park and a 18-hole golf course. Land for the 16-acre park will be dedicated to the City and County of Honolulu. Both the park and the golf course will serve as open space amenities for the development.

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To Enhance and Expand the Existing Village Park Area to an Identifiable Community within the Waipahu Region.

Royal Kunia Phase II, together with the Royal Kunia Phase I and the existing Village Park development will result in a population of some 20,000 people who will be offered living, employment, education, recreation and shopping facilities within a community setting. There will be internal linkages through the roadway system and park facilities, as well as other uses such as Park and Ride facilities and Child Care services. Also, there will be design compatibility among the three developments.

1.8 PURPOSE OF THIS EIS

The Application for Development Plan (DP) Amendment and Environmental Assessment was submitted to the City and County of Honolulu Department of General Planning in October 1988. Because the proposed DP amendment involved a non-county initiated amendment to the City and County of Honolulu Development Plans and would result in designations other than agriculture and conservation, the proposed action was subject to the provisions of the Environmental Impact Statement Law, Chapter 343, HRS [Section 343-5 (a)(6)].

In reviewing the DP amendment, the Department of General Planning ("accepting authority") determined that the proposed action may have a significant effect on the environment, and filed, on October 17, 1988, an Environmental Impact Statement Preparation Notice (EISPN) with the Office of Environmental Quality Control (OEQC). The EISPN was subsequently published in the October 23, 1988 OEQC Bulletin (see *Chapter 11* for listing of consulting parties and comments received).

1.9 HISTORIC PERSPECTIVE

The project site is currently owned by Robinson Estate, however, Halekua Development Corporation has an agreement to purchase. The site is currently in sugarcane production by Oahu Sugar Company and has been for many years past.

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2. EXISTING CONDITIONS AND IMPACT ASSESSMENT

This Chapter describes the physical environment in which the proposed development will be situated, the socio-economic environment, the adequacy of public facilities and services and an analysis of fiscal impacts. The probable impacts from the proposed action are discussed, and when appropriate, mitigative measures are proposed to ameliorate or reduce adverse impacts.

Major sources of information for this Chapter are drawn from discussions and/or communication with public and private agency representatives, published reports and the following reports found in the *Appendix*.

- A. Archaeological Walk-Through Survey
(Archaeological Consultants of Hawaii)
- B. Air Quality Assessment
(Barry D. Root and Barry D. Neal)
- C. Avifaunal and Feral Mammal Survey
(Phillip L. Bruner)
- D. Botanical Survey
(Char and Associates)
- E. Engineering Analysis
(Park Engineering)
- F. Environmental Impact of Fertilizer, Herbicide and Pesticide Use
(Charles L. Murdoch and Richard E. Green)
- G. Impact on Agriculture
(Decision Analysts Hawaii, Inc.)
- H. Impact on State and County Finances
(Decision Analysts Hawaii, Inc.)
- I. Market Assessment
(John Zapotocky)
- J. Social Impact Assessment
(earthplan)
- K. Traffic Assessment Report
(Parsons Brinckerhoff Quade and Douglas, Inc.)
- L. Potential for Chemical Drift from Sugarcane Operations in the
Vicinity of Royal Kunia Phase II Project
(Richard E. Green and Charles L. Murdoch)

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2.1 PHYSICAL ENVIRONMENT

2.1.1 Topography/Geology

The site slopes downwards from the northwest to the southwest at a gradient of 2 - 6%. The ground elevations range from approximately 450' to 575' MSL. Two drainageways traverse the western section of the site.

There are no unusual or unique geological features at or near the project site. There is a 138 KV Hawaiian Electric Company Overhead Transmission Line at the northern boundary of the project site.

IMPACT

The entire site will be graded. Expected impacts from grading include:

- Dust from grading operations.
- Exposed soil subject to wind and rainfall erosion.

These impacts will be mitigated to acceptable levels as described below.

No scenic or geological landmarks will be affected.

MITIGATIVE MEASURES

Dust generation and soil erosion will be minimized by compliance with the city's grading ordinance (Chapter 23, *Revised Ordinances of Honolulu*). With reference to site preparation and construction, all necessary steps will be taken to reduce erosion and silt-laden runoff of exposed areas and to prevent release of petroleum products, building materials (including concrete) and other pollutants into Waikele Gulch/Stream and Village Park drainage system. Typical controls that are incorporated in an erosion control plan include:

- Limiting the extend of exposed area at any one time;
- structural measures, including dikes, berms, interceptor ditches, sediment traps, and sediment basins;
- temporary and permanent vegetative cover or mulching;
- spraying chemicals or liquid asphalt;
- temporary wind barriers;
- plus other measure that may be recommended by appropriate agencies.

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All requirements of Title 11, Chapter 26, paragraph 35 (Rodents; demolishing of structure and clearing of vacant sites and vacant lots) will be strictly adhered to.

2.1.2 Soils

Red to reddish brown residual soils are generally found on the site. A detailed soils investigation conducted for the existing Village Park and Royal Kunia, Phase I Subdivisions indicated that the surface soils are underlain by rocks, generally near depths of about 10 feet. Boulders and cobbles were encountered at lesser depths.

The U.S. Soil Conservation Service (SCS) classifies the soils as Molokai silty clay loam (MuB, MuD) and Lahaina silty clay (LaA, LaB) (see *Exhibit 4*). The Molokai and Lahaina soils have similar characteristics— they are moderately permeable, have slight erosion hazards, and are underlain by bedrock at depths greater than 5'.

Under the Unified Soil Classification System, which is used for engineering purposes, the soils are classified as ML and MH. The "M" indicates that the soils are silt with high ("H") and low ("L") liquid limits. These designations have limited value in Hawaii since engineering properties for tropical soils may be significantly different than temperate soils having the same classifications. Tropical soils exhibit a higher shear strength and lower shrink-swell volume change with change in moisture content. The difference is apparently related to the very fine particulate size, microstructure, and high aggregate stability of tropical soils (USDA, 1972). In fact, experience at the existing Village Park Subdivision indicates that the soils are generally good for homesite development. Roadways have been constructed without utilizing a subbase course. Good bearing values of up to 4000 pounds per square foot have been used for the design of footings and walls.

The soils are suitable for agriculture as indicated by the ALISH (Agriculture Lands of Importance to the State of Hawaii), Land Study Bureau (LSB), and Soil Conservation Service (SCS) classification systems:

ALISH: Prime (671.0 acres)

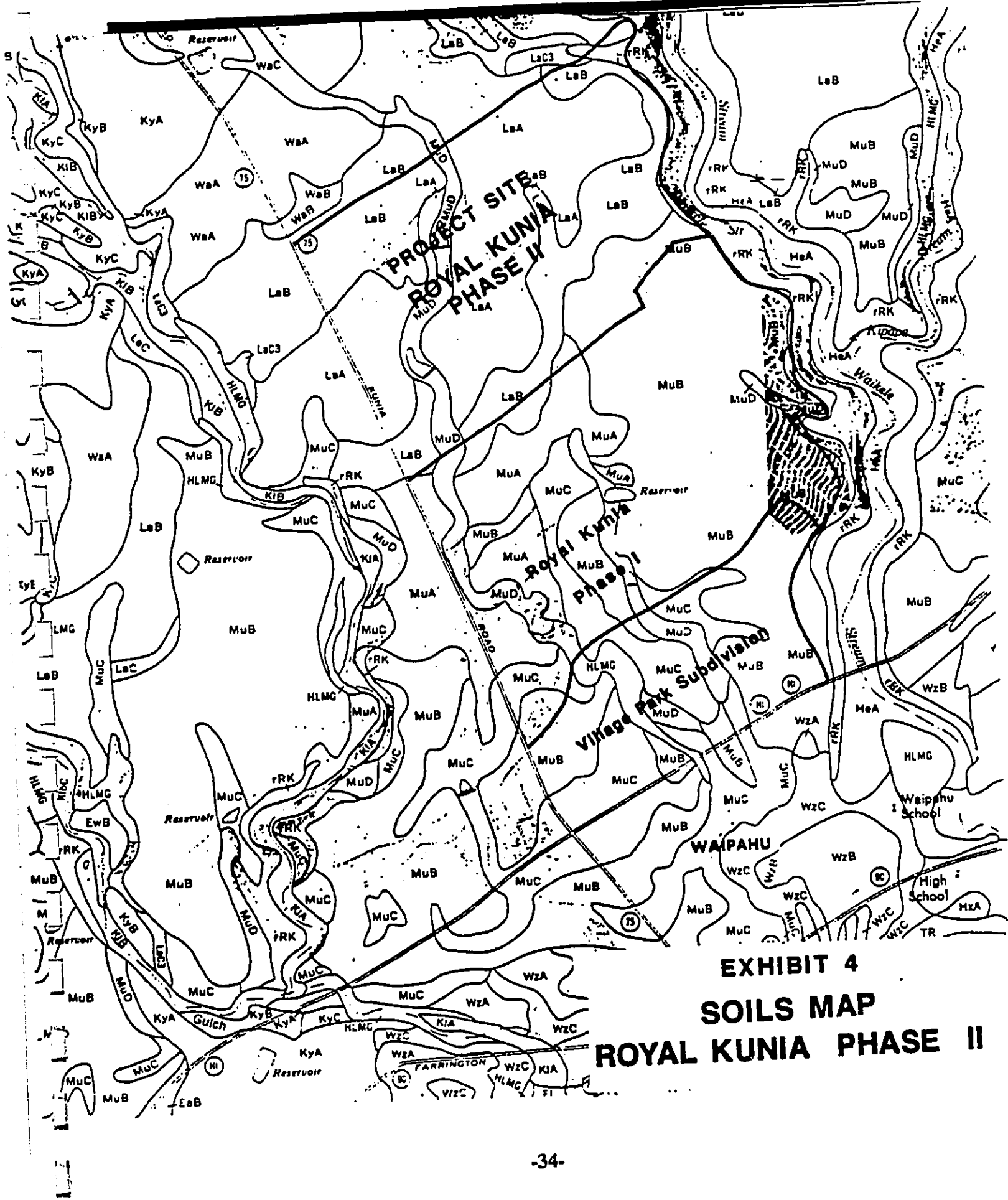
LSB: A or B (irrigated); D or E (non-irrigated)

SCS: I or II (irrigated); III or IV (non-irrigated)

The Land Evaluation and Site Assessment (LESA) Commission developed a rating system to synthesize these various classification systems for agricultural suitability. The soils were rated quite highly (LESA, 1985).

For further discussion on the agricultural suitability, please refer to *Appendix G, Impact on Agriculture* (Decision Analysts Hawaii).

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IMPACT

The soils have good bearing capabilities to adequately support the residential and apartment structures. Additional soil engineering investigations are necessary for the heavier structures planned for the industrial area.

The prime agricultural soils will be lost for commercial agricultural operations. See *Section 2.2.3* and *Appendix G* for a discussion of the project's impact on Oahu Sugar Company, diversified agriculture, and on the agricultural policies of the State.

MITIGATION MEASURES

Findings from detailed soils investigations will be used in developing the construction plans. These plans will be reviewed and approved by various public agencies as part of the subdivision approval and building permit process.

The loss of prime agricultural land is an unavoidable impact. The acceptability of this impact is a policy determination that must weigh the trade-offs between agriculture and housing. The relatively low site preparation costs associated with level, non-stoney soils will enable the delivery of affordable housing to help alleviate the housing shortage problem. The applicant proposes to build 50% of the units for families in the 80% to 140% median income range. For a complete discussion on the agricultural issues see *Appendix G*. A summary of these issues is also found in *Section 2.2.3*.

2.1.3 Climate

The project site is located above Waipahu with elevations from 440' to 575' MSL. The annual median rainfall is about 34" (State gage no. 740.1). The months of May - September are usually drier than October - April. Temperatures are about 1 degree F. higher than Wahiawa (based on a general observation that temperatures in Hawaii decrease about 3.2 degrees F. per 1,000 feet in elevation). The average annual maximum temperature is about 79 and the average annual minimum temperature is about 64.

Predominant wind direction and the higher wind speeds are from the northeast to east direction (based on data from Wheeler AFB). These tradewinds prevail 41.5% of the time with an average speed of 6.1 knots. Using National Weather Services data (Honolulu Airport), the tradewinds (prevailing 70 percent of the time) are from the north-northeast, northeast, east-northeast and east. The predominant tradewind direction is from the east-northeast. The average wind speed is 11.5 mile per hour.

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IMPACT

Climate factors are being considered in the planning, design, and construction of the project. Such factors as the wind direction, path of the sun, and amount of rainfall influence the siting and orientation of housing, grading practices, landscaping. By considering these factors, natural ventilation of homes can be maximized, solar heating options ensured, erosion during construction minimized and water consumption for landscaping irrigation minimized.

MITIGATION MEASURES

None necessary since there are no adverse impacts.

2.1.4 Flora

A Botanical Survey of the project area (Char and Associates, November 1988) was conducted. The report is attached as *Appendix D* and is summarized below.

A walk-through method was used in the survey. Almost the entirety of the site was covered with sugar cane (*Saccharum officinarum*). The site was devoid of noteworthy features for two earth-and-stone dams, which formerly impounded water, and an abandoned landing-strip, which has been incorporated into the systems of cane-haul roads. Rock piles are small and widely scattered.

A total of 59 species of vascular plants were found on the site. Of these, 57 (97%) were exotic weeds or deliberately introduced plants, and 2 (3%) were native or presumed-native plants. None of the species found on the site were officially listed as endangered or threatened; nor were any species proposed or candidate for such status. A list of all the vascular plants found on the site is included in the Consultant's Report, *Appendix D*.

IMPACT

There is little of botanical interest on the property, as most of the area has been extensively cultivated for many years. The proposed development is not expected to have a significant impact on the total island populations of the species involved.

MITIGATION MEASURES

None necessary since there are no adverse impacts.

2.1.5 Fauna

An Avifaunal and Feral Mammal Survey was conducted (Phillip L. Bruner, Assistant Professor of Biology, BYU-H) on the property in

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November. The report is attached as *Appendix C* and is summarized below.

No endemic birds were recorded during the survey. A total of 45 plover (Pacific Golden Plover [*Pluvialis fulva*]) were recorded during the survey. Most were seen along the roads which run in all directions through the property and in a recently cleared sugar cane field just outside the west property and in a recently cleared sugar cane field just outside the west boundary. No other migratory birds were recorded. Also, no indigenous resident species were seen. The property as it is presently constituted does not provide any suitable habitat for indigenous resident birds.

A total of 15 species of exotic birds were recorded. The most abundant species was the Zebra Dove (*Geopelia striat*) followed closely by Japanese White-eye (*Zosterops japonicus*). The others include the Cattle Egret (*Bulbucus ibis*) Common [Ring-necked] Pheasant (*Phasianus colchicus*), Spotted Dove (*Streptopelia chinensis*), Common Myna (*Acridotheres tristis*), Northern Cardinal (*Cardinalis cardinalis*), Red-crested Cardinal (*Paroaria coronata*), Red-vented Bulbul (*Pycnonotus cafer*), White-rumped Shama (*Copsychus malabaricus*), House Sparrow (*Passer domesticus*), House Finch (*Carpodacus mexicanus*), Nutmeg Mannikin (*Lonchura punctulata*), Chestnut Mannikin (*Lonchura malacca*), and Common Waxbill (*Estrilda astrild*). *Table One* of the report (*Appendix C*) shows the relative abundance and habitat associations of these species.

With regards to Federal Mammals, Mongoose (*Herpestes auropunctatus*) were commonly observed during the survey. Feral cats were also reported. No rats or mice were observed but a trapping program would likely show that their numbers are similar to what one would find elsewhere in sugarcane fields on Oahu.

IMPACT

Overall the conversion of the property from a sugarcane monoculture to a more diversified habitat of trees and grass should have a positive effect on the population of most bird species present on the property.

MITIGATION MEASURES

None necessary since there are no adverse impacts.

2.1.6 Archaeological/Historic

An archaeological reconnaissance survey of the project site was conducted in November 1988 (Joe Kennedy, Archaeological Consultants of Hawaii). The survey is attached as *Appendix A* and is summarized below.

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IMPACT

Climate factors are being considered in the planning, design, and construction of the project. Such factors as the wind direction, path of the sun, and amount of rainfall influence the siting and orientation of housing, grading practices, landscaping. By considering these factors, natural ventilation of homes can be maximized, solar heating options ensured, erosion during construction minimized and water consumption for landscaping irrigation minimized.

MITIGATION MEASURES

None necessary since there are no adverse impacts.

2.1.4 Flora

A Botanical Survey of the project area (Char and Associates, November 1988) was conducted. The report is attached as *Appendix D* and is summarized below.

A walk-through method was used in the survey. Almost the entirety of the site was covered with sugar cane (*Saccharum officinarum*). The site was devoid of noteworthy features for two earth-and-stone dams, which formerly impounded water, and an abandoned landing-strip, which has been incorporated into the systems of cane-haul roads. Rock piles are small and widely scattered.

A total of 59 species of vascular plants were found on the site. Of these, 57 (97%) were exotic weeds or deliberately introduced plants, and 2 (3%) were native or presumed-native plants. None of the species found on the site were officially listed as endangered or threatened; nor were any species proposed or candidate for such status. A list of all the vascular plants found on the site is included in the Consultant's Report, *Appendix D*.

IMPACT

There is little of botanical interest on the property, as most of the area has been extensively cultivated for many years. The proposed development is not expected to have a significant impact on the total island populations of the species involved.

MITIGATION MEASURES

None necessary since there are no adverse impacts.

2.1.5 Fauna

An Avifaunal and Feral Mammal Survey was conducted (Phillip L. Bruner, Assistant Professor of Biology, BYU-H) on the property in

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At the time of the survey, the entire property was covered in sugarcane and because of this, the prospect of any remaining archaeological sites was judged to be remote. This proved to be the case as no above ground representatives of past use were indicated on the subject property.

Three archival maps were examined: the W. H. Pease Map prepared in 1850, the 1873 Alexander Map of Honouliuli, and the Pearl Lochs Map prepared by the officers of the USS Bennington in 1879. Functional indications for this portion of Hoaeae were nonexistent on these maps.

The consultant concluded that the property contains no remaining, above ground archaeological features and offers little opportunity for subsurface recovery. The supportive data are survey results, lack of indicator data from the literature and map sources, and an environmental setting that does not lend itself to permanent habitation. Gathering, limited dryland cultivation, and later ranching have clearly taken place here, however, these activities do not easily lend themselves to archaeological investigations. He further states that there is no need for additional archaeological work on the property.

IMPACT

Because no evidence of past utilization in the form of structural or midden remains were found, and because there have been no archaeological or historical sites previously recorded on the property, there should be no adverse impacts caused by the proposed development.

MITIGATION MEASURES

Should any archaeological or historic remains be uncovered during construction, the contractor will stop further construction in the area and will immediately notify the State Historic Preservation Office.

2.1.7 Hazards

The probabilities for flooding and earthquakes are very low for the project site. The flood insurance hazard rating for this area is Zone C, areas of minimal flooding. According to the U.S. Army Engineering District, the site is also located outside of the 500-year flood plain (Zone X, unshaded). The seismic risk classification for the entire island of Oahu is Zone 1 (Uniform Building Code). Zone 1 indicates that the island is subject to minor earthquake damage.

Potential man-made hazards in the project vicinity include fire hazards from nearby sugarcane harvesting, and safety hazards posed by cane haul trucks. Also, the proposed project's eastern (Honolulu) border is shared with the Naval Magazine Waikale Branch. With

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respect to Royal Kunia, Phase I (just makai of the proposed project), the Navy's "official" buffer zone was established as extending about $\pm 1,300$ feet into the property from the eastern boundary, e-wa-direction. It was expected that this same condition would apply to the project site. However, according to a letter from W.K. Liu, Assistant Base Civil Engineer, Naval Base Pearl Harbor, Department of the Navy, December 5, 1988 (see Blue Section), the "blast zone" distances will be reduced. After the reduction, this area will be adjacent to the "blast zone" and should more appropriately be referred to as a "buffer zone."

Agricultural operations (sugar cultivation) pose a potential hazard to the environment due to the potential for accumulation of toxic substances found in agricultural chemicals (fertilizers, pesticides and herbicides) in the environment. This hazard may be from accidents or from long run accumulations of "safe" applications. Also, sugarcane burning and fugitive dust concentrations from cane haul road traffic are potential hazards to the development. These issues are specifically addressed in *Section 2.1.8, Impact of Chemicals* and in *Section 2.1.11, Air Quality*.

IMPACT

The proposed project will include an industrial component of some 130 acres. The proposed industrial is intended to be developed under the I-1 and/or I-2 Industrial District of the Land Use Ordinance. Under the I-2 District, certain uses have the potential to generate industrial and hazardous wastes. Such uses require the processing of a Conditional Use Permit, where the environmental effects are examined. At the present time, it is not the intent to develop the site for such uses.

The proposed development will also contain a golf course which poses risks similar to the potential hazards from the existing agricultural operations. In the following Section (2.1.8), the impact of fertilizer, herbicide and pesticide use on the golf course is discussed. Also, refer to *Appendix F* for more detail. The golf course will serve as a buffer zone between the proposed residential area and the NAVMAG Lualualei Waikele Branch station boundary.

MITIGATION MEASURES

Flooding: Drainage facilities will be constructed to County standards. No special flood-proofing measures are necessary.

Earthquake: Structural designs will conform to Building Code requirements.

Naval Magazine Waikele Branch: No residential development will take place near the Naval Magazine. Instead, a buffer area

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consisting of an 18-hole golf course will separate the residential development from the Naval facilities.

Industrial Development: No noxious-type uses are intended. Appropriate covenants will be established to ensure that the uses intended for development in the industrial area are compatible with the other land use components of the plan. Appropriate setbacks, building designs and generous landscaping will be provided to ensure its compatibility with adjoining uses. The development is not expected to generate hazardous waste. If any hazardous waste is generated, it will be strictly managed in accordance with Federal regulations, 40 CFR part 260 to 270.

Golf Course Development: Following is a separate section dealing with the environmental impact of fertilizer, herbicide and pesticide use on the proposed golf course.

2.1.8 Impact of Chemicals

A study of the environmental impact of fertilizer, herbicide and pesticide use on the proposed golf course was performed by Charles L. Murdoch, Ph.D. and Richard E. Green, Ph.D. in November 1988. The report is attached as *Appendix F* and is summarized below.

The report includes an analysis of site factors such as geology, soils, topography, climate and hydrology as it may impact on the chemical movement, an assessment of the impact of chemicals applied to the proposed golf course as it may affect groundwater and runoff, wildlife, and air quality, and a comparison of the chemicals applied to the golf course versus those applied to the existing agricultural crops.

Following are tables on the fertilizer use rates for the different parts of a golf course and a typical pesticide program for an 18-hole golf course in Hawaii.

**Table 2-1
APPROXIMATE FERTILIZER USE RATES FOR
DIFFERENT AREAS OF A TYPICAL
18-HOLE GOLF IN HAWAII**

TYPE OF TURF	AREA (Acres)	FERTILIZER AMOUNT (lb.N/1000sq.ft.)	APPLICATION FREQUENCY	TOTAL ANNUAL APPLICATION (Tons N)
Greens	3	0.5	2 Weeks	0.85
Tees	3	1.0	3 Weeks	1.15
Fairways	50	1.5	8 Weeks	10.00
Roughs	30	1.0	3 Months	2.60
TOTAL	86			14.60

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Table 2-2

**A TYPICAL PESTICIDE PROGRAM FOR
AN 18-HOLE GOLF IN HAWAII**

TURF GRASS AREA	AREA (Acres)	CHEMICAL	FREQUENCY	RATE/ APPLICATION	ANNUAL TOTAL
I. HERBICIDES					
A. Greens	3	MSMA	6 times/year	2 lb.ai/acre	36 lb.ai
		bensulide	2 times/year	12 lb.ai/acre	72 lb. ai
B. Tees	3	MSMA	6 times/year	2 lb.ai/acre	36 lb.ai
		33 Plus	3 times/year	1 pint/acre	9 pints
		bensulide	2 times/year	12 lb.ai/acre	72 lb. ai
C. Fairways	50	MSMA	6 times/year	2 lb.ai/acre	600 lb.ai
		33 Plus	3 times/year	1 pint/acre	19 gallons
		metribuzin	2 times/year	0.75 lb.ai/acre	75 lb.ai
D. Perimeter Areas	20	glyphosate	3 times/year	1.5 lb.ai/acre	90 lb.ai.
II. INSECTICIDES					
A. Greens	3	chlorpyrifos	As needed	1 lb.ai/acre	Apprx. 18 lb.ai
B. Tees	3	chlorpyrifos	As needed	1 lb.ai/acre	Apprx. 18 lb.ai
C. Fairways	Spot Treatments	chlorpyrifos	As needed	1 lb.ai/acre	Apprx. 50 lb.ai
III. FUNGICIDES					
A. Greens	3	metalaxyl	As needed	1.3 lb.ai/acre	Apprx. 25 lb.ai
		chlorothalonil	As needed	8 lb.ai/acre	Apprx. 72 lb.ai
B. Tees	3	metalaxyl	As needed	1.3 lb.ai/acre	Apprx. 25 lb.ai
		chlorothalonil	As needed	8 lb.ai/acre	Apprx. 72 lb.ai
C. Fairways	Spot treatments	chlorothalonil	As needed	8 lb.ai/acre	Apprx. 250 lb.ai

IMPACT

Groundwater and Runoff

A principal concern is the potential for movement of applied chemicals to streams and eventually to shoreline waters by runoff or by leaching to groundwater with subsequent lateral transport. Recharge of groundwater from infiltration in the development area will be minimal due to the relatively low rainfall much of the year. Additionally, the organic matter in

Table 2-3: PROPERTIES OF PESTICIDES USED ON TURF IN HAWAII

Pesticide common name	Trade name(s)	Oral LD-50 (mg/kg body wt.)*	Toxicity to fish and wildlife*	Soil sorption Index (Koc)**	Water solubility (mg/l)**	Half-life in soil (days)**	Surface loss potential**	Leaching potential**
Herbicides:								
MMSA	Weedhoe etc.	1800	Low	10000	1000000	100	Large	Small
glyphosate	Roundup, Kleenup	150	Mod. to birds, none to fish	10000	1000000	30	Large	Small
meibuzin	Sencor	2200	Moderate	41	1220	30	Medium	Large
2,4-D	part of mixtures	370-700	High to fish	109	300000	10	Medium	Medium
meoprop	dito	700-1500	Low	3	660000	21	Small	Large
dicamba	dito	1000-2000	Non toxic to fish	80000	800000	14	Small	Small
oryzalin	Surflan	10000	Mod. to birds, toxic to fish	2700	2.5	60	Large	Small
oxadiazon	Ronsiar	8000	Toxic to fish	990	0.7	30	Large	Small
propyzamide	Kerb	5620-8350	Low	138	3.5	75	Medium	Large
simazine	Princep	>5000	Low	5000	0.5	30	Large	Small
chlorthal-dimethyl	Dacthal	>3000	Low	10000	25	60	Large	Small
bensulfide	Belasan, Belamec	770	Mod. to fish	10000	1000000	3600	Large	Small
parquat dichloride	Orlho Parazquat CL	150	Mod. to birds, none to fish	100000	0.1	30	Large	Small
benfluralin	Balan	10000	Low to birds, high to fish	11000			Large	Small
Insecticides:								
chloropyrifos	Dursban	135-163	High	6070	2	30	Large	Small
benidocarb	Ficam	40-156	High	229	40	7	Medium	Small
carbaryl	Sevin	400-850	Moderate	2	154000	27	Small	Large
trichlorfon	Dylox	450-630	Moderate					
Fungicides:								
azilazine	Dyrene	<5000	Low	3000	10	1	Small	Small
benomyl	Benlate	8590	Low	2100	2	100	Large	Small
chlorothalonil	Daconil 2767	>10000	Low to birds, mod. to fish	1380	0.6	20	Large	Small
prodione	Chlipo 26019 RP	3500	Low	500	13	20	Medium	Small
mancozeb	Dithane M-45	>8000	Low	1000	0.5	35	Large	Small
quinaltozone	PCNB, Terrachlor	12000	Non-toxic	1000	0.44	21	Large	Small
thiam	Tersan	7500	Low	383	30	20	Medium	Medium
tridemefon	Bayleton	568	Low	273	260	21	Medium	Medium
metlaxyl	Subdue	669	Non-toxic	16	7100	7	Small	Medium
thiophanate-methyl	Cleary 3336	7500	Low	1000	3.5	0	Small	Small

*Data from Hatrley, Douglas and Hamish Kid (Eds.). 1983. The Agrochemicals Handbook: Unwin Bro., Ltd. Old Working, Surrey, England

**Data from R. D. Wauchop. 1985. USDA-ARS Interim Pesticide Properties Database, Version 1.0.

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these soils (approximately 2% organic carbon) will tend to retard movement of most pesticides below the A horizon. Removal of topsoil during development should be limited as much as possible because the topsoil is the zone of high organic matter content, high biological activity and high sorption of applied chemicals; surface soils reduce the movement of chemicals from the site of application. The two principal soils (Wahiawa and Lahaina) have relatively deep profiles (more than 36 inches) which will retard vertical movement of applied chemicals to subsurface waters and provide an opportunity for biological and chemical degradation. While leaching of pesticides is unlikely on these deep soils, over-irrigation combined with over-application of nitrogen fertilizer could result in leaching of nitrate nitrogen. Nitrate leaching can be avoided by careful management of both irrigation and nitrogen fertilization. This fact is recognized by Golf Course Superintendents as it is in the interest of both management economics and environmental quality to use no more water and fertilizer than is required for good growth of turfgrass.

In general, a properly developed and managed golf course should not represent a threat to the quality of either groundwater or surface drainage waters in the project area. The quantities of both fertilizers and herbicides used on a typical 18-hole golf course are less than are used on a comparable area of sugarcane, which has proven to be an environmentally acceptable economic crop for this area.

During the public review period of the DEIS, the Applicant was advised by the State Department of Health (DOH) that the Department has recently established eleven (11) conditions applicable to new golf course developments designed to protect groundwater resources. Subsequently, following our response to the comment letter, the Applicant was further advised by DOH that it is essential that a groundwater monitoring program be instigated by the owner/developer. DOH letters and our responses are included in Section 12 of this document. In summary, the Applicant will work closely with the DOH in the design, development and maintenance of the golf course to ensure that groundwater resources are not contaminated, and that the eleven (11) conditions are met.

With reference to chemical uses on the 16-acre park, staff from the Department of Parks and Recreation noted that all federal and state requirements will be followed to ensure groundwater resources will not be affected by the development and maintenance of the park. Impact of fertilizers and pesticides used on lawns and gardens in the residential areas were not assessed since basic information on areal extent, nature of chemicals used and recharge estimates are not known at the present time.

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Air Quality

a. Golf Course Chemicals

Most herbicides and pesticides used on golf courses are of relatively low mammalian toxicity, ranging from hundreds to several thousand mg/kg body weight (Table 2-3). Because they are not highly volatile and are applied in dilute sprays (50 to 100 gallons of spray solution per acre) to open areas, there is little likelihood of volatility once the pesticides are applied. The greatest danger of significant airborne concentrations of pesticides is from aerial application. Golf course pesticides are applied with ground spray equipment. Boom height of spray equipment is less than one meter. Low spray pressures (20 to 40 psi) and coarse spray droplets further reduce the hazard of airborne fine droplets. Droplets larger than 100 micrometers diameter are not highly subject to drift. Table 2-4 illustrates the effect of spray droplet size on spray drift.

Most of the spray volume from typical flat-fan nozzles used in agricultural spray equipment is from droplets larger than 100 micrometers. Table 2-5 below shows a typical distribution of droplet sizes for a flat-fan nozzle (the type used in most golf course spray equipment).

Table 2-4

**RELATIONSHIP BETWEEN SPRAY DROPLET SIZE AND
SPRAY DRIFT BASED ON DROPLETS
FALLING 10 FEET IN A 3 MPH WIND**
[From Hofman et al. 1986]

DROPLET SIZE RANGE (Micros)	—PERCENT OF— —SPRAY VOLUME—	
	20 PSI	40 PSI
0-21	0.1	0.4
21-63	3.0	10.4
63-105	10.7	20.1
105-147	16.2	25.4
147-210	36.7	35.3
210-294	27.5	7.7
>294	5.8	0.7

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147-210	36.7	35.3
210-294	27.5	7.7
>294	5.8	0.7

Table 2-5

**DROPLET SIZE RANGE FOR A TYPICAL FLAT-FAN
 NOZZLE AT 20 AND 40 PSI.**
 [From Hofman et al. 1986]

DROPLET SIZE RANGE (Micros)	-----PERCENT OF----- -----SPRAY VOLUME-----	
	20 PSI	40 PSI
0-21	0.1	0.4
21-63	3.0	10.4
63-105	10.7	20.1
105-147	16.2	25.4
147-210	36.7	35.3
210-294	27.5	7.7
>294	5.8	0.7

At the low concentrations used in pesticide application, this would not result in significant quantities of pesticides being carried downwind. High wind speed would increase the likelihood of drift of fine spray droplets, however, because high wind speed distorts spray patterns and results in poor pesticide coverage; spraying in periods of high wind is not common practice. Table 2-6 below shows the percent of spray application volume deposited at 4 and 8 feet downwind and the distance downwind for the volume to drop to 1% or below

Table 2-6

**PERCENT OF SPRAY VOLUME DEPOSITED AT 4
 AND 8 FEET DOWN SIDE AND THE DISTANCE
 IN FEET FOR THE VOLUME OF SPRAY SOLUTION TO DROP
 TO 1% OF THE TOTAL SPRAY VOLUME**
 [From Hofman et al. 1986]

NOZZLE PRESSURE (IN.)	WIND SPEED (PSI)	WIND SPEED (MPH)	--PERCENT-- --DEPOSITED--		DISTANCE TO DROP TO 1% OF VOLUME
			4 FT.	8 FT.	
14	40	3.5	3.1	0.6	7.0
27	40	3.5	5.9	1.5	13.0
18	30	5.3	9.3	2.2	14.0
18	25	9.9	10.3	3.1	15.5
18	40	9.9	9.1	3.6	17.0

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for flat-fan nozzles under different conditions. Even under high wind conditions (almost 10 mph) and spraying to 40 psi, the distance downwind at which 1% or less of the total spray volume was deposited was only 17 feet.

To facilitate spray operations and to comply with label instructions of some pesticides, spray applications are only made in later afternoon or early morning hours when golfers are not on the golf course. This reduces the risk of exposure of people to airborne spray particles. Sufficient buffer space with tall vegetation between the golf course and housing sites and facilities (such as the clubhouse) which will be used by people will further reduce the chance of exposure to airborne pesticide particles.

In the preparation of this Final EIS, a comment letter was received from the State Public Work Engineer (February 14, 1989) regarding what impacts the spraying of pesticides and herbicides on the golf course would have on school children or staff, or on people using the park. Our consultant, Dr. Charles L. Murdoch (University of Hawaii) studies this issue and concluded that there will be no effect of pesticide sprays on the school children or staff, or on people using the park. The comment letter and our full response is included in *Section 12* of this document.

The greatest danger of airborne pesticides is to the applicators of pesticides themselves. Mixing of wettable powder formulations and being in close proximity to airborne spray particles, particularly when operating spray equipment in a downwind position, places spray operators in particularly vulnerable positions. EPA and OSHA have strict standards which specify that spray operators wear appropriate protective clothing and breathing apparatuses.

b. Agricultural Chemicals

The potential for adverse impact of agricultural chemicals used in sugarcane culture in the vicinity of the project on the environment of the development area was assessed by Richard E. Green, Ph.D. and Charles L. Murdoch, Ph.D. in May 1989. The assessment was undertaken as a result of comments received during the public review period of the Draft EIS. The report is included in this document as *Appendix L* and is summarized below.

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In the Kunia area, Oahu Sugar Company applies all herbicides by ground sprayers which minimize drift off the field. Fertilizers are applied to the soil at planting or through drip irrigation system, so that drift of fertilizers is not a factor. Treatment of seed pieces with fungicide is done prior to planting with no associated drift problems.

The greatest potential for drift are chemicals which are applied by aircraft. In the Kunia area, the only chemicals applied by aircraft is Polado (glyphosate). It is applied only once during a crop cycle and to only one field at a time. The study found that Polado should be of no danger to humans or animals at rates used for sugarcane ripening. Any negative impact of drift would likely be upon sensitive plants receiving spray drift. Standard plantation practice is to spray only when wind velocity is low.

Wildlife

The fertilizers, herbicides, and fungicides used in golf course maintenance pose little or no hazard to birds frequenting the grassed areas of ponds associated with golf courses. Fertilizers are relatively non-toxic unless ingested in large amounts. All herbicides and fungicides used in golf course maintenance in Hawaii are of low to moderate toxicity (see *Table 2-3*). The only chemicals used in golf course maintenance in Hawaii which are highly toxic to birds are the organic phosphate insecticides, especially chlorpyrifos.

Although chlorpyrifos is toxic to birds, it is strongly absorbed on the thatch layer of turf and moves little from the site of application. One reason for its weakness in controlling soil insects is the inability to get the insecticide through the thatch layer to the depth needed to contact these pests. Recent studies (Sears and Chapman, 1980; Tashiro, 1980) have shown that chlorpyrifos applied to turfgrasses does not penetrate more than 2 to 3 centimeters in the soil. In addition to resistance to movement in the soil, it has been shown that it is rapidly degraded in the soil, both by hydrolysis and microbial action (Miles et al. 1979).

Because of the absorption of organic phosphate insecticides on organic layers in turf and their rapid break down, there is little chance of their movement from grassed areas into the ponds associated with the proposed golf course. Label instructions for application of these pesticides (which turfgrass managers are required by law to follow) specifically prohibit their direct application to streams and ponds.

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driven by long range demographic changes which anticipate that the average of Hawaii's population will increase from 31 years in 1986 to 37 years by the year 2010.

The market assessment estimates that by the year 2010 average household size will be 2.5 persons per unit based on regression analysis techniques and that the ratio of population to occupied housing units will reach 2.7 persons.

3. Non-Residential Use of Housing Stock

Between 1970 and 1983 the percentage of vacant residential units (vacant - defined as not occupied by a member of the resident population) has ranged from 5.2% to 6.8%. While some vacancy of residential housing units is a normal phenomena which includes units for rent and units held vacant for sale or new units completed awaiting occupancy, on Oahu "vacancy" is further increased by the use of residential units as transient rental units. In fact, approximately 50% of the "vacancy" is due to transient rental units. Given the projected growth in tourism to the year 2010, this relationship of "vacant" units is expected to be maintained.

4. Governmental Policies

State and City policies aimed at increasing the supply of housing units in order to achieve desirable social and economic goals including a vacancy rate of 5% to insure a healthy housing market and policies directed at increasing affordability argue for an increase in demand at least in the short and mid range due to the necessity to increase the housing stock in order to achieve the stated goals.

SUPPLY OF FUTURE HOUSING UNITS

The supply of residential units actually developed to meet the demand will depend on a number of factors.

1. Governmental Approvals

Residential unit development requires that the proper land use approvals are in place which permit the development of residential units. As of the end of 1987 the Department of General Planning

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indicated that approximately 70,000 units had at least City development plan approval to proceed. Another 5,000 units at Kapolei Village had direct legislative approval to proceed and approximately 20,000 additional units had Land Use Commission approval. Thus, approximately 95,000 units had achieved at least one major governmental approval.

2. Other Factors Impacting Supply

There are a number of factors which tend to limit the supply including the following.

a. Normal Development Risks

Developers like others in private business are subject to any number of risk factors including, economic downturns, business reverses and changing interest rates. The financial condition of individual developers impact the ability to carry on the development.

b. Social and Political Changes

Development of individual residential parcels may be impacted by social or political concerns which arise over the long term. Numerous examples of these changes have occurred in the recent past, including, Date Laau, Salt Lake IDC, and Save Sandy Beach.

c. Long Range Projects

Most of the developments planed for the Ewa and Central Oahu areas are long term planned communities. In the past planned communities have required over twenty years to complete. Thus a number of the developments which have been approved or will be approved in the future may require more than twenty years to complete.

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ESTIMATED SHORTFALL OF RESIDENTIAL UNITS BY 2010

Total demand for residential units assuming a population to household size of 2.7, a continued 6% "vacancy" factor composed primarily of transient occupied units and an increase in the normal vacancy rate to 5% would result in a total demand of 407,000 residential units by 2010. The total supply composed of the 1987 estimated housing stock of 273,000 units, 95,000 units with at least on major governmental approval and a 9,500 deduction for units remaining unbuilt by the year 2010 results in a total estimated supply of 358,000 by 2010. Thus the increase in residential units is estimated at 134,000 by the year 2010 or 5,800 per year between 1987 and 2010 (See *Table 1-1*). Based on the estimated supply of units till 2010 there will be a shortfall of approximately 49,000 units or 2,100 units per year.

CENTRAL OAHU-DESIRABILITY AS A RESIDENTIAL LOCATION

The Central Oahu development plan area has provided more residential units than any other development plan area other than the primary urban center (PUC). It has also shown the largest percentage growth during the past 11 years with a 44% gain compared to the second highest gainer the PUC 17%. Thus the Central Oahu area has shown itself to be attractive as a residential area. It is the second largest residential area behind the PUC and according to Department of General Planning is expected to maintain that status at least through the year 2010.

DISTINGUISHING CHARACTERISTICS OF THE ROYAL KUNIA PHASE II PROJECT.

The market assessment has identified an approximately 49,000 unit shortfall by 2010 on Oahu even including eleven major developments in the Ewa and Central Oahu development plan areas. Market studies undertaken for these developments have shown that the Central Oahu and Ewa areas are: (1) Acceptable locations for housing from the consumers point of view; (2) Permit development at reasonable costs; (3) Have access to existing or planned infrastructure; and show that their projects are viable and reasonable. The Royal Kunia, Phase II development offers an opportunity to meet a portion of the identified housing needs by timely delivery of new units based on the following factors:

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TABLE 1-1

Summary of Housing Unit Shortfall 1987 to 2010
 Island of Oahu
 December 1988

Assumptions		Source				
Population 2010	999,500	Series M-K Final Projections DBED October 1988				
Persons Per Household	2.7	Consultant Estimate				
Unoccupied Units	6%	Characteristics of Housing Inventory 1970-1983, U.S. Census				
Desired Increase in Vacancy Rate	3%	Desirable Vacancy Rate 5% per Hawaii State Plan (Draft) 11/88				
Demand Computations						
Population/Households	370,185	Resident Population/Household Size (999,500/2.7)				
Normal Vacancy	25,913	Households/Normal Vacancy (370,185/1.06)				
Vacancy Increase	<u>11,106</u>	Households/Desired Increase in Vacancy (370,185/1.03)				
Total Demand	407,204	Sum of Demand Factors				
Supply Computations						
Existing Inventory (1987)	273,054	Dept. of General Planning "Development Plan Status Review: Sept. 1988				
Housing Capacity	70,000	Dept. of General Planning "Development Plan Status Review: Sept. 1988				
Kapolei Village (HFDC)	4,871	Special Legislation 4/88 Exempts Project from County Approval				
Approved by LUC						
	<table border="1"> <tr> <td>Ewa</td> <td>2,554</td> </tr> <tr> <td>Central</td> <td>17,217</td> </tr> </table>	Ewa	2,554	Central	17,217	
Ewa	2,554					
Central	17,217					
	19,771	Consultant Estimate				
Deduction for Timing (10%)	<u>(9,464)</u>	Consultant Estimate				
	<u>358,232</u>	Sum of Supply Factors				
Estimated Shortfall	<u><u>48,972</u></u>	Sum of Supply and Demand Factors				

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The likelihood of bird injury by pesticides used in maintenance of the proposed golf course can be reduced by proper application of pesticides with reduced toxicity to birds. *Table 2-3* shows that carbaryl and trichlorfon are less toxic to birds than chlorpyrifos. In most cases these insecticides may be substituted for chlorpyrifos with little loss of effectiveness.

Golf courses are excellent habitats for birds. As far as we are aware, there have been no reported incidents of bird kill in Hawaii from chemicals applied in golf course management. Waterfowl and fish appear to thrive in ponds and water hazards on golf courses in Hawaii. Many golf courses cultivate white amur fish in the ponds to control algae. Mosquito fish are generally stocked to prevent mosquito problems. We are aware of no incidents of fish or waterfowl injury from chemicals applied to golf courses.

The labeling of herbicides and pesticides by EPA for particular uses enforced by the Hawaii Department of Agriculture, is perhaps assurance of protection of humans and wildlife from their hazards. All pesticides must be applied in compliance with federal and state laws regulating their use. Hazards to both humans and wildlife are included in the decision to label a pesticide for specific uses, including use on golf courses, and in developing regulations on allowable application procedures of the pesticide for various uses.

Golf Course Versus Sugarcane

Golf course management is much more intense than sugarcane management. At first glance it would appear that more fertilizers are being applied to golf course than to sugarcane because of the higher application rates to turfgrass. After close examination, however, it is shown that, because only a small portion of the area is fertilized, total fertilizer use will be similar. If sugarcane culture uses 300 pounds of N per acre for one year of the two-year growing cycle, this results in about 30 tons of N for the 2 years. Golf course culture, as shown in *Table 2-1* above, requires approximately 14.6 tons of N each year. For a two year period about 29 tons of N would be applied in golf course fertilization.

Because the area treated with pesticides on a golf course is small, the total amount of pesticide applied is relatively small also. The pesticides used in golf course management are mostly of very low toxicity (*Table 2-3*). Most are either rapidly degraded in soil and/or sorbed tightly to organic matter or soil colloids and move little from the site of application.

Turfgrasses are relatively permanent. Once an area is established, it is not cultivated with the associated erosion that occurs when sugarcane fields are cultivated for replanting. In

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fact, the presence of a large turfed area, such as the proposed golf course, would reduce the sediment load entering the drainage way and eventually Pearl Harbor.

While the recent adoption of drip irrigation in most sugarcane production (including that in the area of the proposed golf course) has resulted in more efficient water use, and therefore less recharge, sprinkler irrigation of turgrasses is even more efficient. By proper management of water, there should be minimal recharge because of the evapotranspiration deficit discussed previously.

SUMMARY AND CONCLUSIONS

Mismanagement of chemicals and/or irrigation water applied to the turf on the golf course could conceivably result in their reaching groundwater by leaching or the shoreline by storm runoff. The groundwater aquifer in this area will likely be used as a source of potable water, thus it is especially critical that chemicals applied in the management of the golf course not reach groundwater. Analysis of the site and management factors suggests that, with appropriate golf course development and management practices, there will be no significant adverse environmental or ecological consequences resulting from the use of herbicides, pesticides and fertilizers on the proposed golf course.

The following items support the conclusion:

1. Among the fertilizer elements, only nitrogen in the form of nitrate could possibly diminish water quality, but with proper management of nitrogen fertilizer and water leaching will be minimal, since turfgrass roots are excellent scavengers of nitrate. Phosphorus sorption is high in these soils, so that movement of P from the site of application is not a problem.
2. Runoff amounts will be negligible on the permeable, relatively level Wahiawa and Lahaina soils, especially after establishment of a turfgrass cover. Since rainfall, storms causing runoff from the golf course would result in massive quantities of water in intermittent streams fed from off-site. Thus runoff from the golf course will be highly diluted, so that any negative impact of transported chemicals on local streams or on coastal waters is most unlikely.
3. Leaching of pesticide chemicals to groundwater is not expected to be a concern because of the organic carbon content (approximately 2%) of the surface

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soils and relatively deep profiles. Natural recharge is negligible in this area of relatively low rainfall and high evapotranspiration, and the pesticides used are highly sorbed and/or rapidly degraded under moist soil conditions.

4. The chemicals applied in golf course management pose little hazard for birds or wildlife. Fertilizers are relatively non-toxic unless ingested in large amounts. With the exception of chlorpyrifos, the pesticides are of low toxicity to birds.
5. There will be no significant adverse effects on air quality from application of herbicides or pesticides in golf course management provided that appropriate application techniques are used. The spray equipment used in golf course maintenance is ground-operated. Nozzle heights are typically less than 2 feet. Low spray pressures and coarse nozzle openings result in relatively large droplet sizes which are not highly subject to drift.

MITIGATION MEASURES

- Irrigation management is critical to the conclusions reached above. For this reason it is recommended that a U. S. Weather Bureau class A evaporation pan be used to measure evaporation and schedule irrigation application in the management of the proposed golf course. Excellent discussion of irrigation scheduling can be found in the book *Golf Course and Grounds Irrigation and Drainage* (Jarret, 1985).
- Where grading is necessary, topsoil should be stockpiled and replaced over the areas to which chemicals will be applied; the high organic matter surface soils will retard pesticide movement.
- Judicious use of fertilizers and pesticides, especially in the early establishment of turf, is essential, since pesticides and nitrogen will be more likely to move before an extensive root system and thatch layer are developed.
- A qualified Golf Course Superintendent be given the responsibility of managing the golf course.
- Compliance with the eleven (11) conditions established by the State Department of Health to protect groundwater resources from new golf course development.

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2.1.9 Noise

Existing sources of noise in the project site include vehicular traffic along the cane haul road and Kunia Road. Noise has not been a concern with the existing Village Park residents, located approximately one-mile makai of the site.

IMPACT

Reaction to noise differs from person to person. The most common complaints include:

- Interference with rest and recreation
- Interference with speech communication
- Interference with radio, music, and television listening
- Interference with sleep

The severity of the impact is function of the following factors:

- Frequency and amplitude of the noise
- Loudness and duration
- Time of occurrence (day, evening, night)
- Number of occurrences per day
- Ambient noise levels
- Activity the person happens to be engaged in which the noise intrusion occurs
- Health and noise exposure history of the person

Because approximately 10% of the population is apparently supersensitive and would object to any noise (except that of their own making), complaints would be expected under any conditions. On the other extreme, approximately 25% of the population tolerate noise at any level. The remaining 65% generally do not complain until the indoor noise level exceeds 56dbA for more than 10% of the exposure time. This means, for light weight structures such as those found in Hawaii, the outdoor L10 value should not exceed 66dbA. For concrete and masonry structures, the outdoor L10 noise level can be as much as 79dbA. Complaints can expect to increase rapidly as the noise level exceeds these limits.

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Potential sources of noise in the area include vehicular traffic along Kunia Road, cane haul roads, golf course and recreational areas, and the noise potential from the industrial area.

Cane Haul Roads: The existing cane haul roads on the site will be rerouted to the area mauka of the project. Coordination with Oahu Sugar Company will ensure that the rerouting will take into consideration the development of the project.

Kunia Road: Most of the Kunia Road frontage will be for industrial development, which will buffer the noise from the residential development. Where the residential development adjoins Kunia Road, appropriate setbacks and landscaping will be introduced to buffer the noise.

Industrial Area: There is a potential for noise generated in the industrial areas to impact the adjacent areas planned for apartment use. The residential areas are not expected to be impacted since they are buffered by the apartment development. Restricted covenants will be designed to ensure a compatible relationship between the industrial uses and the other components of the project.

Golf Course/Recreation: A 16-acre public park and an 18-hole golf course is proposed for the project that may generate noise which will impact the residential areas. The applicant believes that the noise impacts of these facilities on residential areas will be minimal and that numerous mitigating measures are available.

MITIGATION MEASURES

Industrial Noise: The applicant will follow all City and County and State laws and regulations relating to noise. In addition the applicant will follow City Ordinances relating to the separation of industrial and residential districts. Current ordinances (Land Use Ordinance) require special setbacks, solid walls and landscaping where uses in the industrial district adjoins uses in residential and apartment districts. In certain instances, uses are restricted within the industrial district where there is an abutting residential and/or apartment district. In addition, the applicant intends to develop restrictive covenants for the industrial development which will ensure a harmonious relationship with the residential and apartment development in close proximity, including restrictions on noise, and other items incompatible with such developments.

Recreation Noise: The primary mitigating measure will be in facilities design. For the golf course and clubhouse, the siting of the clubhouse facilities, their orientation and the location of the tees and greens on the course will have a major impact on

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the potential noise impact of the facilities. The siting and design, as well as the landscaping, will be major considerations during the design phase of the golf course complex. Selection of maintenance equipment which includes noise minimization features can also mitigate against noise impacts. In addition, the scheduling of maintenance operations and golf activities can also be done to minimize noise impacts.

The same mitigation measures as apply to the golf course also apply to the park area. The development will have a community association which will be a forum for balancing the needs of residents for recreational activities with those of the nearby residents for minimal noise impacts. This organization will assure that the rules and regulations governing the various recreational facilities of the development will continue to meet the needs of the community that they serve.

2.1.10 View Assessment

The Royal Kunia, Phase II project is a proposed 669.9 acre development located mauka of the existing Village Park development in Central Oahu. The project site will be accessible from Kunia Road from which two major entry roads will provide the primary ingress and egress to the development.

REGIONAL CONTEXT

The project site is part of the broad central plain stretching between the Waianae mountains and the Koolau mountains and links the Pearl Harbor basin area to the North Shore. This central plain rises from near sea level at Waipahu at a gradual and moderate rate, reaching an upper elevation of 575 feet near Wahiawa and Schofield Barracks. It then gradually descends down again to near sea level at Haleiwa.

As a gentle sloping plain, the area is not noted for its landmark features or other natural elements of visual significance. Rather it is the distant views of the mountain ranges and the seemingly endless miles of agricultural land that characterize the visual experience when driving through the area on Kunia Road and Kamehameha Highway.

KUNIA ROAD

The Kunia Road portion of this drive is flanked on both sides with sugar cane at the lower elevations and pineapple at the upper elevations. This agricultural use provides a sense of openness and public views to the west focus on the steep slopes of the Waianae mountains as seen when traveling in either a mauka or makai direction. The makai direction also provides very distant views of the Honolulu area and the southern shoreline of Oahu. These distant views however are

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intermittent due to blockage from road embankments, tree masses and the height of the sugar cane. Due to the great viewing distance (approximately 19 miles) very little detail is distinguishable and therefore this view plane is of minor significance and not noted in any visual inventory of record.

The lower portions of Kunia Road is distinctly non-agricultural due to the H-2 Freeway and the Village Park development. It has a lowrise residential character, landscaped with ornamental plant material and suburban type intersections and roadways connecting to Kunia Road.

This character may be representative of the Royal Kunia, Phase II development, replacing the agricultural (sugar cane) crops currently occupying the site. While it will create a distinct visual difference, there are no significant public views or visual features that will be impacted and it will instead extend the urban character already established through the Village Park development.

MAUKA VIEWS

Mauka views from Waipahu town were studied. Similar to Village Park, the Royal Kunia, Phase II development will be visible from most of Waipahu when viewing in a mauka direction. Due to the scale of the residential structure, the impact will not be a particular house or structure but the overall development imposed against the agricultural background.

This mauka viewing however is not a significant viewing direction and is not identified in any visual inventory of record.

MITIGATING MEASURES

Kunia Road- The visual character along Kunia Road may be substantially mitigated by maintaining a substantial landscaped setback along the roadway. This measure is particularly important for the industrial uses proposed in the development. It is not the intent of this measure to preserve the "agricultural" character but to instead buffer the proposed development with a "soft" landscaped edge and insure visual compatibility between the current agricultural character and the proposed development.

Mauka Views- The incorporation of large bodies of open space (such as the proposed golf course) and street tree plantings within the development (residential and industrial area) will have substantial mitigative effects in minimizing the overall impact of the development when viewing in a mauka direction.

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In addition to landscaping other mitigative techniques include variation to residential building colors and roof lines to add visual texture to the overall development.

Makai Views- In addition to the landscaped setback along Kunia Road, industrial building adjacent to Kunia Road should be kept low with additional screening provided with solid walls in conjunction with an approved thematic landscape planting.

Views from the house lots into the Pearl Harbor basin may become an attribute, however such views are non-public and will be addresses through the developer's master planning efforts and convenents.

2.1.11 Air Quality

This Section incorporates a Revised Air Quality Study undertaken in response to comments received during the public review period of the Draft EIS. The Revised Air Quality Study has been expanded in scope to include impacts associated with industry emissions, electrical generation, solid waste disposal, sugarcane burning and cane haul road usage, in addition to the impacts associated with construction activities and vehicular emissions. Because the expanded scope was beyond the expertise available at Parsons Brinckerhoff Quade and Douglas, Inc., the study was prepared by Barry D. Root and Barry D. Neal in June 1989 and replaces the initial Air Quality Study prepared by Parsons for the DEIS. The revised report is included in this document as *Appendix B* and is summarized below.

EXISTING CONDITION

Except for occasional dust and smoke from nearby agricultural operations, the present air quality of the project area is relatively good. Air quality data from nearby monitoring stations operated by the State indicate that air quality standards are currently being met.

IMPACTS

It is inevitable that some short- and long-term impacts on air quality will unavoidably occur either directly or indirectly as a consequence of project construction and use.

Short-term impacts from fugitive dust would likely occur during project construction phase. To a lesser extent, exhaust emissions from stationary and mobile construction equipment and from workers' vehicles may also affect air quality during the period of construction. State air pollution control regulations require that there be no visible fugitive dust emissions at the property line.

After construction, long-term impacts on air quality could occur directly from emissions emanating from industries located and

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operating at the proposed industrial area and indirectly from air pollutants emitted by vehicular traffic coming to and from the development. Since the specific industries that would be located at the project have not been determined, quantitative estimates of any direct air quality impacts from the industries locating there cannot be made. However, based on the types of industries permitted in the I-2 zoning district, most of the industrial park residents would likely emit little or no air pollution.

Vehicles coming to and from the proposed project will use Kunia Road and the project collector roads. To assess the impact of emissions from these vehicles, an air quality modeling study was undertaken to estimate current ambient concentrations of carbon monoxide along Kunia Road and to predict future levels both with and without the proposed project. The EPA computer model MOBILE3 was used to calculate vehicular carbon monoxide emission estimates for each of the years studied. The data were then input to the computer model CALINE4 to simulate vehicular movement and atmospheric dispersion of vehicular emissions. Input meteorological conditions for this study were defined to provide "worst-case" results.

Present carbon monoxide concentrations were established to be well within national ambient air quality standards but may occasionally exceed the state standard during adverse conditions near the Kunia Road/South Kupuna Loop intersection. In the year 1999 without the project, concentrations were predicted to increase due to the increase in traffic associated with Phase I of the Royal Kunia development. Worst-case concentrations levels would occasionally exceed the state standards in small "hot spot" areas near Kunia Road intersections, while the national standards would be met. For the 1999 with project scenario, maximum concentrations would likely exceed both the state 1-hour and 8-hour standards in isolated areas near Kunia Road intersections but would remain within the national standards.

Long-term, indirect impacts are also possible due to the project's electrical power and solid waste disposal requirements. Quantitative estimates of these potential impacts were not made, but based on the estimated emission rates involved, the attendant impacts are expected to be small.

In addition to investigating the potential impacts of the project on the surrounding environs, the reverse problem of the impacts from the surrounding area onto the project was examined. In this case, the primary concerns are smoke and dust from sugarcane operations. Worst-case analyses indicate that emissions from sugarcane burning could exceed state and/or national air quality standards for both particulate

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matter and carbon monoxide for a distance of about one-mile downwind of the fire. Thus, it would not be advisable to burn nearby fields during periods when the wind direction would carry the smoke over the proposed development. It may also be appropriate to forewarn potential residents of the possibility of occasional smoke problems. Fugitive dust concentrations within the project residential areas from haul road traffic should not be a problem as long as haul roads are paved and kept reasonably clean and a separation distance of about 1000 feet is maintained.

NOTE: For a discussion on the impact of chemicals (used on golf courses and in sugarcane operations) on the environment, please refer to *Section 2.1.8* and *Appendices F and L*.

MITIGATIVE MEASURES

Short-term construction impacts to air quality can be mitigated by an effective dust control plan to ensure compliance with state regulations. Fugitive dust emissions can be controlled by watering of all active work areas and by covering of open-bodied trucks. Paving and landscaping early in the construction schedule will also reduce emissions.

Although quantitative estimates of any direct air quality impacts from industries locating in the industrial area cannot be made since specific industries have not been determined, it is noted that before any air pollution source locates at the site, state permits to construct and to operate must be obtained. At the time of permit application, an air quality impact assessment of the proposed source's emissions may be required.

National CO standards can be met, however, some exceedances of the state's 1-hour and 8-hour standards are predicted in certain "hot spot" areas under a "worst case" situation. Encouraging mass transit use and carpooling and improving road design could reduce vehicle emissions. Increasing bus service and promoting carpooling could reduce concentrations by about 10 percent.

Oahu Sugar complies with State Department of Health controls for burning sugarcane. These controls ensure that burning is undertaken during favorable wind conditions. In addition, the project design will provide for an adequate fire break between the sugarcane and any structures. Potential residents of the project area will also be made aware of the sugarcane operations. A separation distance of about 1000 feet will be maintained between the paved cane haul road and the residential areas of the project.

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2.2 SOCIO-ECONOMIC

2.2.1 Social Impact Assessment

A social impact assessment was prepared by Earthplan for the development of Royal Kunia, Phase II. The assessment describes the social context in which the Royal Kunia, Phase II is proposed, and identifies potential social impacts of the proposal, including community issues and concerns. Discussed below is a description of the existing impact on the community, and an identification of community issues through interviews with various residents of the area.

The social impact assessment dealing with schools/parks/police and fire protection/health care and other services are discussed in the appropriate sub-sections of *Section 2.3*. The complete social impact assessment report is presented in *Appendix J*.

DESCRIPTION OF THE EXISTING COMMUNITY

Central Oahu and Ewa

The proposed project is situated in westernmost portion of the Central Oahu Development Plan Area and borders the Ewa Development Plan Area. In the 1970s, Central Oahu was the fastest growing area on the island. The nearby Ewa Development Plan Area also experienced much growth in the 1970s, but its population is still small compared to Central Oahu. Central Oahu continued to grow in the early 1980s.

The 1980 census shows that, when compared to the islandwide population, Central Oahu and Ewa had younger populations. Both regions tended to have higher percentages of people from "different state," and Central Oahu's has more people "different country." Less people completed 4 years of college. Both regions are more family-oriented. Central Oahu and Ewa had mean family incomes below Oahu's average; Central Oahu, in particular, had a relatively high percentage of people below poverty level.

While both regions had high unemployment rates, Ewa's was particularly high. Both regions had lower proportions of people in managerial and professional jobs. Ewa shared this latter characteristic, but also had more people in service, agriculture, and labor-related jobs.

Waipahu as a Whole

Of all the Neighborhood Board area, Waipahu experienced the largest population increase between 1980 and 1985.

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When compared to the islandwide community and the Central Oahu and Ewa regions, Waipahu was the "youngest" community. Residents were more mobile (in terms of "same house") than the larger Central Oahu, but less so when compared to the islandwide community. Waipahu had only seven percent of people completing 4 years of college. This is lower than Central Oahu, and Ewa, both of which were, in turn, lower than Oahu averages. Waipahu was even more family-oriented than the larger regions. The family median income was slightly lower than Oahu's median income, and is thus similar to Central Oahu and Ewa. Like Central Oahu, Waipahu residents tended to be employed in jobs which were less-paying than managerial and professional jobs.

Waipahu Town and Mauka Communities

Waipahu has two fairly distinct areas - the town below the freeway (called "Waipahu Town" in this report) and the mauka residential communities of Crestview/Seaview, Waipio-Gentry and Village Park. The town's population has been stabilizing over recent years; the mauka population has tripled in numbers in just the first five years of the 1980s.

Both the town and the mauka areas have young populations. Most of the mauka residents in the new developments were from another part of the island. Waipahu Town has higher proportions of people who live in different countries, or different states.

Mauka residents tended to have completed more formal education than Waipahu Town residents. Residents of both Waipahu Town and the mauka communities are relatively family-oriented. Waipahu Town had lower mean family incomes and a significantly higher percentage of families below poverty. That area also had a high unemployment rate; the mauka communities had very low unemployment rates.

Current Waipahu Issues and Concerns

In a 1982 survey, Central Oahu and Waipahu Town residents identified the "need to keep Oahu Sugar Company" and the need for more "housing that families making less than \$40,000 can afford" as top priorities. There was a distinct lack of concern about more "high quality housing." Over three-quarters of the respondents felt that "Many of Waipahu's important problems can be solved by well-planned growth."

In a 1988 survey, Waipahu residents reacted to the increasing number of care homes in the area, and traffic was no longer "not a problem." Complaints about airplane noise were expressed. Two-thirds of the respondents favored rapid transit.

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Waipahu community leaders believe that much of their current needs and problems are related to a perception that this is a relatively poor community. Waipahu community leaders want to change this identity. They feel that most of the mauka communities do not necessarily share the problems of Waipahu Town and, consequently, they support similar developments. Waipahu appears to welcome new developers because they feel this will create a more diverse community. An ongoing effort among Waipahu leaders is supporting General Plan amendments allowing further development, and thus more people.

On a day-to-day basis, many of Waipahu's needs and values are reflected in the workings of the Waipahu Neighborhood Board. Major topics addressed by the Board included:

- adding much-needed public facilities, including a civic center, library and a police sub-station;
- reducing the number of care homes and halfway houses, particularly those that are unlicensed;
- support for current public plans for fixed rail rapid transit, in the hopes that traffic problems will be alleviated;
- solving current parking- and pedestrian-related problems;
- beautification efforts; and
- increasing police protection services.

The Board supported virtually all of the public-sponsored proposals, except for Waiola Estates which is still being studied. Residential developments which were privately-sponsored were also supported.

VILLAGE PARK - THE NEARBY NEIGHBORHOOD

Village Park comprises primarily single-family detached houses on an average lot of 4,000 square feet. The community has 1,806 housing units, 120 of which are townhouse units. The completion rate of Village Park's housing component accelerated over the last three years, mostly because of reductions in interest rates. Further, Village Park selling prices increased, as did the housing absorption rate. These price increases were due to large units, upgraded products and design changes.

Village Park was designed for the first-time homebuyer. Most of the buyers prior to 1985 were married couples in their early

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thirties. Over three-quarters were renters before they bought in Village Park, which implies that this was their first time purchase.

As the selling price of Village Park units increased, Village Park began attracting slightly different homebuyers. In 1986 and 1987, buyers were slightly older. Significantly more buyers already owned homes when they bought into Village Park. The non-married buyer became a new addition to the Village Park community. The implied trend in Village Park homebuyers is towards more experienced homebuyers earning higher incomes.

Current Village Park needs and values have to do with protecting and improving their community. Those interviewed wanted to instill community pride and encourage more cohesion. Some of the current needs of the Village Park community include (1) property maintenance and enforcement of homeowner covenants; (2) neighborhood security; and (3) parking and speeding.

NON-PROJECT CHANGES TO THE COMMUNITY

Proposed Changes in Central Oahu and Ewa

Both the Central Oahu and Ewa Development Plan areas are eyed for major development proposals, and some of these proposals have progressed towards realization sooner than others. In general, those in the Ewa Development Plan area have been more successful in obtaining land use approvals, primarily because of public policy to establish Ewa as Oahu's secondary urban center. Projects nearest the project site include Kapolei Village, Soda Creek and West Loch.

In Waipahu, only Waikele is in pre-construction stages. The other projects are either currently seeking land use approvals or are in the planning stages. Wahiawa Ridge is seeking Development Plan amendments; and Waiola Estates is again in the planning stage.

Non-residential public facilities will also contribute to the changes in the region. A Paiwa interchange has been proposed by Amfac to facilitate access between H-1, Waikele and Waipahu. The Leeward Civic Center is designed to serve Leeward residents and comprising offices of government agencies. Waipahu police substation has been requested by the community, and possible sites in new developments are currently being explored.

Near the Village Park Neighborhood

With the residential component in Village Park already completed, only the 4.5-acre commercial area needs to be

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developed, and this is estimated for completion in 1991. Hoaeae Elementary is scheduled to open in September 1989.

Royal Kunia, Phase I includes 2,450 single family detached homes and townhouses, golf courses, recreation center, 20 acres for light industrial and/or commercial facilities, and three park facilities. Phase I covers a total 715 acres. The bulk of Phase I — 645 acres and 2,000 units — recently received Development Plan amendment approval in 1989.

A portion of Phase I has already received Development Plan approvals. The City is allowing 70 acres for 150 low to moderately priced apartment units and 300 single family units. A 5-acre park site is also included.

The 150-unit project recently received Planned Development approval. The 300 single-family units comprise Increment 1 of Royal Kunia, Phase I and this is currently in process for Final Subdivision Approval. All homes are expected to be completed on or before August 31, 1989.

Unlike the Village Park homes, Increment 1 homes will be sold in fee. Increment 1 lots range between 5,000 and 8,000 square feet, and are thus larger than the average 4,000-square-foot Village Park lots.

POPULATION IMPACT

During the 1970s, the Central Oahu DP Area was proportionally the fastest growing of Oahu's eight DP areas. Its average annual population growth rate of 4.3 percent exceeded the 4.1 percent for the Ewa DP Area. The bulk of Central Oahu's growth in the 1970s was in new communities and subdivisions.

Since 1980, Central Oahu has continued to grow primarily in new communities and subdivisions. The estimated population for Central Oahu in 1985 is 114,611.

The General Plan for the City and Count of Honolulu contain percentage guidelines for the distribution of Oahu's population for the eight Development Plan Areas (DP Areas) comprising the entire Island of Oahu.

Until these distribution policies were revised in early 1989, the 2005 population allocated to the Central Oahu Development Plan area was already "absorbed" by the existing 33,783 residential units and additional developable capacity of 8,390 units.

Two revisions to the General Plan have occurred, however, which increases the growth potential for Central Oahu. First,

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the 2010 population projections from the State Department of business and Economic Development, which were issued on November 30, 1988 were incorporated as required. Second, the population distribution table was revised to reflect, among other items, an increase in Central Oahu's share of islandwide 2010 population — from 12.8 - 14.2 percent, to 14.9 - 16.5 percent.

Given these two amendments, the Central Oahu Development Plan area could accommodate a population of 148,900 persons by the year 2010.

This time frame extension and increased population allocation provides for a greater development capacity in Central Oahu and, recently, three new development projects were approved. These included 3,500 units for Mililani Mauka, 2,000 units in Royal Kunia Phase I, and 1,375 units in Waiawa Gentry.

Collectively, these three projects will increase Central Oahu's housing supply to sufficiently meet the targeted 2010 population allocated by the Central Plan.

Based on an estimated household size of 3.2, the 2,400 residential units of Royal Kunia, Phase II is expected to house a population of 7,680. This is well within the State's population forecasts for Oahu's share of the statewide population. However, the proposed project's population will exceed the General Plan guidelines for Central Oahu's share of population. Therefore, the project will require a General Plan amendment that would increase the population distribution percentage for Central Oahu to about 17.3 percent of the islandwide population.

The proposed project's population will exceed the General Plan guidelines for Central Oahu's share of population, unless the previously discussed General Plan amendments are adopted.

The combined population of Village Park and Royal Kunia, Phase I is estimated at 13,600 people. Phase II is estimated to add another 7,680 people, bringing the total population of the three developments to 21,200.

Half of the proposed residential units will be designed for people with incomes up to 140% of the islandwide median income. The other half will be sold at market prices. Demographically, Royal Kunia residents — of both Phases I and II — will likely continue the slight trend towards more experienced purchasers with more buying power than the earlier Village Park homebuyers, since the new units will be higher priced. This trend could be tempered by income increases in current Village Park homeowners due to increased earning power as the residents become older, and income

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increases due to appreciation of property values and consequent higher incomes of resale purchasers.

In increasing the population base, the proposed project will increase the community's need for public services, as well as provide justification for more services and facilities. While this will put a strain on current services, it will also create a larger political base which can then encourage funds for facilities, such as schools and parks.

COMMUNITY ISSUES

Process of Identifying Issues

Earthplan conducted interviews with community residents and organization leaders in the course of this study. No attempt was made to assess the extent or "quantity" of project support or opposition. The selection of individuals was based on the following cross-section of potential interests. Those interviewed included leaders of regional Waipahu organizations, and residents in Village Park who are active in their community activities.

The issues identified in this report are preliminary in that they indicate what is important to the community in a specific point in time (November 1988). Changes in attitude and issues may occur in time, given possible project modifications and other events or influences in the community.

REGIONAL ISSUES AND CONCERNS

Efforts Toward a Mixed Community

Those interviewed stressed their desire for moving towards a socio-economically mixed population and they felt that Royal Kunia, Phase II is another step in this direction. All of those interviewed favored the mix in housing prices and types. They expressed an appreciation for the moderately-priced units because they acknowledged a regional need for affordable housing. They especially liked the market units and the higher-priced golf course units because these units would attract more affluent homebuyers, and thus diversify the Waipahu population.

There was mixed reaction to the low-density apartment units. While most people felt that these units would help meet current housing needs, some felt that the 900-unit proposal was over-sized, and would create social conflicts because of economic disparity.

The census information indicates that the region — particularly Waipahu Town — is lower on the economic scale in the

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islandwide community. Community perception of socio-economic differences between Waipahu Town and the mauka communities is therefore accurate.

Support for Royal Kunia, Phase II is a reflection of the community desire for upward mobility. Implied in their comments is a feeling that the current composition of the community is not conducive to immediate community change and improvement. The addition of new and socio-economically different residents to the community is expected to somehow provide the catalyst for improvement.

To a large extent, the effectiveness of this catalyst will depend on (1) the desire of new residents to integrate into Waipahu, and (2) the practical boundaries (such as distances between communities and the self-sufficiency of planned communities). Both of these aspects are discussed later in this report.

Community Improvements Efforts

Encouraging a mix of residents is not the sole solution towards community improvement. Informants also stressed the need to improve Waipahu Town and described current efforts of beautification and improving the delivery of public services. In this effort, Waipahu leaders often invite developers in the area to participate in community efforts either through on-site facilities or by contributing to off-site improvements.

When the "Village Park Expansion" was first presented to Waipahu community organizations, the developer committed to a number of off-site in-kind and off-site contributions. Since then, a number of these items have been completed.

At the time of this writing, no formal project presentation has been made to community groups. It is likely, however, that as presentations are made, community representatives will suggest ways for developer involvement in community efforts. It is equally likely that the developer will participate, since many of the same individuals are in the current development team.

Integration Into Waipahu

Underlying the informants' support for the Royal Kunia, Phase II is an assumption that the residents of this new project will consider themselves part of Waipahu, and thus contribute to a practical demographic mix and participate in community efforts.

The mauka communities have the potential to be full-service communities. Waipio-Gentry has neighborhood facilities, and Village Park is soon to have a shopping mall and school. Continuation of this could mean a lessening of interaction

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between mauka and makai residents. Such a mauka-makai separation would be inconsistent with current Waipahu goals, and some steps can be taken to mitigate this impact. First, regional Waipahu organizations, such as the Waipahu Community Association and the Waipahu Neighborhood Board, can actively solicit membership from the newer communities. This is already occurring with Village Park and Waipio-Gentry. Second, in marketing the project, the developer could emphasize a positive relationship to the Waipahu community.

Traffic and Infrastructure

Most of those interviewed believed that the transportation system was the source of traffic problems, and not development projects. Most felt that only major systemic changes — such as mass transit — can solve the problem at this time. Thus, most did not feel that the project should be denied because of traffic impacts. A few felt strongly however, that allowing more development in Central Oahu and Ewa will exacerbate not just the roadway problems, but wastewater and utility systems as well, and they had strong reservations about proceeding with any development.

Traffic issues are predominant throughout the islandwide community. For the individual, traffic often translates into increasing commuting times to and from work. These times can be stressful, particularly if there appears to be no other solution. Further, as more and more time is spent in the car, leisure time decreases, thus giving the individual less personal and family time.

NEIGHBORHOOD ISSUES AND CONCERNS

Full-Service, Mixed Community

Village Park informants expected the two phases of Royal Kunia to provide the neighborhood amenities of a full-service community for convenience purposes. They were also hopeful that Village Park residents could find employment at the industrial park and other facilities.

The informants were initially concerned about the nature of the industrial park, but appeared comfortable when it was explained that this is intended for "light industrial" facilities.

Royal Kunia, Phase II will contribute to this full-service concept, particularly if the project will employ nearby Royal Kunia and Village Park residents. Further, the increase in the area's population will create a larger political base which can then lobby effectively for facilities, such as schools and parks.

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Relationship to Village Park

Village Park informants were aware that, on the average, Royal Kunia homes would be sold at higher prices than their homes. They generally considered this a plus, because they saw a potential for increasing their property values.

They were also apprehensive, however, that the Village Park community might be considered economically inferior. They felt that, if more affluent people live in Royal, then Village Park might be considered "poor relations."

Village Park informants felt that this potentially negative impact could be avoided. Upgrading the existing Village Park homes was seen as a definite solution. In terms of developer responsibility, Village Park informants wanted to see design and operational efforts devised to encourage integration among Village Park and Royal Kunia.

Further, Village Park residents can be members of the proposed private recreational facility in Phase I. There will also be internal linkages through the roadway system, as well as design compatibility among the three developments. Finally, the developer will be soliciting input from Village Park residents when formal presentations are made.

Traffic On Kunia Road

Village Park interviewees did not look forward to traffic increases. They were particularly concerned about the Kunia Road on-ramp to H-1 Freeway. None of the informants felt, however, that the project should not proceed because of traffic impacts.

2.2.2 Employment

As part of the Market Assessment for Royal Kunia, Phase II (*Appendix I*) and the Impact Study on State and County Finances (*Appendix H*), the consultants estimated the employment that would be generated by the proposed development.

Employment in the existing Village Park development is essentially construction-related. A 5-acre B-1 Neighborhood Business District shopping center between South and North Kupuna Loop has been proposed and an application for the appropriate zone change has been filed with the Department of Land Utilization. The proposed shopping center is expected to result in about 200 permanent jobs.

According to previous studies, about one-half of the Village Park residents work in Honolulu, one-third in the Pearl City/Waipahu/Central Oahu area, 13 percent in the Airport area and about 7 percent in Waipahu.

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With reference to Phase I of the Royal Kunia development, the EIS that was prepared estimated about 710 permanent jobs would be created, in addition to the construction-related jobs. Phase I development is currently before the City Council, and action on that DP amendment is expected by the end of January 1989.

IMPACT

The proposed project would provide construction-related and permanent employment. Construction-related employment would average about 300 jobs over a 5-year period. Permanent employment would total about 2,000 jobs, the majority of which will be generated by the industrial development.

The Waipahu Town labor force in 1980 had an above-average unemployment rate and civilian workers were employed disproportionately in service and trade occupations. The types of jobs that would be offered at the proposed development appear to be a good match between the existing Waipahu workforce and these future jobs.

The proposed development would also create some indirect and induced employment in the Waipahu area through expenditures of residents, employees and businesses.

MITIGATIVE MEASURES

None necessary since the impacts are beneficial.

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2.2.3 Agricultural Impact

The proposed Royal Kunia, Phase II would result in the urbanization of approximately 670 acres of sugar cane lands which is currently under cultivation by Oahu Sugar Company, Ltd. (OSCo). The land is presently designated State Agriculture. An Agricultural Impact Study was prepared by Decision Analysts Hawaii and is included in this document as *Appendix G*. The impact of this conversion on OSCo operations and on the potential growth of diversified agriculture is summarized below.

Soil Quality of Affected Sugar Cane Acreage	
The affected acreage consists primarily of seven soil types:	
LaA	Lahaina silty clay, 0 to 3 percent slope
LaB	Lahaina silty clay, 3 to 7 percent slope
MuD	Molokai silty clay loam, 15 to 25 percent slope
MuB	Molokai silty clay loam, 3 to 7 percent slope
LaC3	Lahaina silty clay, 7 to 15 percent slope, severely eroded.
WaB	Wahiawa silty clay, 3 to 8 percent slope
WaA	Wahiawa silty clay, 0 to 3 percent slope
LaC	Lahaina silty clay, 7 to 15 percent slope
MuA	Molokai silty clay loam, 0 to 3 percent slope

For each soil type, *Table 2.7* shows the approximate acreage, possible agricultural uses, and two soil ratings (explained below). The predominate soil types — LaA and LaB — comprise about 83 percent of the project area. Suitable agricultural activities associated with the affected soil types include sugar cane and pineapple for all nine soil types except MuA and, for some of the soil types, pasture and truck crops.

The soils within the petition area has been rated in terms of four classification systems commonly used in Hawaii: (1) Land Capability Grouping, (2) Agricultural Lands of Importance to the State of Hawaii, (3) Overall Productivity Rating, and (4) Proposed Land Evaluation and Site Assessment. These classification systems are discussed below:

(1) Land Capability Grouping by the United States Department of Agriculture Soil Conservation Service (SCS).

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This classification system rates soils according to eight levels, ranging from the highest classification level, I, to the lowest level, VIII. Assuming irrigation, these ratings are shown in *Table 2-7*. Soil types LaA, WaA, and MuA have a land capability rating of I, which indicates that the soils have few limitations that restrict their use. These soils cover about 51 percent of the proposed project. Soils LaB, MuB and WaB, which cover 39 percent of the project, have a land capability rating of IIe, which indicates that the soils have moderate limitations that reduce the choice of plants that can be grown successfully, or moderate conservation practices are required. Subclassification "e" indicates that the limitation is due to the risk of erosion, and therefore soils require protection when cultivated. Soil type LaC covers 1 percent of the project, and has a capability rating of IIIe, which indicates that the soil has severe limitations that reduce the choice of plants, require special conservation practices, or both. Again, the problem is due to the risk of erosion. Soil types MuC and LaC3 cover 9 percent of the project area and have a soil classification of IVe which indicates that the soils have very severe limitations that reduce the choice of plants, require very careful management, or both. Again, risk of erosion is the problem.

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**TABLE 2-7
PROPOSED ROYAL KUNIA, PHASE II:
SOIL TYPES, AGRICULTURAL USES, AND
LESA AND SCS RATINGS**

SOIL TYPE	ACREAGE	AGRICULTURAL USES	SCS RATING ¹	LESA RATING
LaA	331.4	Sugar, Pineapple	I	92
LaB	226.6	Sugar, Pineapple, Truck Crops	IIe	90
MuD	43.6	Sugar, Pineapple	IVe	59
MuB	25.9	Sugar, Pineapple, Pasture	IIe	88
LaC3	17.5	Sugar, Pineapple	IVe	66
WaB	11.3	Sugar, Pineapple, Pasture	IIe	94
WaA	7.0	Sugar, Pineapple, Pasture	I	96
LaC	6.3	Sugar, Pineapple, Truck Crops, Pasture	IIIe	82
MuA	0.4	Sugar	I	90

¹ Assuming irrigation.

SOURCE: United States Department of Agricultural, Soil Conservation Service, "Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii", August 1972.

(2) Agricultural Lands of Importance in the State of Hawaii (ALISH), by the SCS, University of Hawaii (UH) College of Tropical Agriculture and Human Resources, and the State of Hawaii Department of Agriculture.

This system classifies lands into three categories: (a) prime agricultural land which is land that is best suited for the production of crops because of its ability to sustain high yields with relatively little input and with the least damage to the environment; (b) unique agricultural land which is non-prime agricultural land that is currently used for the production of specific high-value crops; and (c) other agricultural land which is non-prime and non-unique agricultural land that is of importance to the production of crops. Except for approximately 6.5

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percent of the proposed development area, the soils are rated as "prime" agricultural lands.

(3) Overall Productivity Rating, by the UH Land Study Bureau (LSB).

This classification rates soils according to five levels, with "A" representing the class of highest productivity and "E" the lowest. About 93 percent of the petition lands have soils rated "A," with the remainder rated "B".

(4) Proposed Land Evaluation and Site Assessment (LESA) System, by the State of Hawaii Land Evaluation and Site Assessment Commission

Based on soil quality, locational attributes, improvements, nearby activities, and land-use plans, this proposed classification system would designate a sufficient amount of the better agricultural lands in order to meet projected agricultural goals. If the LESA classification approach were applied, the designated lands would be termed "important agricultural lands" (IAL), and would include all lands having a rating of 66 or over, out of a possible total of 100. Based on the proposed maps, about 93 percent of the petition area would be designated as IAL. The ratings for each soil type are shown in *Table 2-7*. However, the identification would be subject to change based on a change in nearby activities and a change in County land-use plans. Also, the designation could be changed if an overriding public benefit is demonstrated.

IMPACT ON OSCO

Assuming that U.S. sugar prices will continue to be high enough to justify continued sugar operations in Hawaii, an important question is whether Royal Kunia, Phase II — combined with other planned and proposed projects — would eventually cause the closing of OSCo, either by reducing sugarcane acreage sufficiently to reduce economics of scale, and/or by contributing to a scattered and therefore inefficient plantation rather than a more compact and efficient one.

Assuming further that all proposed projects will be approved, and that it would take about 20 years to realize the full development of all projects, OSCo would retain about 11,490 acres under cultivation in the mid-1990s when its major leases expire. This is sufficient land to maintain the historic level of production of 90,000 to 95,000 tons of raw sugar per year, provided that the average yield increases from 14.06 tons of raw

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sugar per acre in 1987, to a very optimistic 17.9 tons per acre by the end of 1995.

However, if an average yield of 17.9 tons per acre is not achieved (which is likely), or if the resulting form of the plantation proves to be inefficient for OSCo to run a two-mill operation, or if urbanization proceeds much more rapidly than projected, then an efficient sugar operation could be achieved by switching to a one-mill operation. For this case, land requirements would be about 10,350 acres, assuming a more realistic yield of 14.5 tons per acre and production of about 67,500 tons per year. This would provide a buffer of 1,140 acres from which to assemble an efficient plantation; this figure is based on 11,490 acres remaining after projected urbanization (assuming approval of all planned and proposed projects), minus the estimated 10,350 acres required for a one-mill operation. If yields reach higher levels, then the buffer increases accordingly. It is uncertain whether or not attrition would be sufficient to accommodate the reduction in employment associated with a switch to a one-mill operation.

In summary, Royal Kunia, Phase II, in combination with other approved and proposed projects, is not expected to threaten the economic viability of OSCo before the major leases expire in the mid-1990s; economics of scale and a compact efficient plantation would be possible by (1) switching to a single-mill operation; or (2) retaining a two-mill operation, provided that urbanization proceeds gradually and yields can be increased rapidly to compensate for the loss of acreage.

In the long term, the future of OSCo is uncertain given the outlook for flat or declining sugar prices, and costs which generally increase with inflation. Furthermore, economic incentives may not favor renewal of the major leases. But assuming continued operations, then at full development of all the planned and proposed projects (assuming approval of all projects), the amount of land under cultivation by OSCo would decline by 5,400 acres, (Table 2.8), from 13,440 acres to about 8,100 acres. This loss of acreage would like require a switch to a one-mill operation in order to maintain economic viability. Furthermore, average yields would have to reach an optimistic 18.5 tons per acre or more. Given currently available information, it is uncertain whether the form of the plantation would allow viable operations.

NOTE: The issue of OSCo's survival was raised by the Department of Agriculture in its comment letter to the Draft EIS (see Section 12). In response, it was acknowledged that the long-term future of OSCo was uncertain. This uncertainty stems primarily from the problems associated with the renewal of the major leases and whether Federal price supports for sugar will be sufficiently high to allow profitable operations. If

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OSCo survives these threats, and if all planned and proposed developments are approved and proceed relatively rapidly to full development, then it is possible that OSCo's survival could be threatened; however, it is unlikely that all of these suppositions will in fact occur.

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**TABLE 2-8
 PLANNED AND PROPOSED
 DEVELOPMENTS AFFECTING
 OAHU SUGAR COMPANY ACREAGE: 1988**

PROJECT	SUGARCANE ACREAGE
Royal Kunia, Phases I and II (547.5 acres partially approved by the State)	1,386
Ewa Gentry (partially approved)	891
Kapolei Village, State of Hawaii (approved)	775
Kapolei Town Center, Campbell Estate (partially approved)	693
Ewa Marina (approved)	410
Ko Olina Resort (approved)	281
Golf Course (J. Myers)	270
West Loch Estates, City and County of Honolulu (approved)	195
Kunia Golf Course	190
Kapolei Knolls	55
Other	241
TOTAL	<u>5,387</u>
SOURCE: Applications and discussions with Oahu Sugar Co., Ltd.	

IMPACT ON DIVERSIFIED AGRICULTURE

The development of Royal Kunia, Phase II on sugarcane acreage would eliminate the possibility of using these lands for diversified agriculture. However, it is extremely doubtful that the project would adversely affect the growth of diversified agriculture in Hawaii. There are four reasons for this assessment: (1) an extensive amount of prime-agricultural land and water has been freed from sugar and pineapple production because of past mill closing and reductions in operations, most of which remains available for diversified agriculture activities;

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(2) a very real possibility exists that additional land and water will be freed from sugar production given the outlook for low sugar prices; (3) some — if not most — of the sugar operations will make their lands available for profitable replacement crops to the extent that such crops are available; and (4) compared to the available supply, a very small amount of land and water is required to grow proven and promising crops to achieve a realistic level of food and animal-feed self-sufficiency, and to increase exports.

The increasing availability of prime agricultural land in Hawaii is part of a very long and acceleration trends occurring throughout most developed and developing market economies. Productivity and yields have been increasing faster than population growth. This situation requires that labor, land and other resources be withdrawn from agriculture in order to restore balanced markets and to increase farm income for those who remain.

CONSISTENCY WITH STATE AND COUNTY PLANS

Since Royal Kunia, Phase II is not expected to adversely affect the economic viability of OSCo before the major leases expire in the mid-1990s, and would not limit the growth of diversified agriculture, the project is consistent with the major thrust of the agricultural portion of the Hawaii State Plan, the State Agriculture Functional Plan, and the General Plan of the City and County of Honolulu. This thrust in all three plans calls for preserving the economic viability of plantation agriculture and promoting the growth of diversified agriculture. Also, the project would provide public benefits of reasonably priced housing, recreation, and employment.

In the longer term, the future of OSCo is uncertain because of a price/cost squeeze, the uncertainty over the renewal of all major leases, and potential impacts of urban pressures on the plantation.

MITIGATIVE MEASURES

The applicant will absorb the cost of relocating cane-haul roads, irrigation ditches and pipes, an earthen reservoir, and power poles. In addition, the phasing plan for the proposed project will allow OSCo to gradually reduce sugar cane acreage, rather than completely terminating cultivation at one time.

Regarding diversified agriculture, there are no mitigative measures proposed since there are no significant adverse impacts.

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2.2.4 IMPACT ON STATE AND COUNTY FINANCES

The impact of the proposed Royal Kunia Phase II development on State of Hawaii and City and County of Honolulu finances was studied by Decision Analysts Hawaii, Inc. The study has been incorporated into this document as *APPENDIX H* and is summarized below.

IMPACT

Halekua Development Corporation's proposed Royal Kunia, Phase II would contain a variety of rental apartments, townhouses, and single-family homes; a light-industrial area; a golf course; a public park; and a school. In addition, the developer would provide road, water, drainage, and sewer improvements.

State and County revenues which would be derived from this project are expected to be significant, and sufficient to allow government to easily afford the capital improvements and services required to accommodate the project. The revenues are expected to be sufficient to: (1) finance park, fire station, wastewater treatment, school and roadway improvements; (2) provide the same level of per-unit services as are provided currently to island residents; and (3) serve additional community needs with the remaining net revenues.

At project completion, County revenues derived from the Royal Kunia, Phase II are projected to be \$6.4 million per year, while expenditures to support the project are expected to be \$4.6 million, for a net of \$1.8 million per year (*Table 2-9*). All dollar amounts are in 1987 dollars.

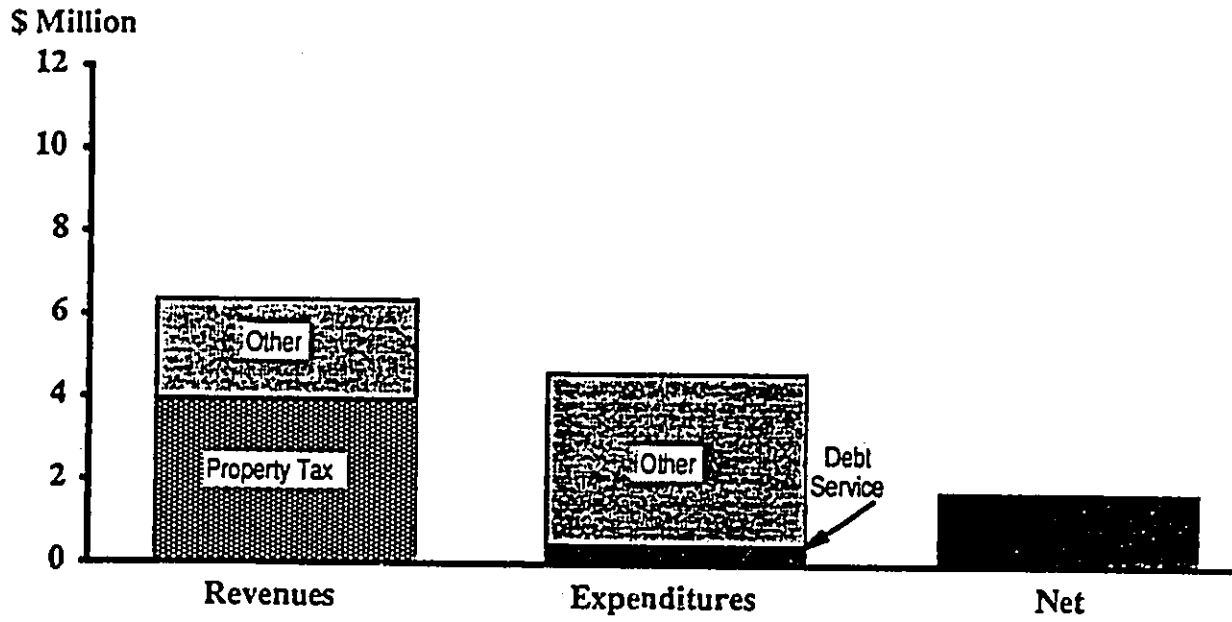
For the State, revenues generated by construction activity are estimated to average \$7.7 million per year over the 5-year construction period, resulting in total construction-generated revenues of \$38.5 million. This sum exceeds the \$10.4 million projected expenditure by the State for required improvements. Upon completion of the project, State revenues derived from the Royal Kunia, Phase II are projected to be about \$10.3 million per year, and expenditures required to support the project are estimated to be about \$6 million per year (including debt service on school and roadway improvements), for a net income of about \$4.4 million per year.

MITIGATIVE MEASURES

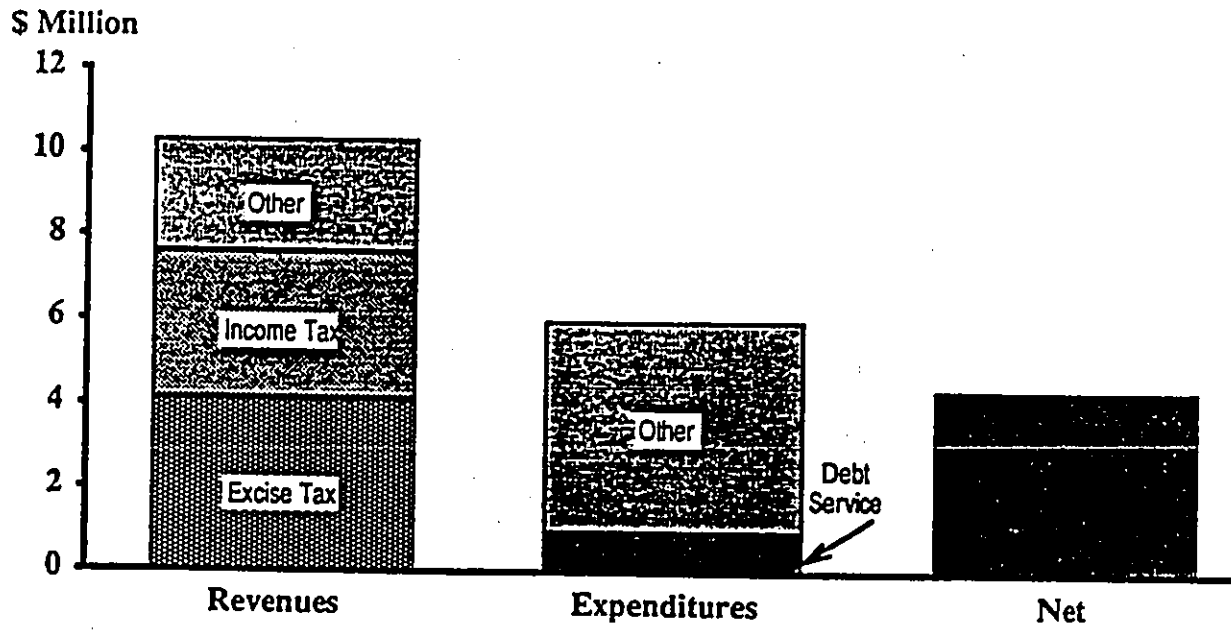
None necessary since the Royal Kunia Phase II development would strengthen State and County finances by providing substantial net income.

TABLE 2-9

Impact on County Finances



Impact on State Finances



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2.3 ADEQUACY OF PUBLIC FACILITIES AND SERVICES

2.3.1 Transportation / Traffic (See Appendix K)

Kunia Road, a two-lane State highway adjacent to the project site, will provide access to the project. Existing traffic volumes in the vicinity of the project are served with little delay on the highway. To the south, near the existing developed Village Park residential area, signalized intersections operate well below capacities during peak hours. While some congestion occurs during the morning peak period at the ramps of the Kunia Interchange of the H-1 Freeway, the primary route toward downtown Honolulu, capacities are sufficient for existing volumes.

The proposed project is located in Central Oahu, an area that is presently primarily residential in nature. Peak period traffic movements between this area and downtown Honolulu to the east are characterized by heavy vehicular flows toward the employment areas surrounding downtown Honolulu in the mornings and high reverse flows back toward Central Oahu in the afternoons. To the west, existing peak hour traffic volumes are nearly equal as employment opportunities at Campbell Industrial Park and at Barbers Point Naval Air Station balance travel demands created by residential areas.

IMPACT

The proposed project would increase traffic volumes along Kunia Road between the project and the H-1 Freeway. Future traffic volumes were established for conditions with and without the project to identify new roadways and additional laneage on Kunia Road to serve the project's traffic demands. Signalized intersections along Kunia Road are expected to provide adequate levels of service for the traffic generated by the project. The traffic report for the project is attached as *Appendix K*.

Improvements at Kunia Interchange will be necessary with or without the proposed project. The project is expected to change the ramp volumes at the interchange, thereby affecting the evaluation of alternatives for increasing capacities at the interchange.

Regional impacts of the project were evaluated by comparing the traffic assignments for future conditions without and with the project. The project is not expected to significantly affect regional travel demands. At full development of the project, employment opportunities and economic activity within the proposed industrial area will help to mitigate regional traffic impacts by diverting a portion of the traffic generated by residential developments in the area that would otherwise have to travel toward downtown Honolulu.

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MITIGATIVE MEASURES

The construction of roadway improvements along Kunia Road will mitigate adverse traffic impacts of the project. The future traffic demands at Kunia Interchange would require that it be reconstructed, with or without the proposed project; evaluation of alternatives for these improvements should consider all proposed development in the area. Improved transit service and a ridesharing program could provide alternative modes of transportation and improve traffic conditions both in the area and on the regional facilities. Other mitigative measures to improve regional traffic concerns will be part of a Regional Traffic Master Planning effort currently underway by private developers in the area together with the State Department of Transportation.

2.3.2 Water (See *Appendix E*)

Water for the existing Harbor View Subdivision, Village Park Subdivision and portion of Royal Kunia, Phase I is provided by Kunia Wells II. Source and storage facilities at the Kunia Well II site, located about 0.8 miles above Village Park along Kunia Road, includes a 1.5 million gallon "440" reservoir, two deep wells and a granular activated carbon water treatment facility for contaminant removal. An additional 1.0 million gallon "440" reservoir and granular activated carbon water treatment facility is being constructed by the petitioner to be turned over to the Board of Water Supply.

Kunia Wells I is located about 1.0 miles makai of Kunia Wells II and is adjacent to the Kunia Interchange of Interstate Route H-1. Source and storage facilities at the Kunia Well site includes a 1.5 million gallon "228" reservoir and four deep wells. Water from this facility is being pumped to Waianae and Makaha.

IMPACT

Royal Kunia, Phase II is located in the Pearl Harbor Water Management Area. Portion of Royal Kunia, Phase I (0.615 MGD average flow) and all of Royal Kunia, Phase II (1.718 MGD average flow) will obtain water from a new well at the Kunia Well II site. As an alternative water source, the Board of Water Supply has indicated that water can be made available from their existing facilities.

Board of Water Supply potable water will not be used for golf course irrigation. Approximately 60% of the storm runoff generated by this project (2,000 cfs) will be diverted into ponding areas and will be used to irrigate the golf course. Agreements are being finalized to obtain approximately 700,000 gallons a day of irrigation water from Oahu Sugar Company for golf course irrigation.

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Recharge of ground water from infiltration should be minimal due to the relative low rainfall of the project area and less likelihood of the residential, industrial or golf courses to over-water. The quantity of both fertilizers and herbicides that may be used by the residential, industrial or golf courses should be less than the used on a comparable area of sugar cane. Therefore, there should be minimal impact on ground water quality resulting from residential, industrial and golf course development over the Pearl Harbor Groundwater Control Area. For addition discussion on this issue, see *Section 2.1.8* and *Appendix F*.

MITIGATIVE MEASURES

Assuming negligible infiltration due to the paved surfaces, the net consumption of 2,600 gpad is about 40% less than the amount required for drip irrigation.

Compared to sugar cane irrigation, the proposed urban use will result in a net decrease in water consumption from the Pearl Harbor aquifer. Drip irrigation requires about 7,500 gad. About 20% infiltrates to recharge the aquifer, resulting in a net consumption of 6,000 gpad. In contrast, the proposed project will require 1.718 mdg, or about 2,600 gpad (1,718,000/655 acres).

2.3.3 Wastewater (See *Appendix E*)

Wastewater from the development will be collected by a network of pipes flowing through Royal Kunia, Phase I and then flowing to the 21" trunk sewer main to be installed from Royal Kunia, Phase I to the Waipahu Sewage Pump Station.

IMPACT

Average daily wastewater flow generated by the development of the project site will be approximately 1.77 mgd. The flow requirement was computed according to the City and County Wastewater Standards.

MITIGATIVE MEASURES

Royal Kunia's implementation schedule is being coordinated with the Division of Wastewater Management who is in the process of expanding the existing Waipahu Sewage Pump Station and Honouliuli Wastewater Treatment Plant.

According to the City Department of Public Works, the construction funds for the Honouliuli Wastewater Treatment Plant expansion and planning and engineering funds for the Waipahu Wastewater Pump Station modification are being programmed in the FY 89-90 Capital Improvement Budget

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proposals. If the funds are appropriated, the expanded WWTP and WWPS will be in operation by 1993. DPW, however, also reported that future effluent discharge requirements by EPA for the Honouliuli WWTP may disallow connection of any new development (see *Section 12, Comments Received During the Preparation of the Final EIS*).

2.3.4 Solid Waste (See *Appendix E*)

The City and County of Honolulu provides refuse collection services for the existing Village Park development located makai of the project site. Within the Ewa area, the City and County operates the Waipahu Incinerator.

IMPACT

Fully developed, the proposed project would generate approximately 32 tons of mixed industrial, institutional and residential solid waste per day. This quantity represents about one percent of the total solid waste generated on Oahu each day. The proposed industrial activity is not anticipated to generate hazard wastes.

Refuse collection services will be provided by both government and private work forces. The City and County services single family residences, while private collectors service commercial and industrial establishments. Apartment units can be served by either City and County or private collectors.

The Waipahu Incinerator will be kept in service until the Resources Recovery Project (H-Power) become operational. Private industry is pursuing approvals to establish a sanitary landfill at Waimanalo Gulch. The implementation of the City and County's resource recovery project at Barbers Point within two years and the land fill Waimanalo Gulch should be able to accommodate the proposed project and handle the future growth in Leeward Oahu.

MITIGATIVE MEASURES

If hazardous waste is generated, disposal methods will conform to strict standards established by the Department of Health and U.S. Environmental Protection Agency.

2.3.5 Drainage (See *Appendix E*)

The proposed project site is within the Waikele Stream hydrological basin that has a total drainage area of about 29,000 acres. Waikele stream originates in the western slopes of the Koolau Range, courses through Central Oahu, and discharges with an annual average flow of 25 mdg into Pearl Harbor (Middle Loch).

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The flood insurance hazard rating for this area is Zone C, areas of minimal flooding. Also, the project site is located outside of the 500-yard flood plain (Zone X, unshaded). Any proposed structure will not require special flood-proofing measures.

Waikele Stream is not within the project boundaries and no filling will be done along the stream banks.

IMPACT

Development of the project site is not expected to have any noticeable impact upon the configuration of Waikele Stream. Flow levels and water quality of Waikele Stream are not expected to be altered or changed to any noticeable or measurable degree. This conclusion is based on the relatively small area of that portion of the project site that presently drains directly into Waikele Gulch as compared to the large area of the Waikele Stream hydrological basin (381 acres and 29,000 acres respectively).

MITIGATIVE MEASURES

Storm runoff will be handled by onsite improvements that will be designed to current City and County Drainage Design Standards.

A offsite drainage study for Royal Kunia, Phase II has been submitted to the City and County for approval.

2.3.6 Electric and Telephone Systems (See *Appendix E*)

Electric and telephone services for the existing Royal Kunia subdivision are available from HECO and HTCO facilities extended from Kunia Road.

IMPACT

Based on the activities anticipated, the consumption of electricity for the project is forecasted to be: $43,412 \text{ KW} \times 12 \text{ hours/day} \times 312 \text{ days/year} = 162,534,528 \text{ KWH/year}$.

HECO and HTCO facilities must be extended from Royal Kunia Subdivision Phase I onto the project site. HTCO will require a 6,000 square foot parcel in Phase I for the installation of a remote switching unit and needs to relocate aerial and direct buried cable facilities along Kunia Road to underground.

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MITIGATIVE MEASURES

Extension of HECO and HECO facilities will be planned to coincide with the project development. There are existing HECO 138 KV transmission lines traversing the northern section of the proposed project site. If construction crosses or comes in close proximity to these lines, the Applicant will meet HECO's requirements:

- The Contractor is to exercise extreme caution when excavation and construction crosses or is in close proximity of our lines and is to maintain 13'-0" clearance for his equipment while working close to and/or under the overhead facilities.
- The Contractor is to comply with the directions of the State of Hawaii Occupational Safety and Health Law (DOSH).
- When excavation is adjacent to or under existing structures or facilities, the Contractor is responsible for properly sheeting and bracing the excavation and stabilizing the existing ground to render it safe and secure from possible slides, cave-ins and settlement, and for properly supporting existing structures and facilities with beams, struts or underpinning to fully protect them from damage.
- Should it become necessary, any work required to relocate HECO facilities shall be done by HECO. The Contractor shall be responsible for all costs and coordination.
- The Contractor shall be liable for any damages to HECO's facilities.
- The Contractor shall report any damages to HECO's facilities to the HECO Trouble Dispatch at phone number 543-7838.
- Service roads and/or trails leading to and from HECO's facilities shall remain accessible for HECO's use at all times.
- The Developer shall indemnify HECO against all claims resulting from the proposed Royal Kunia development.

Project roadways will be illuminated per City and County of Honolulu standards. It is anticipated that high pressure sodium lamps will be utilized for its high efficiency and long lamp life.

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Some of the types of energy conservation measures or renewable energy sources that will be given consideration in the project include:

- Siting buildings to minimize the heat loads and effectively utilize trade winds for indoor and outdoor living and recreational spaces.
- Use of high-efficiency light sources and ballasts for indoor and outdoor lighting purposes.
- Use of high-efficiency refrigerators, washers and dryers, and ranges.
- Use of high-efficiency air conditioners.
- Use of heat pump and solar heating systems.
- Facilitating energy-saving opportunities through innovative architectural design of buildings.
- Use of occupant-sensing or time switch type light and air conditioning controls.

2.3.7 Police Protection (See Appendix J)

The Pearl City Police Station on Waimano Home Road currently serves Waipahu, Ewa and Waianae, the latter of which has a sub-station.

IMPACT

In its review of the EISPN, police officials reported that the increase in population and traffic, when considered with other proposed developments in Waipahu and Ewa, will definitely have an impact on their operations. They believe additional manpower will be needed and suggested that a new police facility to serve the Ewa Plain should be considered by those developing the area. Also, traffic along Kunia Road and the H-1 will increase which will further burden the roadways now function at maximum capacity.

MITIGATIVE MEASURES

The Police Department has recommended, and the Applicant agrees, to install adequate warning signs and safety barricades during project construction to insure the safety of passing motorists. The hiring of special duty officers will also be considered.

With reference to a new police facility in the Ewa Plain, it is noted that the Environmental Impact Statement for Kapolei

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Town Center (August 1988) in the Ewa Secondary Urban Center, reports that the Police Department will be considering the feasibility of this area for a police station (*Section 5.3.2*, page 5-4).

Proposed traffic improvements are described in *Section 2.3.1* and *Appendix K*.

The cost for additional police officers and vehicles will be offset by the tax revenues generated from the project. For more detail, see *Section 2.2.4* and *Appendix H*.

2.3.8 Fire Protection (See *Appendix J*)

Primary fire protection would be provided to Royal Kunia, Phase II from the Waipahu Fire Station with twelve (12) on-duty personnel. Secondary service would be provided by the Pearl City, Waiiau and Makakilo Fire Stations.

IMPACT

Fire Department officials expressed concern that existing fire protection is considered marginal, and that they are projecting the need for a new Fire Station to house an engine company in the Kunia area.

MITIGATIVE MEASURES

A new Fire Station is currently planned in the Waikele area to service the future Waikele development. Regarding the Kunia area, Chief Word has advised the Applicant's consultant (William E. Wanket) that no new facilities are needed for Royal Kunia, Phase II, but development further mauka of the project area will probably require another Fire Station.

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2.3.9 Schools (See Appendix J)

Students from existing Village Park development attend Hoaeae Elementary School (scheduled to open in fall 1989), Waipahu Intermediate School, and Waipahu High School.

IMPACT

According to the Department of Education, Royal Kunia, Phase II may generate the following student enrollment.

<u>SCHOOL</u>	<u>GRADE</u>	<u>APPROXIMATE ENROLLMENT</u>
Hoaeae	K-6	300 - 500
Waipahu Intermediate	7-8	80 - 120
Waipahu High	9-12	150 - 200

The Department of Education cannot assure the availability of classrooms and will require legislative appropriations to accommodate the anticipated enrollment increase. Currently, Waipahu Intermediate and High Schools are operating at capacity.

MITIGATIVE MEASURES

A second elementary school site within the proposed Royal Kunia, Phase I (formally called Village Park Expansion) was planned in anticipation of the need for an additional facility (Environmental Impact Statement 1986, Section 2.3.9, page 52a). Royal Kunia, Phase II also has reserved an elementary school site. The developer will work closely with the Department of Education (DOE) to ensure that the proposed school site meets the requirements of the DOE, including acreage size and fire truck access.

The cost for additional classrooms will be offset by the tax revenues generated from the project. For more detail, see Section 2.2.4 and Appendix H.

2.3.10 Parks (See Appendix J)

The Park Dedication Ordinance (Chapter 22, Article 7, Revised Ordinances of Honolulu) requires a developer to dedicate sufficient land or pay a fee in lieu of land in order to meet the recreational needs of the project's residents. The minimum standard require a dedication of 350 square feet of park land per single-family unit and 110 square feet for multiple-family units. These provisions are implemented through the subdivision process.

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IMPACT

The project proposes a 16-acre public park to meet the recreational needs of the residents and the acreage requirements of the Park Dedication Ordinance. According to the Department of Parks and Recreation, the park proposal is "conceptually acceptable." However, the exact location, size and configuration of the park site will require additional meetings with the Department of Parks and Recreation.

MITIGATIVE MEASURES

During the development plan process, the Applicant will meet with the Department of Park and Recreation to better establish the location, size and configuration of the park site.

Additional public funds will be needed to improve and maintain the park site. These impacts are acceptable since the tax revenues generated from the project will offset the costs. For more detail, see *Section 2.2.4* and *Appendix H*.

2.3.11 Health Care (See *Appendix J*)

In recognition of Central Oahu and Ewa population growth, medical service providers have already begun to move much of their services to these regions.

Nearest the project site are Kahi Mohala, a psychiatric treatment facility and St. Francis Medical Center - West. The latter is envisioned as a full-service medical service designed to serve West Oahu. Located adjacent to the intersection of Farrington Highway and Fort Weaver Road, this facility currently has a recently complete medical office building. To be added is a five story hospital with 12 intensive care beds, 28 obstetrics/gynecology beds and 96 medical surgical beds. This hospital will offer 24-hour ambulatory services, cardiopulmonary and 24-hour emergency care. Near the Pearl Ridge Shopping Center, the Pali Momi Medical Center houses 116 beds, an ambulatory services center and a medical office building. In Moanalua, the Kaiser Foundation Health Plan has a central hospital. The Waipahu Fire Station would respond to medical emergencies at the project site, and backup services would be provided by the City ambulance at Aiea.

IMPACT

The existing facilities would be adequate to serve the residents of the proposed project.

MITIGATIVE MEASURES

None necessary.

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2.3.12 Park-and-Ride and Child Care Facilities (See Appendix J)

There are currently no developed park-and-ride and child care facilities along Kunia Road.

IMPACT

The City's Office of Human Resources, in commenting on the EISPN for the project, believes that the size of the project, together with the proposed Royal Kunia, Phase I, will require that space be provided for a Park-and-Ride facility and an adjacent child care center.

MITIGATIVE MEASURES

A 5-acre site for a Park-and-Ride facility, together with a 30,000 square foot site for a Child Care facility is currently being dedicated to the City and County in compliance with a Unilateral Agreement filed as part of the approved zone change for increment I of Royal Kunia, Phase I (Ordinance 88-02). A Development Plan Amendment was also approved (Ordinance 88-114) for these facilities.

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3. RELATIONSHIP TO LAND USE POLICIES AND REGULATIONS

This chapter analyzes the relationship of the project with existing public plans, policies and controls of the State of Hawaii and the City and County of Honolulu.

3.1 STATE

3.1.1 State Land Use Law

All lands in the State have been classified in one of four land use districts, Urban, Rural, Agricultural, and Conservation, by the State Land Use Commission, pursuant to Chapter 205 HRS. The subject property is in the Agricultural District. A petition will be filed with the State Land Use Commission for a boundary change to redesignate the property for Urban use.

3.1.2 Hawaii State Plan

The Hawaii State Plan (Chapter 226 Hawaii Revised Statutes, as amended) establishes a set of goals, objectives and policies which are to serve as long-range guidelines for the growth and development of the State. The overall theme of the State Plan is:

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

In general, the proposed project is consistent with the overall intent of the State Plan.

POPULATION

OBJECTIVES AND POLICIES

HRS sec. 226-5(b)(1)

Manage population growth statewide in a manner that provides increased opportunities for Hawaii's people to pursue their physical, social and economic aspirations while recognizing the unique needs of each county.

HRS sec. 226-5(b)(3)

Promote increased opportunities for Hawaii's people to pursue their socio-economic aspirations through the islands

HRS sec. 226-5(b)(7)

Plan the availability of land and water resources in a coordinated manner so as to provide for the desired level of growth in each geographic area.

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HRS sec. 226-104(a)(3)

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

COMMENT

Both statewide and local policies regarding the management of population growth rely upon Oahu, and in particular the Ewa and Central Oahu districts, to accommodate a substantial amount of the increase in population in Hawaii. The proposed Royal Kunia, Phase II residential development is in response to such policies as well as the immediate demands for housing on Oahu. The majority of the 2,400 residential units proposed in the Royal Kunia, Phase II project will be targeted for people in the middle income range thereby providing an opportunity for a larger segment of Hawaii's people to pursue their social and economic aspirations through homeownership. The basic element of homeownership is the foundation for creating family self-sufficiency and social/economic mobility as referred to in the overall theme of the State Plan.

The socio-economic aspirations of Hawaii's people are intrinsically linked to their homeownership opportunities. The Royal Kunia, Phase II project will provide such opportunities by pricing a majority of the proposed homes within the reach of middle income families (\$30,000 to \$60,000 annual income).

Both the State Plan and the City's General Plan anticipate an increase in the residential population on Oahu. A significant portion of this increase, through the year 2010, is targeted for the Central Oahu and Ewa in keeping with current policies and infrastructure investment already directed to these two districts. The Royal Kunia, Phase II project would provide a significant amount of the affordable housing needed to support such growth policies and objectives.

Adequate support facilities are available or shall be provided through the development of the project. Other public expenditures for services and infrastructure will be off-set by an increase in the tax revenues generated through general excise, property and other forms of taxation.

ECONOMY - GENERAL

OBJECTIVES AND POLICIES

HRS sec. 226-6(a)(1)

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

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HRS sec. 226-6(b)(3)

Seek broader outlets for new or expanded Hawaii business investments.

COMMENT

Industrial land within the Primary Urban Center (PUC) or in close proximity to the PUC is in short supply. The primary purpose for this short supply is the limited opportunities to develop new industrial land within the PUC because of the lack of available land and State and County policies which encourages higher land uses in the older industrial areas of Kakaako and Kalihi in the PUC. The proposed project will include 130 acres of land for industrial activities generating an employment of some 2,000 people. A variety of business activities are envisioned, including the availability of various industrial lot sizes to accommodate the small business, as well as the larger and expanding businesses. See Appendix I for a full discussion on the need and demand for the industrial lands at Royal Kunia, Phase II.

ECONOMY - AGRICULTURE

OBJECTIVES AND POLICIES

HRS sec. 226-7(a)(1)

Continued viability in Hawaii's sugar and pineapple industries.

HRS sec. 226-7(a)(2)

Continued growth and development of diversified agriculture throughout the state.

HRS sec. 226-7(b)(6)

Assure the availability of agriculturally suitable lands with adequate water to accommodate present and future needs.

HRS sec. 226-103(d)(1)

Identify, conserve and protect agriculture lands of importance and initiate affirmative and comprehensive programs to promote economically productive agricultural uses of such lands.

HRS sec. 226-103(c)(1)

Provide adequate agricultural lands to support the economic viability of the sugar and pineapple industries.

HRS sec. 226-104(b)(2)

Make available marginal or non-essential agricultural lands for appropriate urban uses while maintaining agricultural lands of importance in the agricultural district.

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COMMENT

The economic viability of the sugar and pineapple industries and the growth of diversified agriculture are the main thrusts of the above objectives and policies. To address these issues with respect to the proposed project an agricultural analysis was conducted by Decision Analysts Hawaii, Inc. to assess the project's impacts. The study found that the project would not adversely affect the economic viability of Oahu Sugar before the leases expire in mid-1990's, would not adversely affect existing diversified activities, and would not limit the growth of diversified agriculture. Section 2.2.3 of this EIS discusses these conclusions in greater detail, while Appendix G contains the entire agricultural study.

PHYSICAL ENVIRONMENT

HRS sec. 226-11(b)(3)

Take into account the physical attributes of areas when planning and designing activities and facilities.

HRS sec. 226-13(b)(6)

Encourage design and construction practices that enhance physical qualities of Hawaii's communities.

HRS sec. 226-13(b)(7)

Encourage urban developments in close proximity to existing services and facilities.

HRS sec. 226-104(b)(7)

Pursue rehabilitation of appropriate urban areas.

HRS sec. 226-104(b)(1)

Encourage urban growth primarily to urban areas where adequate public facilities are already available or can be provided with reasonable public expenditures and away from areas where other important benefits are present, such as protection of valuable agricultural land or preservation of lifestyle.

HRS sec. 226-104(b)(9)

Direct future urban development away from critical environmental areas or impose mitigating measure so that negative impacts on the environment would be minimal.

COMMENT

The site will consider climate, topography, wind direction, views and other physical attributes in finalizing the site plan and designing the structures. The design and construction of the Royal Kunia, Phase II will emphasize an aesthetic philosophy in keeping with the scale and value associated with pride in one's community.

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The proposed project borders the existing Village Park and is therefore in close proximity to public services and facilities. The applicant will provide the necessary support facilities to include sewer, water, drainage and roadways. Anticipated tax revenues generated by the project will exceed the cost for other public facilities and services. For additional detail see *Appendix H* and *Section 2.2.4*.

Regarding *HRS sec. 226-104(b)(7)*, reliance on urban infilling and rehabilitation will not completely satisfy the need of affordable housing. Most of the population capacity projected for the Primary Urban Center and to varying degrees, those projects in other areas come from plans for redevelopment and infilling of previously passed over sites. The projections for development in these areas are overly optimistic. Some of the reasons are: (1) they ignore the public and special interest groups' awareness and propensity to use their ability through legal and political means to stop or delay project which may have a negative impact on their property or community; and, (2) they ignore the immense number of factors which must all come together to make a redevelopment physically and economically attractive, and the human constraints on undeveloped and underdeveloped properties.

The City Council, Planning Commission and the City Administration are recognizing the above limitations and are actively seeking to reduce the population capacity for the PUC and increasing the capacity within Central Oahu.

With reference to *HRS sec. 226-104(b)(9)*, no critical resources will be irretrievably damaged by the project. There are no native or endangered species, habitats, archaeological sites or other environmentally sensitive areas within the project area. For more detail see *Appendices A, C and D*.

FACILITIES

SEWERAGE

HRS sec. 226-15(b)(1)
Encourage the adequate development of sewer facilities that complement planned growth.

WATER

HRS sec. 226-16(b)(1)
Coordinate the development of land use activities with existing and potential water supply.

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TRANSPORTATION

HRS sec. 226-17(b)(2)
Coordinate state, county, federal and private transportation activities and programs toward the achievement of statewide objectives.

HRS sec. 226-17(b)(10)
Encourage the design and development of transportation systems sensitive to the needs of affected communities and the quality of Hawaii's natural environment.

POWER AND COMMUNICATIONS

HRS sec. 226-18(b)(4)
Insure that the development or expansion of power systems and sources adequately consider environmental, public health and safety concerns, and resource limitations.

COMMENT

The project will be developed with a modern waste water disposal system and will be a component to an overall sewer system for the region. Sufficient water is available to support the project. The project site is within the Pearl Harbor Ground Water Control Area. Allocation of this water is controlled by DLNR. DLNR recently allocated approximately 11 mgd to the City and County of Honolulu, Board of Water Supply (BWS). The BWS in turn will allocate this 11 mgd to development in the Central Oahu and Ewa areas.

The planning and design efforts of the Royal Kunia, Phase II project shall coordinate with appropriate federal, state and county agencies regarding the achievement of statewide transportation objectives. On-site transportation systems to include roadway design, bus shelters, parking and other physical elements shall be designed for the visual and pedestrian sensitivity and quality associated with residential neighborhoods and the surrounding residential communities.

The development of power and communication services for the proposed project shall be engineered and designed to ensure that environmental, public safety and health, and resource limitations are adequately considered.

HOUSING

POLICIES AND OBJECTIVES

HRS sec. 226-19(a)(1)
Greater opportunities for Hawaii's people to secure reasonably priced, safe, sanitary homes located in suitable environments that

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satisfactorily accommodate the needs and desires of families and individuals.

HRS sec. 226-19(a)(2)

The orderly development of residential areas sensitive to community needs and other land uses.

HRS sec. 226-19(b)(2)

Stimulate and promote feasible approaches that increase housing choices for low-income, moderate-income and gap group households.

HRS sec. 226-19(a)(3)

Increase homeownership and rental opportunities and choices in terms of quality, location, cost, density style and size of housing.

HRS sec. 226-19(a)(5)

Promote design and location of housing developments taking into account the physical setting, accessibility to public facilities and services, and other concerns of existing communities and surrounding areas.

HRS sec. 226-19(a)(6)

Facilitate the use of available urban lands to accommodate the housing needs in various communities.

HRS sec. 226-104(b)(1)

Encourage urban growth primarily in existing urban areas where adequate public facilities are already available or can be provided with reasonable public expenditures. Secondly, encourage urban growth away from areas where other benefits are present, such as protection of valuable agricultural land or preservation of life style.

HRS sec. 226-104(b)(2)

Make available marginal or non-essential agricultural lands for appropriate urban uses while maintaining agricultural lands of importance in the agricultural district.

HRS sec. 226-104(b)(5)

Encourage CIP expenditures, public services and housing developments that recognize the needs and preference of the counties.

COMMENT

Demand for housing on Oahu is not being met as illustrated by high housing costs and current lack of inventory for sale and for rent. Newspaper articles cite instances of prospective buyers camping overnight at real estate sales offices in order to assure themselves of an opportunity to buy into new projects. State and City agencies have developed studies which indicate an existing unmet need for housing units ranging from 20,000 to 40,000.

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The proposed project would contain 2,400 units. The majority of the units will be intended for people in the middle income range of \$30,000 to \$60,000, while higher priced units are intended along the perimeter of the golf course. Fifty percent of the units will be affordable to household earning below 140% of median income. Therefore, the project will provide a broad range of unit types and unit prices which will appeal to a wide range of home buyers and a wide range of family sized.

The project is located within the Central Oahu Development Plan area. During the past eleven years, this area has been the fastest growing area on the island. Previous studies by the Department of General Planning (City and County of Honolulu) have concluded that allowing greater population growth in Central Oahu would be beneficial in terms of providing a greater choice of desirable living environments, stimulating housing market competition, and increasing the supply of affordable housing. It was also concluded that the greater population growth could be accommodated without serious negative impacts on the agricultural economy and in a manner consistent with achieving a desired urban-fringe environment. Furthermore, following a City Council public hearing in Mililani (January 5, 1989) on the General Plan and Development Plans for Ewa and Central Oahu during which the vast majority of persons testifying spoke on behalf of increasing growth, the City Council has taken initial steps to adopt a General Plan change that would substantially increase growth in Central Oahu.

3.1.3 State Functional Plans

The Hawaii State Plan directs the appropriate State agencies to prepare functional plans. These plans serve as the primary implementing vehicle for the goals, objectives and policies of the Hawaii State Plan. Following is a discussion of the applicable functional plans impacted by the proposed project.

AGRICULTURE

The State Agriculture Functional Plan focus is to carry out the Hawaii State Plan objectives and policies for agriculture which center on the (1) continued viability in Hawaii's sugar and pineapple industries, and (2) continued growth and development of diversified agriculture throughout the State.

The proposed project will result in the urbanization of lands which are currently under sugarcane cultivation by the Oahu Sugar Company. A thorough discussion of the impact of the proposed development on agriculture is presented in *Section 2.2.3* and *Appendix G*. As noted, the proposed development (1) is not expected to adversely affect the economic viability of OSCo before the major leases expire in the mid-1990's and (2)

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would not limit the growth of diversified agriculture. On the other hand, the project would substantially contribute to meeting the affordable housing need of the island.

HEALTH

The State Health Plan focuses essentially on public health programs under the jurisdiction of the State Health Department. With reference to the proposed project, health and medical care facilities are located in the immediate region and are expected to accommodate the additional population of the project.

Environmental matters of the State Health Plan have been addressed in the sections of this document relating to air quality, use of chemicals, noise impacts, and the adequacy of public facilities and services. Where adverse impacts have been identified, appropriate mitigative measures have been proposed.

HOUSING

The State Housing Functional Plan is maintained by the State Housing Finance and Development Corporation, an agency administratively attached to the State Department of Business and Economic Development. The objectives of the plan primarily deal with the orderly development of housing and expanded opportunities for Hawaii's people to secure adequate and affordable housing.

The Royal Kunia, Phase II project will contribute significantly to the State's housing inventory in offering a broad range of unit types at various sizes and costs. A thorough discussion on the proposed housing is presented in *Section 1.6* and *Appendix I* of this document.

HISTORIC PRESERVATION

The State Historic Preservation Functional Plan is prepared and maintained by the State Department of Land and Natural Resources (DLNR). Procedures for development include preparing an archaeological survey, preserving sites considered of value, and coordination of salvaging and preservation with the State Historic Sites Office. An archaeological survey of the proposed site has been conducted (*Appendix A*). Survey results indicate that no significant archaeological or historical sites exist in the area.

RECREATION

The State Recreation Plan reviews the demands and actions that need to be taken to meet existing and future recreational

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demands. The proposed project includes a 16-acre public park and will also include a 18-hole golf course as a major amenity in the development.

TRANSPORTATION

The general intent of the Transportation Plan is to provide for an efficient, safe, and convenient movement of people and goods, and to develop a statewide transportation system supportive of planned growth objectives throughout the state.

A Traffic Assessment (*Appendix K*) was performed for the project development. Roadway modifications will be necessary and mitigative measures such as a park and ride program are recommended.

ENERGY

The State Energy Functional Plan is prepared and maintained by the Energy Division of the State Department of Business and Economic Development. The purpose of the plan is to further define and implement objectives of the State Plan which include the provisions of dependable, efficient and economic statewide energy systems capable of supporting the needs of the people, and increased energy self-sufficiency.

Energy conservation methods will be investigated for use in the project, and buildings, where possible, will be designed to take advantage of natural ventilation.

WATER RESOURCES

The plan's objectives generally are the development and regulation of water resources to meet different land uses, as well as the preservation of water-related ecological, recreational, and aesthetic values and the quality of water resources.

The developer will coordinate with the DLNR and the Board of Water Supply in addressing the project's water needs. The proposed water system development for the project is not expected to be of any significant impact. Water quality impacts in the area are expected to be minimal and in conformance with the objectives of the Plan.

3.1.4 Coastal Zone Management Area Rules and Regulations

The objectives and policies of the Hawaii Coastal Zone Management (CZM) Program are included in the Shoreline Protection Act of 1975 (Chapter 205A-2), Hawaii Revised Statutes. The project is about 7-miles from the coastline and does not lie within the Special

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Management Area (SMA). A Special Management Area Permit from the City and County of Honolulu is not required.

Compliance with the relevant objectives of the Hawaii CZM Program (205A-2, HRS) are outlined below:

(b) (1) Recreational Resources

The focus of this objective is to provide "coastal recreational opportunities accessible to the public". Although the project is some 7-miles away from the coastline, the developer recognizes the need to provide recreational opportunities to the residents of the project. A 16-acre park and an 18-hole golf course, together with other recreational amenities in Royal Kunia Phase I, will serve the recreational needs of the residents.

(b) (2) Historic Resources

No archaeological or historically significant resources are known to exist on the property.

(b) (3) Scenic and Open Space Resources

As a gentle slopping plain, the area is not noted for its landmark features or other natural elements of visual significance. Development along Kunia Road will have a substantial landscaped setback area to ensure visual compatibility between the current agricultural character and the proposed development. The 18-hole golf course and street tree plantings, and other landscape amenities, will have substantial mitigative effects in minimizing the overall impact of the development when viewing in a mauka direction.

(b) (4) Coastal Ecosystems

Development of the project site is not expected to have any noticeable impact upon the configuration of Waikele Stream, and flow levels and water quality of the Stream are not expected to be altered or changed to any measurable degree.

(b) (5) Economic Uses

The proposed development, especially the industrial area, will stimulate the region, county and state economies.

(b) (6) Coastal Hazards

Due to its inland location, the development is not subject to inundation by Coastal storm waves or tsunamis. A drainage master plan has been prepared and is presently under study by the Department of Public Works.

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3.2 CITY

3.2.1 General Plan

POPULATION

OBJECTIVE C:

POLICY 3: Manage physical growth and development in the urban-fringe and rural areas so that:

- a. An undesirable spreading of development is prevented; and
- b. Their proportion of the island wide resident population remains unchanged.

COMMENT

The current General Plan population distribution for Central Oahu shows that the present development plan for the area is at the upper limits of the population range in the General Plan for the year 2010.

The proposed project will require an amendment to the General Plan population distribution guidelines. The current 16.5% allocation for Central Oahu would have to be increased to about 17.3% to accommodate the anticipated 7,680 additional residents. Both the State and City has acknowledged the attractiveness of Central Oahu as a residential area in recent land use boundary change amendments and in various development plan approvals. Consideration for adjusting the population guidelines of the General Plan is likely to occur following the 1990 U.S. Census.

ECONOMIC ACTIVITY

OBJECTIVE A: To promote employment opportunities that will enable all the people of Oahu to attain a decent standard of living.

POLICY 1: Encourage the growth and diversification of Oahu's economic base.

POLICY 2: Encourage the development of small businesses and larger industries which will contribute to the economic and social well-being of Oahu residents.

COMMENT

In addition to construction jobs, the industrial component of the development could generate between 1300 and 2000 jobs, with another 50 jobs generated by the proposed golf course.

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OBJECTIVE G: To bring about orderly economic growth on Oahu.

Policy 2: Permit the moderate growth of business centers in the urban-fringe areas.

COMMENT

Royal Kunia I and II, together with Village Park development will represent about 7,000 residential units. The planned industrial area will be conveniently located to serve the needs of the residents as well as provide close-in employment.

NATURAL ENVIRONMENT

OBJECTIVE B: To preserve and enhance the natural monuments and scenic views of Oahu for the benefit of both residents and visitors.

POLICY 2: Protect Oahu's scenic views, especially those seen from highly developed and heavily travelled area.

COMMENT

The development will not impair any existing views enjoyed by the public. Furthermore, the residents of the development will enjoy views of Pearl Harbor, Diamond Head and the mountains.

HOUSING

OBJECTIVE A: To provide decent housing for all the people of Oahu at prices they can afford.

POLICY 1: Develop programs and controls which will provide decent homes at the least possible cost.

POLICY 3: Encourage innovative residential development which will result in lower costs, added convenience and privacy, and the more efficient use of streets and utilities.

POLICY 10: Promote the construction of affordable dwellings which take advantage of Oahu's year-round moderate climate.

COMMENT

Central Oahu has been a leader in providing decent affordable housing for Oahu residents for many years. Housing development, especially along Kunia Road (Village Park), have provided homes mainly for first time buyers. The proposed Royal Kunia development will continue this pattern providing homes that are affordable to those in a wide range of income levels. The units will be designed to take advantage of the mild

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weather conditions, and the land development cost is expected to be favorable due to the gentle topography of the area and nearby infrastructure.

OBJECTIVE C: To provide the people of Oahu with a choice of living environments which are reasonably close to employment, recreation, and commercial centers and which are adequately served by public utilities.

POLICY 1: Encourage residential developments that offer a variety of homes to people of different income levels and to families of various sizes.

POLICY 3: Encourage residential developments near employment centers.

POLICY 5: Discourage residential development where roads, utilities and community facilities cannot be provided at a reasonable cost.

COMMENT

Central Oahu has been recognized as a very desirable place to reside, and Village Park in particular (below the project site) has offered Oahu residents an opportunity to live in an area close to the future employment, commercial and recreational centers of the Ewa secondary urban center.

Royal Kunia, Phase II (and Royal Kunia, Phase I now under consideration by the City Council) will offer a variety of housing choices ranging from apartment units to various types of single-family units. Within the developments major areas will be devoted to recreational and open space uses, including parks, recreational facilities and golf courses.

Royal Kunia, Phase II will also offer employment opportunities created by the development of 130 acres of industrial land, as well as the employment opportunities generated by the golf course development.

Roads, water, and other utilities and services in the area will require upgrading; but the cost of these improvements are expected to be reasonable in light of the major infrastructure improvements already in place to serve the development of Village Park.

TRANSPORTATION AND UTILITIES

OBJECTIVE A: To create a transportation system which will enable people and goods to move safely, efficiently, and at a reasonable cost; serve all people, including the poor, the elderly, and the physically

*Royal Kunia, Phase II
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handicapped; and offer a variety of attractive and convenient modes of travel.

POLICY 9: Promote programs to reduce dependency on the use of automobiles.

POLICY 10: Discourage the inefficient use of private automobile, especially in congested corridors and during peak-hours.

COMMENT

Land for a 5-acre Park and Ride Facility has been dedicated to the City on lands makai of the project site. This facility will also serve Royal Kunia, Phase II.

OBJECTIVE C: To maintain a high level of service for all utilities.

POLICY 5: Require the installation of underground utilities wherever feasible.

COMMENT

The utilities systems will be underground.

PHYSICAL AND DEVELOPMENT AND URBAN DESIGN

OBJECTIVE A: To coordinate changes in the physical environment of Oahu to ensure that all new developments are timely, well-designed, and appropriate for the areas in which they will be located.

POLICY 4: Require new developments to provide or pay the cost of all essential community services, including roads, utilities, schools, parks, and emergency facilities that are intended to directly serve development.

POLICY 6: Encourage the clustering of developments to reduce the cost of providing utilities and other public services.

POLICY 7: Locate new industries and new commercial areas so that they will be well related to their markets and suppliers, and to residential areas and transportation facilities.

POLICY 8: Locate community facilities on sites that will be convenient to the people they are intended to serve.

POLICY 10: Establish danger zones to exclude incompatible uses from hazardous areas surrounding airfields, electromagnetic-radiation sources, and storage places for fuel and explosives.

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COMMENT

Royal Kunia, Phase II is an extension, a continuation of the proposed planned community of Royal Kunia, Phase I and the existing planned community of Village Park. These developments have been designed to create a community, a living environment where parks, schools recreation facilities, commercial and social services, and jobs are available and located conveniently to serve the residents of the development. Roads and utilities will be built by the applicant. Park lands will be dedicated to the City, and land for a park and ride and child care facility has already been dedicated to the City. All the land use components, including the transportation network, have been designed to ensure a proper land use relationship, including the placement of the golf course next to the Naval Magazine area.

CULTURE AND RECREATION

OBJECTIVE D: To provide a wide range of recreational facilities and services that are readily available to all residents of Oahu.

POLICY 9: Require all new developments to provide their residents with adequate recreation space.

POLICY 10: Encourage the private provision of recreation and leisure-time facilities and services.

COMMENT

Land for a 16-acre park will be dedicated to the City. In Royal Kunia, Phase I, a 12-acre private recreation center will be built.

3.2.2 Development Plan

LAND USE MAP

The site is currently designated Agriculture. To change the agricultural designation to the uses proposed in the project will require a prior amendment to the General Plan population distribution guidelines.

**COMMON PROVISIONS - SECTION 4, GENERAL URBAN
DESIGN PRINCIPLES AND CONTROLS**

This section of the DP Ordinance discusses the importance of Public Views, the provisions of Open Space, and the need for Landscaping.

COMMENT

The proposed development is consistent with the General Urban Design Principles and Controls as called for in the

*Royal Kunia, Phase II
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General Plan. The project will be generously landscaped, parks and other open space uses, such as a golf course will be provided, and residents within the project will be afforded views of the mountains and ocean.

**SPECIAL PROVISIONS - SECTION 2, URBAN DESIGN
PRINCIPLES AND CONTROLS**

This Section of the DP Ordinance for Central Oahu specifies the guidelines for Height Controls, Density Controls, Open Space, and Public Views, with the latter calling attention to the panoramic views of the Waianae mountains and the sea from Kunia Road.

COMMENT

The project will incorporate the Urban Design Principles and Controls into its design. Panoramic views of the mountains and sea from Kunia Road will not be impacted. Instead, these views will be part of the living environment of the people living in the project.

3.2.3 Zoning and Subdivision

The existing zoning is Ag-1, Restricted Agriculture. The proposed zoning would consist of the following districts: R-5 Residential, A-1 Low Density Apartment, I-1 and/or I-2 Limited and/or General Industrial District, P-2 General Preservation District (golf course and parks/recreation). These zoning districts are consistent with the proposal to amend the Central Oahu Development Plan. Application for these zoning districts would be filed with the Department of Land Utilization once the Development Plan is approved.

To conform with the subdivision requirements, the applicant will ensure that the facilities to be provided will be designed and built to County standards, and that the number and size of lots will conform to the standards of the Land Use Ordinance, and that grading will meet the requirements of the Department of Public Works. Also, the requirements of the Park Dedication Ordinance will be met.

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4. PROBABLE ADVERSE ENVIRONMENTAL EFFECTS

The following adverse environmental effects, short and long term, cannot be avoided if the project is implemented as proposed.

IMPACT

MITIGATING MEASURES

Loss of Agricultural Lands:

The project area is presently under sugarcane cultivation by the Oahu Sugar Company (OSCo). Study prepared for this report indicate that the project is not expected to threaten the economic viability of OSCo nor the growth of diversified agriculture.

The developer will bear the cost of existing Ag infrastructure and will coordinate with OSCo on the phasing of the project.

Traffic:

Increased vehicular traffic will be generated on Kunia Road, Kunia Interchange and H-1 Freeway.

Kunia Road will be improved. Kunia interchange will require improvement with or without the project. Interchange improvement alternatives will require consideration of all proposed developments in the area. A coordinated effort between developers and the State Department of Transportation to develop a Regional Traffic Master Plan is underway.

The capacity of H-1 is a regional problem shared by existing and proposed communities from Moanalua to Ewa. State and City transportation system will require improvements, including the State's phased program that maximizes the use of existing facilities.

To help alleviate traffic congestion, park and ride facilities and ridesharing programs will be considered.

Also, employment opportunities and economic activity within the proposed industrial area will help mitigate regional traffic impacts.

Construction:

Clearing and construction work will result in temporary dust, noise and some traffic disruption.

The developer and its contractors will comply with local grading and subdivision ordinances, and with the regulations of the Department of Health.

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IMPACT

MITIGATING MEASURES

Utilities:

Increased need for utility services, including city supplied water and sewer.

Water consumption would be less than current agricultural use. Both water and sewer plans must be approved by public agencies.

Services:

Increased need for public services such as police, fire, schools and recreational facilities.

A study impact on state and County finances indicates that the project will generate revenues exceeding expenditures by \$6.2 million per year.

Air Quality:

Under "worst-case" conditions some exceedances of the State's ambient air quality standards for carbon monoxide are predicted.

Encouraging mass transit use and carpooling.

The proposed development, however, will have overriding public benefits, including an increased supply of affordably priced units and provisions for some 2,000 jobs.

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5. ALTERNATIVES CONSIDERED

The purpose of this Chapter is to develop, describe and weigh alternatives to the proposed development which can involve significant tradeoffs among the uses of available environmental resources.

Three alternatives to the proposed development were evaluated:

1. Alternative Land Uses
2. Continued Agricultural Use
3. No Action

5.1 ALTERNATIVE LAND USES

This alternative essentially examines the redistribution of the various land use components presently on the proposed plan to either more or less acreage.

RESIDENTIAL

The proposed plan allocated about 50 percent of the acreage to residential development. Increasing this acreage will result in more units to meet the housing needs. However, it will result in more traffic congestion, the need for more school facilities, more infrastructure, and probably less revenues to the State and City. Increasing the residential acreage will probably require the reduction of the land allocated to industrial development, thereby reducing employment opportunities in the area. Although the proposed golf course represents some 172 acres (25%) of the project area, it is located in an area that the Navy considers to be an appropriate buffer zone next to its Naval Magazine Waikale facilities. Residential or industrial type uses would not be considered appropriate at this location.

INDUSTRIAL

The proposed plan allocated about 130 acres of land (20% of total) for industrial development. Increasing this acreage could result in more employment opportunities, but at the expense of needed housing units. This alternative would probably cause more noise and environmental concerns among the residents in the project as well as the adjoining residential areas. Marketability of a much larger industrial area also becomes a question in light of the existing Campbell Industrial Park.

OTHER

Another land use alternative is to develop the entire site for residential and/or industrial uses. Although there are advantages, such as more residential units or a major employment center for the central corridor, it would not achieve the growth objectives of existing developments in the area for a full-service community.

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5.2 CONTINUED AGRICULTURAL USE

This alternative would result in the land either being continued under sugarcane production or developed for other agricultural uses. Retention of the site in agricultural use will preserve open space and reserve important agricultural lands for future development options.

However, the long term outlook for the sugar industry is poor, and the future of Oahu Sugar Company becomes increasingly uncertain - See *APPENDIX G*.

Diversified agriculture is another alternative. However, considering the amount of uncommitted acreage which remains available to diversified agriculture at other locations, it is extremely doubtful, given lease revenues derived from agriculture and the pressures for urbanization, that the land will be put to such uses. Furthermore, retention of this land for agricultural use will put pressure on other lands in agricultural use to be converted to residential use to meet the demand for housing.

The Conditional Uses allowed under the Land Use Ordinance within the Ag-1 Agricultural District are still other alternatives.

The Land Use Ordinance (LUO) permits certain uses as Conditional Uses, Type 1 and Type 2.

Type 1 (Public Hearing Not Required)

Agricultural product processing, minor

Broadcasting antennae, line-of-sight relay devices

Centralized bulk collection, storage, and distribution of agricultural products

Helistops

Use of Historic Structures

Neighborhood grocery stores

Resource extraction

Sale and service of machinery use in agricultural production

Saw mills

Storage and sale of seed, feed, fertilizer and other products essential to agricultural production

Utility installations, Type B

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Wind machines with a rated capacity of more than 100 kilowatts

Type 2 (Public Hearing Required)

Agricultural products processing, major, on a site area of one acre or less

Group living facilities

None of the uses listed are considered economically viable uses for the property because of the following reasons:

The property's relative isolation.

The specialized nature and technical needs of some of the uses.

No demonstrated market demand or public need.

Furthermore, it is likely that some of the uses listed would result in adverse impacts greater than the proposed project.

5.3 NO ACTION

Since the project site is presently in sugar production, the no action alternative is feasible at this time. Therefore, non-implementation would allow the land to remain in agricultural use. By allowing the agricultural use to continue, the open space value and drainage characteristics of the site will remain unchanged. Any adverse or beneficial impacts created by the proposed project would not be generated.

If the project was not implemented at this time, it is probable that the land would remain in its present condition until other alternatives, more profitable to the owners, surfaced.

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6. RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES AND MAN'S ENVIRONMENTAL AND THE MAINTENANCE AND ENHANCEMENT OF LONG TERM PRODUCTIVITY.

Implementation of the proposed project clearly defines the short-term uses of the environment and the maintenance and physical actions required to establish and develop the project. These actions include clearing, grubbing, installing infrastructure, constructing varied buildings and the developing of support facilities to sustain users at each stage of development.

Short-Term

Construction-related activities will create noise, increase air pollution, disrupt traffic circulation and generate dust from dump trucks, earth-moving equipment, and various mechanical construction tools, etc. During grading operations, the existing vegetation cover will be lost and surface soils will be subject to erosion. Immediate mitigation measures will be required to prevent increased siltation in streams leading to Peal Harbor. Construction will result in a short-term negative impact on the environment. Completion of the project in accordance with local standards provide sufficient mitigation measures to reduce and virtually eliminate these temporary conditions. However, increased traffic, concentrations of CO and ambient noise levels will increase upon completion of the project.

Jobs will be created during the construction period. In terms of "cash flow", this results in a short-term positive impact on employment within the area.

Materials purchased and their utilization will also create a short-term beneficial impact on the economy of the area.

Long-Term

The completed community of 2,400 residential units, infrastructure, recreational facilities and industrial area reflects the long-term commitment of resources to the project. The continuing interaction of the community with the surrounding area through its support facilities, services and social activities will contribute to its long-term productivity.

The development of the project is a long-term commitment of prime agricultural land to a permanent urban community.

Maturing of plant materials and maintenance of the golf course and park areas and private yard will have the positive impact of increasing the livability for all occupants in the community.

Air pollution levels will increase due to internal traffic within the project and, to a lesser extent, the use of power tools and equipment used for maintenance of streets and park areas. A negative impact will be the long-term increase of pollution due to increased vehicular traffic on the freeway and Kunia Road at the entrance to the project. Although National CO standards will be met, some exceedances of the State's 1-hour and 8-hour CO standards are predicted in certain "hot spots" areas under "worst case"

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situations. Air pollution will decrease from agricultural sources including cane burning, plowing, harvesting and transportation of harvested crops.

Maintenance of necessary infrastructure elements, community facilities and municipal services will sustain the project at a high degree of livability for an average of 30 to 50 years.

Job opportunities will change from short-term construction-oriented to those created by the industrial development. In addition, the golf course will offer employment in the recreational industry.

The urbanization of the land forecloses the land's future option for agriculture. Once the infrastructure and buildings are constructed, it would be extremely difficult to change the designated land use to agricultural or other land uses especially in relations to investment and return on private capital.

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7. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Completion of each phase of the project will add a progressive and permanent commitment of resources for each development site.

Conversion of agricultural land to a long-term commitment of 30 to 50 years' urbanization would not be retrievable unless structures were demolished.

Building materials necessary to construct the project will be irretrievably committed. There would be only limited salvage value.

Human resources and energy expended to construct, maintain, and service the project would be irretrievable.

Infrastructure and service consumption factors are essentially irreversible.

State and local governments would have a long-term public financial commitment to support facilities, services and programs such as fire, police, utilities, education, solid and liquid waste disposal, parks and recreation, cultural, social and health care services.

Environmental resources will be committed or changed according to the community's needs and desires. Air masses will change and become polluted with dust and vehicular exhaust emissions. Water resources will be tapped, used and returned in polluted form to the environment. Ecological balance will be modified between such natural events as precipitation, ground run-off, evaporation and ground water storage as surface permeability is reduced due to construction. The developer must control erosion and establish new drainage patterns with man-made structures and landscaping. All structures placed on the site will result in a loss of views, vistas and existing open space.

Use of the land for urbanization illustrates the trend of growth in the Central Oahu area. Development will also irreversibly close another gap in the central corridor of the island.

The present shift in population distribution patterns towards the Ewa and urban-fringe areas will be irreversibly accommodated by implementation of the project.

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8. AN INDICATION OF WHAT OTHER INTEREST AND CONSIDERATION OF GOVERNMENT POLICIES ARE THOUGHT TO OFFSET THE ADVERSE ENVIRONMENTAL EFFECTS OF THE PROPOSED PROJECT.

The proposed project was determined the best alternative for the project site. The negative impacts generated by the proposed project are small when compared to the positive impacts of the project.

The project will provide needed affordable housing, recreational benefits and amenities, and industrial land for an employment base. The project is also expected to generate a \$6.2 million dollar a year surplus in public revenue over public expenditure. The project also conforms to many of the State and City Objectives and Policies as discussed in Chapter 3 of this document.

The combination of uses being proposed allows for the integration of a number of varying objectives sought by government and by the surrounding community. The alternatives considered achieve these ends to a lesser degree.

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9. MAJOR PERMITS AND APPROVALS

A number of permits and approvals must be secured by the Applicant before development of the site can begin:

<u>PERMIT/APPROVAL</u>	<u>APPROVING AUTHORITY</u>	<u>STATUS</u>
Land Use District Boundary Amendment	Land Use Commission	Petition to be filed
General Plan Amendment	City Council	Awaiting 1990 U.S. Census
Development Plan Amendment	City Council	Application deferred to 1990
Zone Change	City Council	Will be filed following approval of DP Amendment
EIS	Department of General Planning	In process
Water Master Plan	Board of Water	In process
Subdivision	Department of Land Utilization	Application to be filed following zone change
Grading/Drainage	Department of Public Works	To be submitted during subdivision process
Building Permit	Building Department	To be filed following subdivision process

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10. LIST OF CONSULTANTS INVOLVED IN PREPARATION OF EIS

This report was prepared for Halekua Development Corporation by William E. Wanket, Inc. The following identifies the consultants involved in the preparation and their respective contributions.

<u>FIRM</u>	<u>TASK</u>	<u>INDIVIDUAL</u>
William E. Wanket, Inc.	Primary Author/ Consultants Coordinator	William E. Wanket
Takeyama/Sullivan	Legal Consultants	Jan Sullivan
Archaeological Consultants of Hawaii	Archaeological Survey	Joe Kennedy
Char and Associates	Botanical Survey	Winona Char
Decision Analysts Hawaii	Agricultural Impact/ Fiscal Impact	Bruce Plasch
EarthPlan	Social Impact	Berna Cabacungan
Park Engineering	Engineering	Clarence Tanonaka
Parsons Brinckerhoff	Traffic Impact	Julian Ng
Dr. Green/Dr. Murdoch	Pesticides	Dr. Green/Dr. Murdoch
Barry D. Root/Barry D. Neal	Air Quality Study	Barry D. Root/Barry D. Neal
John Zapotocky	Market Study	John Zapotocky
Dr. Phil Bruner	Fauna Survey	Dr. Phil Bruner
McCarter Computer Services	Typing	Ann McCarter
Best	Printing	Ralph Hee

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**11. CONSULTED PARTIES AND COMMENTS RECEIVED DURING
THE PREPARATION OF THE DRAFT EIS**

The notice of availability of the EIS Preparation Notice (EISPN) was officially published in the Office of Environmental Quality Control (OEQC) Bulletin on October 23, 1988. The deadline for requesting consulting party status and/or for submitting comments was established as November 22, 1988. Nine (9) agency comment letters were received after the deadline, however, Applicant has responded to all comment letters.

The 49-agencies, organizations and persons listed below were sent a copy of the EISPN. Two mail-outs, however, were returned to the sender by the Post Office because of the lack of a forwarding address (West Oahu Soil and Water Conservation District and Waipahu Businessmen Association). An asterisk (*) placed before the entry indicates receipt of comments (26 total) and a plus (+) sign following the entry indicates a response to the comment received (20 total). The remaining 6 comments required no response.

FEDERAL AGENCIES

- U.S. Department of Agriculture, Soil Conservation Services
- * Lt. Chris Reiling, Commanding Officer, Naval Magazine Lualualei
- * U.S. Department of Interior, Fish and Wildlife Services
- * U.S. Department of Navy, Commander Naval Base, Pearl Harbor +
- U.S. Department of Transportation
- * U.S. Army Corps of Engineers +

STATE AGENCIES

- * Department of Accounting & General Services, Division of Public Works
- * Department of Agriculture +
- * Department of Business and Economic Development, Housing Finance and
Development Corporation +
- * Department of Education +
- * Department of Health +
- Department of Human Services
- * Department of Land and Natural Resources +
- * Department of Transportation +

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- * Hawaii Housing Authority +
Office of Environmental Quality Control
- * Office of State Planning +
- * State Land Use Commission
University of Hawaii Environmental Center
University of Hawaii Water Resources Research Center

CITY AND COUNTY OF HONOLULU

- Mayor's Office
- * Board of Water Supply +
- * Building Department
Department of General Planning
- * Department of Housing and Community Development +
- * Department of Land Utilization +
- * Department of Parks and Recreation +
- * Department of Public Works +
- * Department of Transportation Services
- * Honolulu Fire Department +
- * Honolulu Police Department +
- * Office of Human Services +

COMMUNITY ORGANIZATIONS/PERSONS

- American Lung Association
- Conservation Council of Hawaii
- * Hawaiian Electric Company +
- * Hawaiian Telephone Company +

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Life of the Land

Mililani Neighborhood Board No. 25

Sierra Club, Hawaii Chapter

Village Park Community Association

Waipahu Community Association

Waipahu 2000 Community Council

Waipahu Neighborhood Board No. 22

Waipahu Businessmen Association

West Oahu Soil and Water Conservation District

Wahiawa Neighborhood Board No. 26

Councilperson Mansho

Oahu Sugar Company

Senator Menor

The Estate of James Campbell

Reproduced in the following pages (blue section) is the EISPN, followed by the comments received and the letters prepared in response.

Royal Kunia, Phase II
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12. COMMENTS RECEIVED DURING THE PREPARATION OF THE FINAL EIS

Sixty (60) copies of the Draft Environmental Impact Statement (DEIS) were delivered to the Office of Environmental Quality Control (OEQC) on February 3, 1989. Notice of the DEIS was published in the February 8, 1989 issue of the OEQC Bulletin. OEQC distributed copies of the DEIS to interested public agencies, organizations and individuals (see OEQC Distribution List in the following *GREEN Section*) per Section § 11-200-21 of the Environmental Impact Statement Rules. In addition, one copy of the DEIS was delivered to the Honolulu Department of General Planning, the "accepting agency."

Following is a list of persons, organizations and public agencies that have commented on the DEIS (26 total). An asterisk placed before the entry indicates receipt of comments after the 45-day public review deadline of March 25, 1989 (3 total).

**LIST OF PERSONS, ORGANIZATIONS
AND PUBLIC AGENCIES COMMENTING
ON THE DEIS**

FEDERAL AGENCIES (4)

- U.S. Department of the Army
- U.S. Department of Navy
- * Soil Conservation Service
- U.S. Fish and Wildlife Service

STATE AGENCIES (7)

- Department of Accounting & General Services, Division of Public Works
- * Department of Agriculture
- Department of Business and Economic Development
 - ▶ Housing Finance and Development Corporation
 - ▶ Energy Division
- Department of Defense
- Department of Health
- Department of Land and Natural Resources

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CITY AND COUNTY OF HONOLULU (10)

Board of Water Supply
Department of General Planning
Department of Housing and Community Development
Department of Land Utilization
Department of Parks and Recreation
Department of Public Works
Department of Transportation Services
Honolulu Building Department
Honolulu Fire Department
Honolulu Police Department

OTHERS (5)

American Lung Association
Hawaiian Electric Company
University of Hawaii, Environmental Center
Hawaii Institute for Biosocial Research
* American Lung Association

All comments (including late comments) were responded to within 14-days from the end of the 45-day review period. Reproduced in the following pages (*GREEN Section*) is OEQC's Distribution List of those receiving copies of the DEIS followed by the comments received and the letters prepared in response.

Central Oahu Development Plan Amendment
and
Environmental Assessment

ROYAL KUNIA,
PHASE II
HOAEAE, EWA, OAHU

HALEKUA DEVELOPMENT
CORPORATION

WILLIAM E. WANKET, INC.

OCTOBER 1988

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List of Exhibits

- EXHIBIT 1 LOCATION MAP**
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- EXHIBIT 4 PROPERTY BOUNDARY DESCRIPTION**
- EXHIBIT 5 DGP SUMMARY SHEET**

APPLICATION FOR DEVELOPMENT PLAN
AMENDMENT AND ENVIRONMENTAL
ASSESSMENT TO DESIGNATE CERTAIN
LANDS IN CENTRAL OAHU FOR
RESIDENTIAL, LOW DENSITY APARTMENT,
INDUSTRIAL, RECREATION, AND PUBLIC
FACILITIES

1989 ANNUAL REVIEW

BACKGROUND

A. ESSENTIAL INFORMATION

1. APPLICANT: Halekua Development Corporation
2024 N. King Street
Honolulu, Hawaii 96819
Telephone: 848-2315
2. AGENT: William E. Wanket, Inc.
Pacific Tower 1010
1001 Bishop Street
Honolulu, Hawaii 96813
Telephone: 533-4937
3. LANDOWNER: Halekua Development Corporation
4. REQUEST: To designate certain land in Central Oahu as
Residential, Low Density Apt., Industrial,
Recreation, and Public Facilities.
5. AREA: 669.9 acres.
6. LOCATION: Along Kunia Road, above Village Park
Development.
7. TAX MAP: 9-4-02: Portion of 1 and
9-4-03: Portions of 1 & 9
8. EXISTING USE: Agriculture, sugar cane production.
9. STATE LAND USE: Agriculture.

10. DEVELOPMENT PLAN:

- a. Land Use Map: Agriculture
- b. Public Facilities Map: None.

11. ZONING: AG-1 Restricted Agriculture

B. DESCRIPTION OF THE PROPERTY

1. Property Boundary

See Exhibit 4.

2. Topography (Natural Features)

Aerial photo contour maps of the area indicate that the site slopes from the Northwest to the Southeast at a gradient of 2 to 6 percent. A drainage way traverse the Western section of the site. The ground elevation range from approximately 435 to 595 mean sea level.

3. Elaborate on Existing Uses

The property is under lease to Oahu Sugar Company until 1996, and the land is currently in sugar cane production.

4. Slope

Refer to *B.2 Topography* above.

5. Soils

The red to reddish brown soil found on site generally fall within the clayey silt ML and MH category of the Unified Soil Classification System. The USDA Soil Conservation Survey classifies the soils in the project area as Lahaina silty clay (LaA) and Wahiawa silty clay (WaA).

6. Location Map

See Exhibit 1.

7. Topo Map

See Exhibit 2.

8. Project Layout

See Exhibit 3.

DEVELOPMENT PROPOSAL

A. APPLICANTS PROPOSED USE OF THE PROPERTY

Royal Kunia Phase II consists of the following land use components:

LAND USE	ACRES	UNITS
Single Family	272.8	1500
Low Density Apts.	56.0	900
Industrial	130.0	
Golf Course	171.7	
Public Park	16.0	
School	6.0	
Circulation	17.4	
TOTALS	<u>669.9</u>	<u>2400</u>

The property will be developed as shown on Exhibit 3.

B. DEVELOPMENT TIMETABLE

Construction is estimated to begin in 1994 with completion estimated to occur within 5 years.

C. APPROXIMATE COST

Final cost estimates have not been developed. Preliminary on-site and off-site costs are estimated between 75-100 million.

NEED FOR THE PROPOSED DEVELOPMENT

A. PUBLIC PROBLEM OR NEED

An evaluation of the housing inventory and housing characteristics of Oahu demonstrates that there is not now, nor has there been during the past 25-years, an adequate supply of housing to meet the needs of the existing and growing population. The project is being proposed as a partial solution to resolving this unmet and growing need. The industrial component of the project will serve as a partial answer to Oahu's; future business space needs, as well as promote employment opportunities for residents within the project's environs, reducing employment dependency and travel to other areas.

A market analysis will be performed, and its findings will be made part of the Environmental Impact Statement that will be prepared.

B. INTENDED MARKET

A total of 2,400 housing units are proposed with the predominant type being single-family units (1,500). The intent is to offer a variety of homes to people of different income levels and to families of various sizes. Higher priced market units are intended along the perimeter of the golf course, while the majority of the units will be targeted for people in the middle income range of \$30,000 to \$60,000. During the various planning approval processes, affordable housing requirements will be determined.

C. DESIGNATED USE VS. PROPOSED USE

1. Designated Use

The property is designated Agriculture on the Central Oahu Development Plan and classified State Agriculture by the Land Use Commission. The land is classified mostly as Prime Agricultural Land under the Agricultural Lands of Importance in the State of Hawaii (ALISH). It is also essentially classified as "A" under the Land Study Bureau Classification System, and is classified as important agricultural land under the proposed Land Evaluation and Site Assessment (LESA) System.

The land is leased to Oahu Sugar Company (1996), and it is currently in sugarcane production. With the proposed development, the land will be permanently lost from the State's agricultural land inventory. An Agricultural Impact Analysis will be performed to assess the project's impact on Oahu Sugar Company and on the agricultural policies of the State of Hawaii. The analysis will be part of the Environmental Impact Statement that will be prepared.

2. Proposed Use

The project has been proposed as a response to an acknowledged shortage of and a future need for housing. The project is being designed in the context of a community that will include a variety of housing units and which will offer employment, education, recreation, and business services and opportunities within the project boundaries.

Some of the objectives of the development are:

- a. To expand the opportunities for the first time home buyers.
- b. To provide business and employment opportunities.
- c. To increase the recreational opportunities within the Waipahu region.
- d. To continue, enhance and expand the existing symbiotic relationship between Waipahu Town and the existing Village Park community.
- e. To continue the development of the area above Village Park into a viable community offering its residents all the services and amenities of a desirable living environment.

FEDERAL/STATE/CITY PLANS/PROGRAMS

A. FEDERAL

The property adjoins Military owned lands in Waikele Gulch. These Military lands are used for Naval Magazine. In the "official blast zone," the applicant proposes golf course development, which the Military has found acceptable in similar proposals bordering the Magazine area.

B. STATE

The use and reclassification of the land from agriculture to urban raises at least three major issues addressed by the State Plan: (1) reconciliation of competing policies between provision of affordable housing and preservation of prime agricultural land; (2) population distribution patterns, and (3) compatibility with facility plans.

Conformance with the State Plan, Priority Guidelines, and Functional Plans will be fully discussed and analyzed in the preparation of an Environmental Impact Statement that will be prepared.

C. CITY

1. General Plan

POPULATION

OBJECTIVE C:

POLICY 3: Manage physical growth and development in the urban-fringe and rural areas so that:

- a. An undesirable spreading of development is prevented; and
- b. Their proportion of the island wide resident population remains unchanged.

Comment

The current General Plan population distribution for Central Oahu shows that the present development plan for the area is at the upper limits of the population range in the General Plan for the year 2005.

However, because of the unmet need for additional housing, the Land Use Commission recently approved several requests to redistrict lands in Central Oahu for housing developments. Also, the City's Department of General Planning has for several years attempted to increase the development potential for Central Oahu by proposing changes to the General Plan that would allow greater population growth. The City Council, also,

Royal Kunia, Phase II

has recognized the need for additional growth potential for Central Oahu, and is currently considering several options to amend the General Plan. Furthermore, after considering several options to amend the General Plan population ranges, the Planning Commission acted (1988) to recommend substantial increases in the population limits for Central Oahu.

ECONOMIC ACTIVITY

OBJECTIVE A: To promote employment opportunities that will enable all the people of Oahu to attain a decent standard of living.

POLICY 1: Encourage the growth and diversification of Oahu's economic base.

POLICY 2: Encourage the development of small businesses and larger industries which will contribute to the economic and social well-being of Oahu residents.

Comment

In addition to construction jobs, the industrial component of the development could generate between 1300 and 2000 jobs, with another 50 jobs generated by the proposed golf course.

OBJECTIVE G: To bring about orderly economic growth on Oahu.

Policy 2: Permit the moderate growth of business centers in the urban-fringe areas.

Comment

Royal Kunia I and II, together with Village Park development will represent about 7,000 residential units. The planned industrial area will be conveniently located to serve the needs of the residents as well as provide close-in employment.

NATURAL ENVIRONMENT

OBJECTIVE B: To preserve and enhance the natural monuments and scenic views of Oahu for the benefit of both residents and visitors.

POLICY 2: Protect Oahu's scenic views, especially those seen from highly developed and heavily travelled area.

Comment

The development will not impair any existing views enjoyed by the public. Furthermore, the residents of the development will enjoy views of Pearl Harbor, Diamond Head and the mountains.

HOUSING

OBJECTIVE A: To provide decent housing for all the people of Oahu at prices they can afford.

POLICY 1: Develop programs and controls which will provide decent homes at the least possible cost.

POLICY 3: Encourage innovative residential development which will result in lower costs, added convenience and privacy, and the more efficient use of streets and utilities.

POLICY 10: Promote the construction of affordable dwellings which take advantage of Oahu's year-round moderate climate.

Comment

Central Oahu has been a leader in providing decent affordable housing for Oahu residents for many years. Housing development, especially along Kunia Road (Village Park), have provided homes mainly for first time buyers. The proposed Royal Kunia development will continue this pattern providing homes that are affordable to those in a wide range of income levels. The units will be designed to take advantage of the mild weather conditions, and the land development cost is expected to be favorable due to the gentle topography of the area and nearby infrastructure.

OBJECTIVE C: To provide the people of Oahu with a choice of living environments which are reasonably close to employment, recreation, and commercial centers and which are adequately served by public utilities.

POLICY 1: Encourage residential developments that offer a variety of homes to people of different income levels and to families of various sizes.

POLICY 3: Encourage residential developments near employment centers.

POLICY 5: Discourage residential development where roads, utilities and community facilities cannot be provided at a reasonable cost.

Comment

Central Oahu has been recognized as a very desirable place to reside, and Village Park in particular (below the project site) has offered Oahu residents an opportunity to live in an area close to the future employment, commercial and recreational centers of the Ewa secondary urban center.

Royal Kunia Phase II (and Royal Kunia Phase I now under consideration by the City Council) will offer a variety of housing choices ranging from apartment units to various types of single-

Royal Kunia, Phase II

family units. Within the developments major areas will be devoted to recreational and open space uses, including parks, recreational facilities and golf courses.

Royal Kunia Phase II will also offer employment opportunities created by the development of 130 acres of industrial land, as well as the employment opportunities generated by the golf course development.

Roads, water, and other utilities and services in the area will require upgrading, but the cost of these improvements are expected to be reasonable in light of the major infrastructure improvements already in place to serve the development of Village Park.

TRANSPORTATION AND UTILITIES

OBJECTIVE A: To create a transportation system which will enable people and goods to move safely, efficiently, and at a reasonable cost; serve all people, including the poor, the elderly, and the physically handicapped; and offer a variety of attractive and convenient modes of travel.

POLICY 9: Promote programs to reduce dependency on the use of automobiles.

POLICY 10: Discourage the inefficient use of private automobile, especially in congested corridors and during peak-hours.

Comment

Land for a 5-acre Park and Ride Facility has been dedicated to the City on lands makai of the project site. This facility will also serve Royal Kunia Phase II.

OBJECTIVE C: To maintain a high level of service for all utilities.

POLICY 5: Require the installation of underground utilities wherever feasible.

Comment

The utilities systems will be underground.

PHYSICAL AND DEVELOPMENT AND URBAN DESIGN

OBJECTIVE A: To coordinate changes in the physical environment of Oahu to ensure that all new developments are timely, well-designed, and appropriate for the areas in which they will be located.

POLICY 4: Require new developments to provide or pay the cost of all essential community services, including roads, utilities, schools, parks, and emergency facilities that are intended to directly serve development.

Royal Kunia, Phase II

POLICY 6: Encourage the clustering of developments to reduce the cost of providing utilities and other public services.

POLICY 7: Locate new industries and new commercial areas so that they will be well related to their markets and suppliers, and to residential areas and transportation facilities.

POLICY 8: Locate community facilities on sites that will be convenient to the people they are intended to serve.

POLICY 10: Establish danger zones to exclude incompatible uses from hazardous areas surrounding airfields, electromagnetic-radiation sources, and storage places for fuel and explosives.

Comment

Royal Kunia Phase II is an extension, a continuation of the proposed planned community of Royal Kunia Phase I and the existing planned community of Village Park. These developments have been designed to create a community, a living environment where parks, schools recreation facilities, commercial and social services, and jobs are available and located conveniently to serve the residents of the development. Roads and utilities will be built by the applicant. Park lands will be dedicated to the City, and land for a park and ride and child care facility has already been dedicated to the City. All the land use components, including the transportation network, have been designed to ensure a proper land use relationship, including the placement of the golf course in the Navy's blast zone.

CULTURE AND RECREATION

OBJECTIVE D: To provide a wide range of recreational facilities and services that are readily available to all residents of Oahu.

POLICY 9: Require all new developments to provide their residents with adequate recreation space.

POLICY 10: Encourage the private provision of recreation and leisure-time facilities and services.

Comment

Land for a 16-acre park will be dedicated to the City. In Royal Kunia Phase I, a 12-acre private recreation center will be built.

2. Development Plan

COMMON PROVISIONS - SECTION 4, GENERAL URBAN DESIGN PRINCIPLES AND CONTROLS

This section of the DP Ordinance discusses the importance of Public Views, the provisions of Open Space, and the need for Landscaping.

Comment

The proposed development is consistent with the General Urban Design Principles and Controls as called for in the General Plan. The project will be generously landscaped, parks and other open space uses, such as a golf course will be provided, and residents within the project will be afforded views of the mountains and ocean.

SPECIAL PROVISIONS - SECTION 2, URBAN DESIGN PRINCIPLES AND CONTROLS

This Section of the DP Ordinance for Central Oahu specifies the guidelines for Height Controls, Density Controls, Open Space, and Public Views, with the latter calling attention to the panoramic views of the Waianae mountains and the sea from Kunia Road.

Comment

The project will incorporate the Urban Design Principles and Controls into its design. Panoramic views of the mountains and sea from Kunia Road will not be impacted. Instead, these views will be part of the living environment of the people living in the project.

IMPACTS

A. DEMOGRAPHIC

1. Residential Population

The residential population of Central Oahu would increase by about 7,500 people. Although this increase would exceed the General Plan population guidelines for Central Oahu, it should be noted that the population guidelines for the District are currently under review by the City Council. Both the Department of General Planning and the City Planning Commission have recommended amending the General Planning to allow more growth in Central Oahu.

2. Visitor Population

The project by itself is not anticipated to generate additional visitors. However, indirectly the presence of the golf course helps to solidify Hawaii's position as a golfing mecca for year round visitors.

3. Character or Culture of the Neighborhood

Makai of the project site are the proposed developments of Royal Kunia, Phase I (under consideration as a 1988 DP amendment by the City Council and zoned Urban by the State Land Use Commission), a 70-acre 500 unit development under construction, and the existing Village Park development. The proposed project is an extension of the existing and planned growth for this area.

4. Displacement

The project will occupy an area currently utilized for the growing of sugarcane. This aspect of project impact will be studied further in the preparation of an Environmental Impact Statement.

5. Other Social Impacts

None identified at this time.

B. ECONOMIC IMPACTS

1. Economic Growth

2. Employment

3. Government Revenues (Taxes)

4. Location Vis-a-Vis Intended Market

The industrial component of the plan, together with the golf course development is expected to create approximately 2,000 jobs. Also, construction employment will be created to build the infrastructure

Royal Kunia, Phase II

and housing units. Other service related jobs will be created in the area of planning, development, administrative, marketing and sales. Significant increase in the tax base of the project area can also be expected.

A market analysis and a fiscal impact analysis will be performed and included as part of the Environmental Impact Statement that will be prepared for the project.

C. HOUSING IMPACTS

1. Increase Supply

It is widely acknowledged that there is an inadequate supply of housing to meet the needs of the existing and growing population. The project will help meet this need by providing about 2,400 units of various sizes and types for people of various income levels.

2. Affordable Units

Homes in the project will be affordable to those in a wide range of income levels.

D. PUBLIC SERVICES

1. Access and Transportation

The proposed development is located adjacent to existing Kunia Road on its Eastern boundary approximately 1.2 miles North of Kunia Interchange of Interstate Route H-1. Royal Kunia Expansion Phase I which has access to Kunia Road and the existing Village Park Subdivision will connect to the proposed development.

The Interchange has been improved to increase the capacities of the ramps and Kunia Road which serve the existing project in the two major destinations, namely Honolulu, including Pearl Harbor and the Airport; and Waianae, including Campbell Industrial Park and the proposed West Beach Resort development.

Further to the South, Kunia Road intersects Farrington Highway and connects directly to the realigned Fort Weaver Road. It also partially intersects Honowai Street and Waipahu Street. This network serves the project with interconnects with Waipahu and Ewa.

To the North, Kunia Road provides direct access to Schofield Barracks, Wheeler Field, Wahiawa and the North Shore.

While existing Kunia Road is a two-lane road, conditions at the project site make it feasible to widen the roadway to provide access to the abutting land. The proposed development will have 4850 feet of frontage on Kunia Road.

Royal Kunia, Phase II

Access to the proposed development will be via two (2) intersections off Kunia Road, located approximately 1.4 miles and 2.0 miles North of the existing Kunia Interchange of Interstate Route H-1.

A Traffic Impact Analysis will be performed and included as part of the Environmental Impact Statement that will be prepared.

2. Water System

The source of water for the project will be derived from the Kunia Well I and II sites. Improvements to be made with the proposed development include the construction of a 3.5 MG reservoir at the Kunia 675' Reservoir Site and booster pumps at the Kunia Well I and Kunia Well II sites.

The proposed improvements are in conformance with the Board of Water Supply's masterplan for the area.

Additional onsite distribution systems will be constructed in accordance with the Board of Water Supply's Design Standards.

3. Wastewater

Wastewater from the development will be collected by a network of pipes flowing to the 21" trunk line flowing from Royal Kunia Phase I to the Waipahu Sewage Pump Station.

Onsite wastewater improvements will be constructed in accordance with the current City and County Wastewater Design Standards.

4. Drainage

Approximately 60% of the development, the Westerly portion along Kunia Road, slopes toward the Royal Kunia Phase I. The remaining 40%, the Easterly portion slopes toward Waikele Stream.

Drainage from the development will be directed to the existing drainage system in Royal Kunia Phase I and towards Waikele Stream. The existing drainage system which has been designed to accommodate the additional runoff flow through the existing Village Park Development and discharges into Pearl Harbor.

5. Solid Waste

The City and County of Honolulu is presently providing refuse collection service for the adjacent Village Park Subdivision. Refuse collection for the development will be provided by both government and private work forces. Infrastructure planning will permit City and County of Honolulu refuse collection for the single family residences while commercial and business establishments may be serviced by either the City and County or private collectors.

6. Utilities

Electrical and telephone service will be provided by Hawaiian Electric Company and Hawaiian Telephone Company.

A new HEC_o substation is proposed to be constructed in conjunction with the Royal Kunia Expansion Phase I and is to be located within the project site adjacent to Kunia Road. A low profile substation will be considered (approximate land area required is 120' x 180'). A primary overhead 46 KV feeder is proposed along Kunia Road to service the substation.

HTC_o is proposing to install a remote switching unit within the Royal Kunia Expansion Phase I site. This facility will be housed in a small building. Total land area is estimated at less than 5000 square feet.

As Kunia Road is widened, both HEC_o and HTC_o facilities are proposed to be relocated underground. HEC_o has a 12 KV feeder that needs to be placed underground and HTC_o has the responsibility to underground the existing WOLFE cable. Work for all HEC_o and HTC_o facilities will be planned to coincide to the needs of the proposed expansion.

7. Schools

A new elementary school in Village Park development will open in 1989. A secondary Elementary school site is being reserved within the proposed Royal Kunia Phase I development. A third Elementary school site is designated in Royal Kunia Phase II.

Waipahu Intermediate and Waipahu High Schools will serve the new students from the proposed project. Classroom expansions will probably be necessary.

8. Parks

The Park Dedication Ordinance requires a developer to dedicate sufficient land or pay a fee in lieu of land in order to meet the recreational needs of the project's residents. The minimum standards require a dedication of 350 square feet of park per residential unit and 150 square feet of park for apartment units. These provisions are implemented through the subdivision approval process.

The developer proposes to dedicate a 16-acre park site. The 16-acre park site dedication meets the standards of the Park Dedication Ordinance. Acceptance of the land by the City commits public funds for site improvements and maintenance.

9. Police

City and County police facilities are presently located at a substation in Pearl City on Waimano Home Road.

Adequate police service can be maintained provided sufficient personnel and vehicles are added. The cost for additional police officers and vehicles will be offset by the tax revenues generated from the project. A Fiscal Impact Analysis will be performed and included as part of the Environmental Impact Statement that will be prepared.

10. Fire

A City and County fire station is located in Waipahu Industrial Park. Additional fire stations in the region are located at Pearl City and Makakilo. A new fire station is planned in the Waikele area to service the future Waikele development. The developer will coordinate the fire requirements for the project with the Fire Department.

E. ENVIRONMENTAL IMPACTS

1. Noise

Sources of noise in the project area include vehicular traffic, industrial and recreational activities, and construction.

Setbacks, screening and landscaping, and proper placement of buildings and structures will be extensively used to mitigate against any adverse noise impacts. The developer will follow all City and State laws and regulations relating to noise.

2. Air Quality

Except for dust emissions during the construction phase of the development, no significant short term direct air quality impacts are expected. State of Hawaii regulations stipulate the control measures that are to be employed to reduce this type of emissions.

Increased traffic generated by the project will increase emissions of carbon monoxide along Kunia Road and air quality standards may also be impacted by the use of pesticides and fertilizers on the golf course.

Air quality studies will be performed to address the project's impact on air quality. These studies will be made part of the Environmental Impact Statement that will be prepared.

3. Compatibility with Surrounding Environment

The project will be designed to properly related to the agricultural activity mauka of the site, and to the proposed development of Royal Kunia Phase I, makai of the site. The proposed golf course location will serve as a buffer area within the Navy's blast zone.

4. Historic and Archaeological Resources

No historical and/or archaeological resources are expected to be found on the site. However, an archaeological reconnaissance survey will be conducted, and its report and findings will be made part of the Environmental Impact Statement that will be prepared.

5. Natural Features

a. Water Resources

There are no water resources that will be impacted.

b. Flood Plan Management

The project is not within flood zone.

c. Wetlands Protection

No wetlands exist on the property.

d. Coastal Zone Management.

The project area is outside the Shoreline Management Area administered by the City and County of Honolulu. However, the project site is within an area controlled by the CZMA and is, therefore, subject to HRS Chapter 205-A's objectives and policies.

e. Unique Natural Features

There will be less erosion due to the installation of paved roads and permanent dwellings.

f. Vegetation and Animal Life

The cultivation of the land for sugarcane suggests that there is very little flora variation in relief on the site, and limited mammal activity.

A flora and fauna survey will be conducted and its reports and findings will be made part of the Environmental Impact Statement that will be prepared.

g. Agricultural Lands

The development of the project would result in the urbanization of approximately 670 acres of sugarcane lands which are currently under cultivation by Oahu Sugar Company.

An analysis will be conducted on the project's impact on agriculture, and its report and findings will be made part of the Environmental Impact Statement that will be prepared.

h. Open Space

The land now is in open space/agricultural use. This "open space" however is a distant view enjoyed by the public.

The project will have substantial open space uses, most of which will be available for active use by residents in the area, such as a park and a 172 acre golf course.

6. Hazards

A Naval Magazine facility is located in Waikele gulch adjoining the project site. A golf course development is proposed in the area of the Navy's blast zone. The Navy considers golf course development as an appropriate use for such areas.

F. ALTERNATIVES CONSIDERED

1. No Action

This alternative would result in no action being taken to implement the project. The site would continue under sugarcane production at least until 1996 when Oahu Sugar Company lease expires. Continuation of sugarcane production until 1996 would also occur if the project is approved as proposed.

After 1996, given the outlook on sugar and other factors, it is likely that this alternative will ultimately result in the land becoming inactive, vacant and unproductive. None of the economic benefits of the proposed development would occur. However, any adverse impact of the proposed development will also not occur.

2. Agricultural Conditional Uses

The Land Use Ordinance (LUO) permits certain uses as Conditional Uses, Type 1 and Type 2. None of the uses listed in the AG-1 are considered economically viable uses for the property because of the following, (1) the property's relative isolation, (2) the specialized nature and technical needs of some of the uses, (3) no demonstrated market demand or public need. Furthermore, it is likely that some of the uses listed would result in adverse impacts greater than the proposed action.

G. PROPOSED MITIGATION MEASURES, IF ANY

Certain recommended mitigating measures are described above in the appropriate subsections under *IMPACTS*. Full mitigating measures will be identified in the environmental impact statement process.

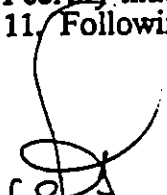
SUMMARY SHEET

A completed Summary Sheet is attached, *Exhibit 5*.

NOTIFICATION REQUIREMENTS

Ordinance 84-11 states: "No application for Development Plan Land Use Map amendment shall be accepted for processing unless the applicant notifies, by mail, all owners, leases, sub-lessees and residents of the affected property and of each abutting parcel."

I certify that I have complied with the notification requirements of Ordinance 84-11. Following is a list of Parties notified.


William E. Wanket
Agent
Halekua Development Corporation

NOTIFICATION LIST

- OAHU SUGAR COMPANY
P.O. BOX "O"
WAIPAHU, HAWAII 96797

- THE ESTATE OF JAMES CAMPBELL
SUITE 500
828 FORT STREET MALL
HONOLULU, HAWAII 96813

- LT. CHRIS REILING
COMMANDING OFFICER
NAVAL MAGAZINE LUALUALEI
LUALUALEI, OAHU, HAWAII 96792

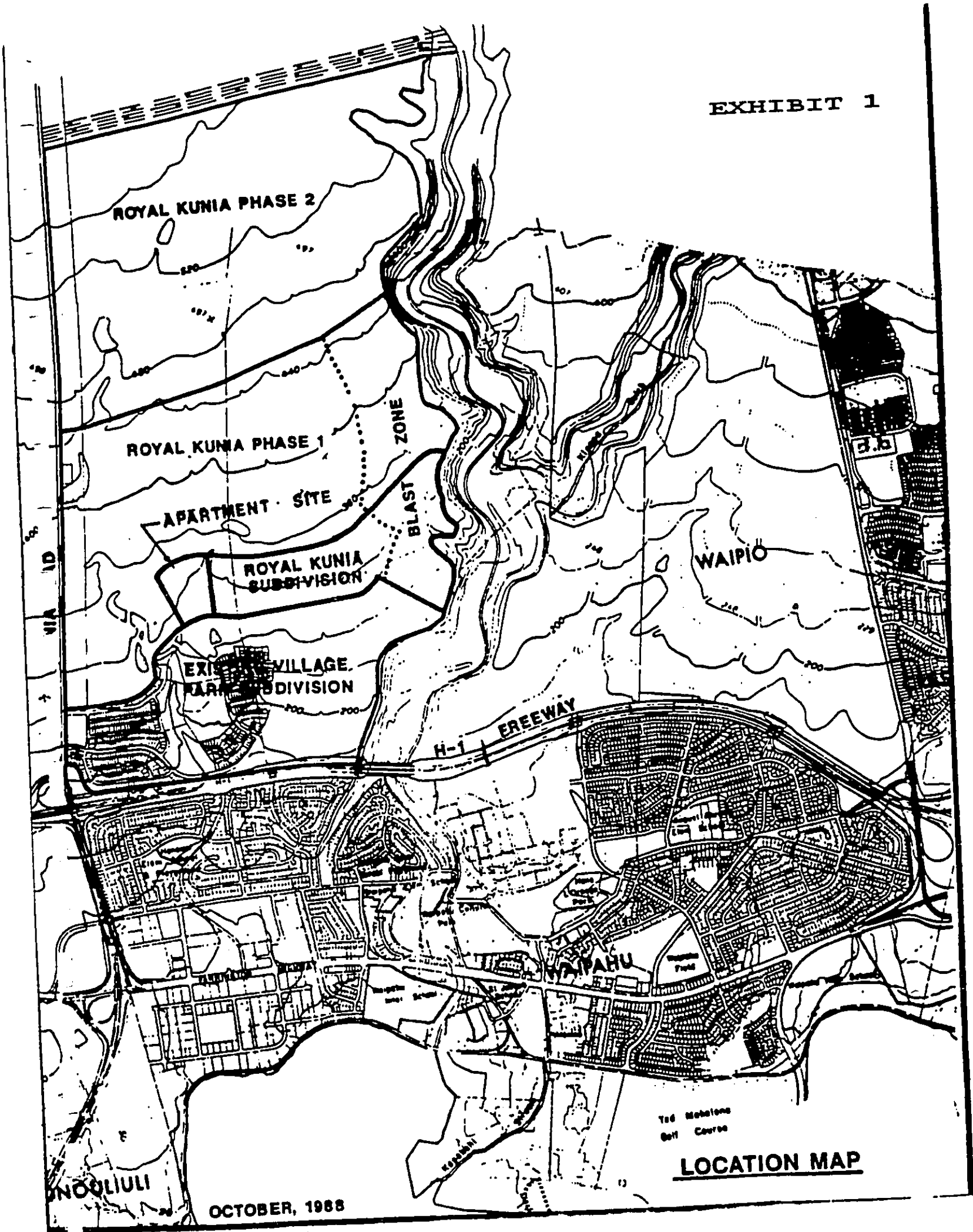
- WAIPAHU NEIGHBORHOOD BOARD #22
P.O. BOX 103
WAIPAHU, HAWAII 96797

- VILLAGE PARK COMMUNITY ASSOCIATION
c/o Dynamic Property Mgmt, Inc.
94-903 FARRINGTON HIGHWAY - SUITE 4
WAIPAHU, HAWAII 96797

- WAIPAHU COMMUNITY ASSOCIATION
94-229 WAIPAHU DEPOT ROAD - ROOM 206
WAIPAHU, HAWAII 96797

- WAIPAHU 2000 COMMUNITY COUNCIL
94-229 WAIPAHU DEPOT ROAD - ROOM 206
WAIPAHU, HAWAII 96797

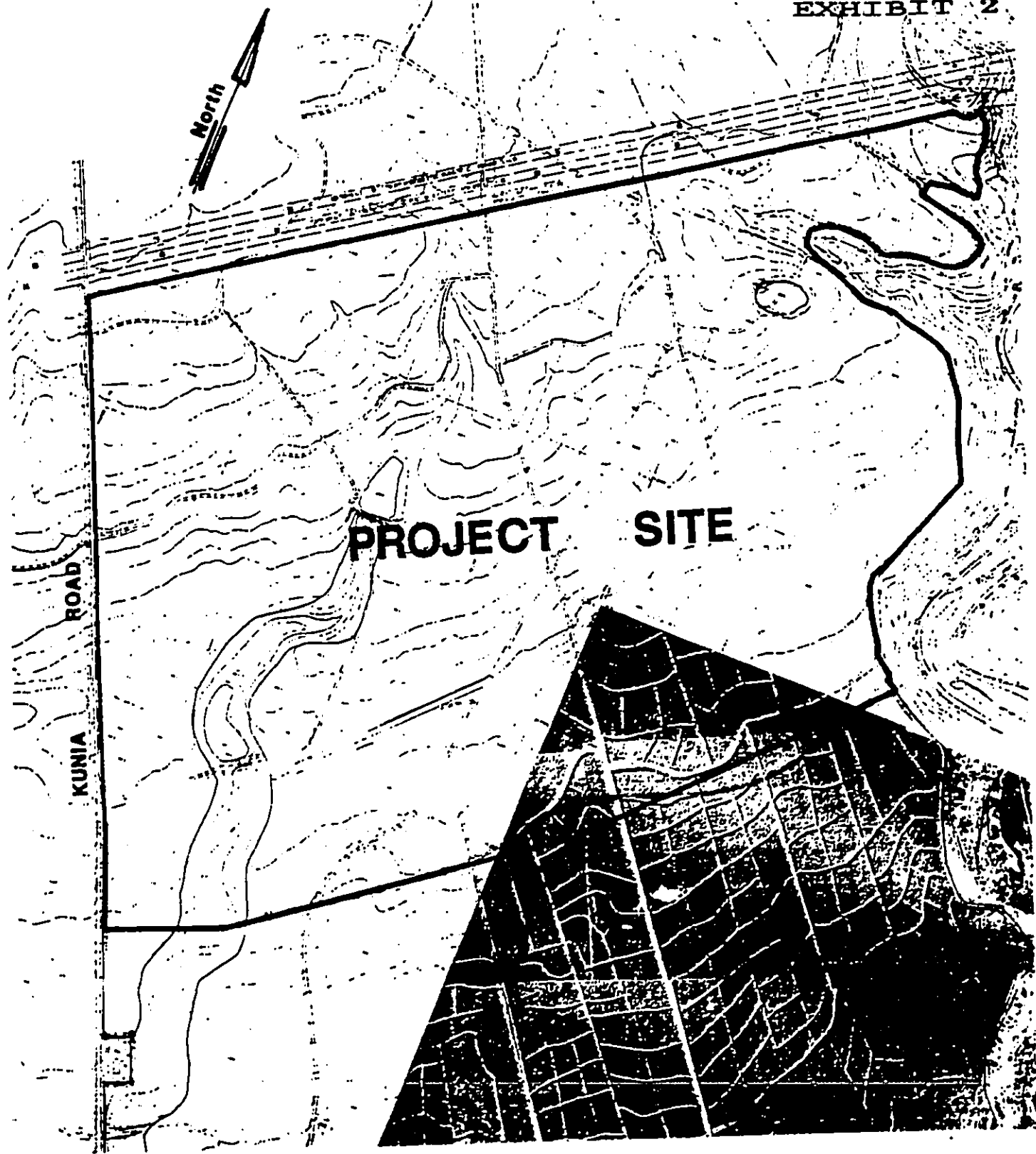
EXHIBIT 1



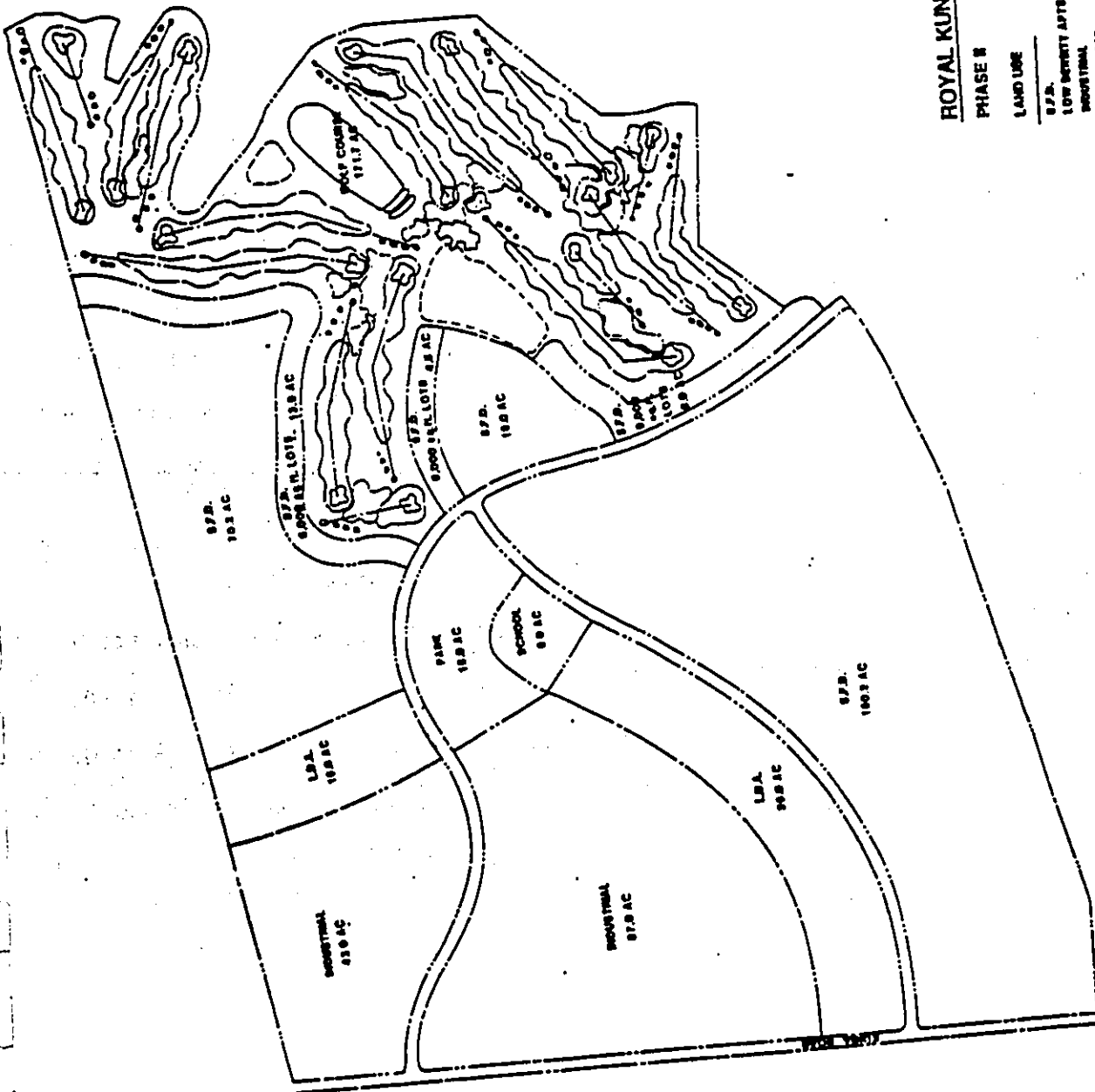
OCTOBER, 1988

LOCATION MAP

EXHIBIT 2



ROYAL KUNIA PHASE 2



ROYAL KUNIA

PHASE II	ACRES	UNITS
LAND USE	318.8	1000
R.F.A.	88.8	800
LOW DENSITY APPTS.	100.8	800
INDUSTRIAL	371.3	
GOLF COURSE	171.7	
PUBLIC PARK	8.8	
SCHOOL	8.8	
CIRCULATION	17.4	
TOTAL	888.8	2400

NOVEMBER, 1961



EXHIBIT 4

DESCRIPTION
ROYAL KUNIA PHASE 2

Being portions of Royal Patent 4486, Apana 1, Mahele Award 4 to
Luluhiwalani and Royal Patent 4490, Land Commission
Award 10474, Apana 9 to N. Namauu

Situated on the Northeasterly side of Kunia Road

At Hoaeae and Waikele, Ewa, Oahu, Hawaii

Beginning at the South corner of this parcel of land and on the Northeasterly side of
Kunia Road, the coordinates of said point of beginning referred to Government Survey
Triangulation Station "EWA CHURCH" being 3360.76 feet North and 20305.92 feet West,
thence running by azimyths measured clockwise from True South:

1. 157° 57' 30" 654.05 feet along the Northeasterly side of Kunia Road;
2. Thence along the Northeasterly side of Kunia Road, on a curve to the left with
a radius of 5759.60 feet, the azimuth and
distance of the chord being:
157° 07' 169.21 feet;
3. 156° 16' 30" 3973.90 feet along the Northeasterly side of Kunia Road;
4. 235° 58' 37" 6636.32 feet along the remainders of Royal Patent 4490,
Land Commission Award 10474, Apana 9 to N.
Namauu and Royal Patent 4486, Apana 1,
Mahele Award 4 to Luluhiwalani;

DESCRIPTION
ROYAL KUNIA PHASE II
PAGE 2 OF 4

5. Thence along the remainder of Royal Patent 4486, Apana 1, Mahele Award 4 to Luluhiwalani, on a curve to the left with a radius of 100.00 feet, the azimuth and distance of the chord being:
239° 02' 32" 167.61 feet;
6. 312° 44' 30" 117.78 feet along the remainder of Royal Patent 4486, Apana 1, Mahele Award 4 to Luluhiwalani;
7. 341° 57' 209.13 feet along U.S. Naval Reservation (Civil 759);
8. 7° 33' 84.25 feet along U.S. Naval Reservation (Civil 759);
9. 351° 00' 85.00 feet along U.S. Naval Reservation (Civil 759);
10. 323° 43' 129.80 feet along U.S. Naval Reservation (Civil 759);
11. 354° 17' 30" 89.00 feet along U.S. Naval Reservation (Civil 759);
12. 91° 42' 194.20 feet along U.S. Naval Reservation (Civil 759);
13. 82° 38' 30" 168.95 feet along U.S. Naval Reservation (Civil 759);
14. 12° 12' 30" 106.20 feet along U.S. Naval Reservation (Civil 759);
15. 282° 57' 30" 417.43 feet along U.S. Naval Reservation (Civil 759);
16. 301° 59' 167.40 feet along U.S. Naval Reservation (Civil 759);
17. 336° 24' 45.50 feet along U.S. Naval Reservation (Civil 759);
18. 14° 39' 30" 80.00 feet along U.S. Naval Reservation (Civil 759);
19. 29° 00' 96.50 feet along U.S. Naval Reservation (Civil 759);
20. 54° 29' 75.92 feet along U.S. Naval Reservation (Civil 759);

DESCRIPTION
ROYAL KUNIA PHASE II
PAGE 3 OF 4

21.	73° 08' 30"	99.80 feet along U.S. Naval Reservation (Civil 759);
22.	88° 47'	231.45 feet along U.S. Naval Reservation (Civil 759);
23.	71° 20'	207.05 feet along U.S. Naval Reservation (Civil 759);
24.	107° 54' 30"	180.91 feet along U.S. Naval Reservation (Civil 759);
25.	93° 02'	180.90 feet along U.S. Naval Reservation (Civil 759);
26.	73° 31'	159.72 feet along U.S. Naval Reservation (Civil 759);
27.	48° 14'	112.24 feet along U.S. Naval Reservation (Civil 759);
28.	351° 50'	103.80 feet along U.S. Naval Reservation (Civil 759);
29.	300° 02'	91.93 feet along U.S. Naval Reservation (Civil 759);
30.	283° 34'	237.16 feet along U.S. Naval Reservation (Civil 759);
31.	295° 18' 30"	268.76 feet along U.S. Naval Reservation (Civil 759);
32.	268° 12'	241.27 feet along U.S. Naval Reservation (Civil 759);
33.	292° 58'	122.27 feet along U.S. Naval Reservation (Civil 759);
34.	278° 26'	139.63 feet along U.S. Naval Reservation (Civil 759);
35.	285° 12' 30"	136.80 feet along U.S. Naval Reservation (Civil 759);
36.	296° 51' 30"	128.75 feet along U.S. Naval Reservation (Civil 759);
37.	322° 24'	345.20 feet along U.S. Naval Reservation (Civil 759);
38.	339° 45'	285.90 feet along U.S. Naval Reservation (Civil 759);
39.	334° 15' 30"	358.90 feet along U.S. Naval Reservation (Civil 759);
40.	14° 54' 30"	41.50 feet along U.S. Naval Reservation (Civil 759);
41.	22° 33'	521.50 feet along U.S. Naval Reservation (Civil 759);

DESCRIPTION
ROYAL KUNIA PHASE II
PAGE 4 OF 4

42.	19° 49' 30"	274.50 feet along U.S. Naval Reservation (Civil 759);
43.	28° 36'	103.60 feet along U.S. Naval Reservation (Civil 759);
44.	359° 04'	106.30 feet along U.S. Naval Reservation (Civil 759);
45.	332° 09'	239.90 feet along U.S. Naval Reservation (Civil 759);
46.	324° 45' 30"	187.90 feet along U.S. Naval Reservation (Civil 759);
47.	341° 14'	89.70 feet along U.S. Naval Reservation (Civil 759);
48.	308° 01' 30"	154.25 feet along U.S. Naval Reservation (Civil 759);
49.	321° 54' 30"	97.35 feet along U.S. Naval Reservation (Civil 759);
50.	303° 47'	70.70 feet along U.S. Naval Reservation (Civil 759);
51.	45° 16'	2770.09 feet along the remainder of Royal Patent 4486, Apana 1, Mahele Award 4 to Luluhiwalani;
52.	52° 58'	2765.65 feet along the remainders of Royal Patent 4486, Apana 1, Mahele Award 4 to Luluhiwalani and Royal Patent 4490, Land Commission Award 10474, Apana 9 to N. Namauu;
53.	67° 57' 30"	700.00 feet along the remainder of Royal Patent 4490, Land Commission Award 10474, Apana 9 to N. Namauu to the point of beginning and containing an Area of 479.477 Acres.

SUMMARY SHEET

CENTRAL OAHU
DEVELOPMENT PLAN AMENDMENT
BEING CONSIDERED

DGP REF. NO.:
NB. AREA: Waipahu No.22
Acreage: 670± acres
TMK:

AMENDMENT REQUEST: From Agriculture to Residential, Low Density Apartment, Industrial, Golf Course, Park and Public Facility.

LOCATION: Mauka of H-1 and along Kunia Road in Hoaeae, Ewa, Oahu.

OWNER/DEVELOPER: Halekua Development Corporation

REQUESTED BY: Halekua Development Corporation

AGENT: William E. Wanket, Inc.

BASIS FOR REQUEST: Provide additional housing, employment and recreation opportunities.

TYPE OF PROJECT: Recreational, residential and industrial.

IMPACT ON PROVISION OF HOUSING: 2400 housing units will be provided, 1500 single-family and 900 multi-family.

EXISTING CONDITIONS

PRESENT PLAN/ZONING DESIGNATIONS

Land Use: Agriculture/sugarcane

State Land Use: Agriculture

Structure: None

DP Public Facilities Map: N/A

ALISH: Prime

DP Special Provisions: N/A

Soil Features: Lahaina silty clay (LaA) and Wahiawa silty clay (WaA)

Zoning: AG-1 Restricted Agriculture

Possible Constraints: General Plan population distribution policies



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

REPLY TO
ATTENTION OF:

November 16, 1988

Planning Branch

Mr. William E. Wanket, President
William E. Wanket, Inc.
Pacific Tower 1010
1001 Bishop Street
Honolulu, Hawaii 96813


Dear Mr. Wanket:

Thank you for the opportunity to review the Environmental Impact Statement Preparation Notice (EISPN) for the proposed Royal Kunia, Phase II development at Hoaeae, Ewa, Oahu. The following comments are offered:

a. Based on information provided in the EISPN, the proposed project borders Waikele Stream, which is perennial. Any fills in Waikele Stream, including any backfill for utilities, would require a Department of the Army permit. For further information regarding permit requirements, please contact Operations Branch (telephone 438-9258).

b. According to the Flood Insurance Study for the City and County of Honolulu, the project site is located outside of the 500-year flood plain (Zone X, unshaded).

Sincerely,


Kisuk Cheung *for*
Chief, Engineering Division

Rec'd 11-19-88

WILLIAM
E.
WANKET
INC.

Land Use Consultant

January 31, 1989

Mr. Kisuk Cheung
Chief, Engineering Division/Planning Branch
Department of the Army
US Army Engineering District
Building 230
Ft. Shafter, Hawaii 96858-5440

**RE: Environmental Impact Statement Preparation Notice (EISPN) for
Proposed Royal Kunia Phase II Development - Response to
Comments Received**

Dear Mr. Cheung:

Thank you very much for reviewing and commenting on the above-referenced EISPN. The information you have provided has been helpful. On the matter of Waikele Stream, it is not within the project boundaries and no filing will be done along the stream banks.

Sincerely,



William E. Wanket

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410



DEPARTMENT OF THE NAVY

COMMANDER
NAVAL BASE PEARL HARBOR
BOX 110
PEARL HARBOR, HAWAII 96860-5020

11010 IN REPLY REFER TO:
Ser 03(09P2)/2862

5 DEC 1988

William E. Wanket, Inc.
Mr. William E. Wanket, President
Pacific Tower 1010
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Wanket:

ENVIRONMENTAL IMPACT STATEMENT (EIS) PREPARATION NOTICE FOR
THE PROPOSED ROYAL KUNIA, PHASE II

The EIS preparation notice for the proposed Royal Kunia, Phase II has been reviewed. On pages 6, 16, and 18, it is erroneously stated that the golf course is encumbered by the blast zone emanating from the Naval Magazine. Based on recent evaluations of the explosives safety criteria associated with the tunnel magazines at Waikele, the blast zone distances will be reduced. After the reduction, the golf course will be adjacent to the blast zone rather than within the blast zone. The location map, Exhibit 1, should read "buffer zone" instead of "blast zone". Development of the proposed adjacent compatible land use is commendable and reflects sound, prudent planning for the best interests of this planned residential community. It is therefore recommended that the proposed golf course be retained in its present configuration and location.

The EIS preparation notice on page 14 indicates that drainage will be diverted toward Waikele Stream. Please note that any drainage plans across Navy lands must provide for control of erosion and must not interfere with the mission of the Naval Magazine.

We would be interested in reviewing the EIS document when it is available.

If you have any questions, please contact Mr. Bill Liu at 471-3324.

Sincerely,

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

POST MARKED 12-6-88 (12-7-88)

WILLIAM
E.
WANKET
INC.

Land Use Consultant

January 31, 1989

Mr. W.K. Liu
Assistant Base Civil Engineer
Naval Base Pearl Harbor
BOX 110
Pearl Harbor, Hawaii 96860-5020

**RE: Environmental Impact Statement Preparation Notice (EISPN) for
Proposed Royal Kunia Phase II Development - Response to
Comments Received**

Dear Mr. Liu:

This is in response to your letter of December 5, 1989.

DRAINAGE: The existing topography and drainage pattern for portion of the project flows toward Waikele Stream over Navy lands. The proposed golf course abutting the Navy lands will be designed to store the drainage runoff within the water hazards which will be used for irrigation. A drainage master plan has been prepared and found acceptable by the City Department of Public Works. I understand that Park Engineering, our consultant engineer, has been in contact with your office and that a copy of the drainage master plan has been submitted to your department.

BLAST ZONE: The draft environmental impact statement will call to the reader's attention your comment that the blast zone distances will be reduced and that the golf course area should be considered as a buffer zone.

Thank you very much for your comments. A copy of the draft EIS will be sent to you for review and comment.

Sincerely,



William E. Wanket

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410



United States Department of the Interior

FISH AND WILDLIFE SERVICE
PACIFIC ISLANDS OFFICE

P.O. BOX 50167
HONOLULU, HAWAII 96850

ES
Room 6307

NOV 21 1988

William E. Wanket, President
William E. Wanket, Inc.
Pacific Tower 1010
1001 Bishop Street
Honolulu, Hawaii 96813

Re: Central Oahu Development Plan Amendment and Environmental
Assessment, Proposed Royal Kunia Housing Project, Phase II,
Ewa, Oahu

Dear Mr. Wanket:

We have reviewed the referenced document transmitted by your
letter of October 23, 1988. We have no comments to offer at this
time.

We appreciate the opportunity to comment.

Sincerely yours,

Ernest Kosaka
Ernest Kosaka
Field Office Supervisor
Environmental Services

NO RESPONSE NECESSARY

Rec'd 11-23-88



DEPARTMENT OF THE NAVY
NAVAL MAGAZINE LUALUALEI
LUALUALEI, HAWAII 96792-4301

11011
Ser 091/1052/88
09 Nov 1988

William E. Wanket, Inc.
Pacific Tower, Suite 1010
1001 Bishop Street
Honolulu, HI 96813

Dear Mr. Wanket:

Thank you for providing us with the Royal Kunia Phase II Development
Environmental Impact Statement Preparation Notice of October 23, 1988.

Comments from the Naval Magazine will be incorporated with comments you will
receive from Commander, Pearl Harbor Naval Base.

Sincerely,

C. D. Reiling
C. D. REILING
LT, CEC, USN
Staff Civil Engineer
By direction of the
Commanding Officer

Copy to:
COMNAVBASE Pearl Harbor
PACNAVFACENGCOM

NO RESPONSE NECESSARY

Rec'd 11-10-88

JOHN WAIHEE
GOVERNOR



YUKIO KITAGAWA
CHAIRPERSON, BOARD OF AGRICULTURE

SUZANNE D. PETERSON
DEPUTY TO THE CHAIRPERSON

State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 So. King Street
Honolulu, Hawaii 96814-2512
December 6, 1988

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

Mr. William E. Wanket, President
William E. Wanket, Inc.
Pacific Tower 1010
1001 Bishop St.
Honolulu, Hawaii 96813

Dear Mr. Wanket:

Subject: Environmental Impact Statement Preparation Notice
(EISPN) For Proposed Royal Kunia, Phase II
Development
Halekua Development Corporation
TMK: 9-4-02: Portion of 1
9-4-03: Portion of 1 & 9
Kunia Road, Ewa, Oahu
Area: 669.9 acres

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

According to the EISPN, the applicant is seeking to amend the designation of the subject parcels on the Central Oahu Development Plan land use map and the public facilities map from Agriculture to Residential, Industrial, Public, and Recreation. In essence, the Royal Kunia Phase II is an extension of the proposed planned community of Royal Kunia Phase I, which will provide approximately 2,400 housing units including a golf course, industrial area, park, and school.

The subject proposal would result in the urbanization of approximately 670 acres in sugarcane cultivation by Oahu Sugar Company (OSC).



Mr. William E. Wanket
December 6, 1988
Page -2-

Issues Which Should Be Addressed

The Draft EIS should include discussion on the following issues:

- what is the relationship of this project to the other planned developments in the Ewa/Central Oahu area;
- according to the EISPN, the Draft EIS will include "An Agricultural Impact Analysis...to assess the project's impact on Oahu Sugar Company and on the agricultural policies of the State of Hawaii" (EISPN, page 4). We would like the information to include the full impact on the economic viability of OSC resulting from the cessation of sugarcane production on fields (whole or in part) 21, 220, 221, 225, and 230. This would include the loss in tons of sugar per acre, lost revenues, cost of replacement field preparation (if any), determination of the significance of the impact on OSC resulting from the subject project's withdrawal of sugarcane-cultivated lands in combination with those of other development proposals in the area, and any other indicators of adverse impact;
- the impact of this development on future agricultural production requirements and expansion of diversified agriculture, as identified in the Final Report of the Land Evaluation and Site Assessment (LESA) Commission (February 1986);
- the potential of establishing viable alternative agricultural uses on the project site;
- the broader economic and resource impact on the State from the irrevocable loss of prime agricultural lands;
- conformity to the State Agriculture Functional Plan and its objectives and policies, particularly, Implementing Action B(5)(c); and
- the relationship to the following Hawaii State Plan policies and priority guidelines:

226-7(b)(6) "Assure the availability of agriculturally suitable lands with adequate water to accommodate present and future needs."

Mr. William E. Wanket
December 6, 1988
Page -3-

226-103(c)(1) "Provide adequate agricultural lands to support the economic viability of the sugar and pineapple industries."

226-103(d)(1) "Identify, conserve and protect agricultural and aquacultural lands of importance and initiate affirmative and comprehensive programs to promote economically productive agricultural and aquacultural uses of such lands."

226-104(b)(2) "Make available marginal or non-essential agricultural lands for appropriate urban uses while maintaining agricultural lands of importance in the agricultural district."

For the record, the Department of Agriculture has opposed the State Land Use District Boundary amendment petition and subsequent Central Oahu Development Plan amendment petitions for the site now called Royal Kunia Phase I.

Thank you for the opportunity to comment. We will provide further comment upon our receipt and review of the Draft Environmental Impact Statement.

Sincerely,

Yukio Kitagawa
YUKIO KITAGAWA
Chairperson, Board of Agriculture

cc: Mr. William Balfour, President and Manager, Oahu Sugar
Company
OSP (attn: LUD)
OEQC
DGP
DLU

POST MARKED 12-13-88 (12-14-88)

WILLIAM
E.
WANKET
INC.

Land Use Consultant

January 31, 1989

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

**RE: Environmental Impact Statement Preparation Notice (EISPN) for
Proposed Royal Kunia Phase II Development - Response to
Comments Received**

Dear Mr. Kitagawa:

This is in response to your letter of December 6, 1988. The project's impact on agriculture was studied by Decision analysts Hawaii, Inc. The report by Decision analysts Hawaii, Inc. has been included as *Appendix G* in the Draft Environmental Impact Statement (DEIS). With reference to your comments:

1. The relationship of the proposed project to the other planned developments in the Ewa/Central Oahu area is discussed in terms of cumulative impacts on pages 8 through 13 in *Appendix G*.
2. The full impact on the economic viability of OSCo resulting from the cessation of sugarcane production on fields 21, 220, 221, 225 and 230 is discussed on pages 8 through 13 in *Appendix G* which addresses cumulative impacts of the proposed project.
3. The impact of the proposed development on future agricultural production requirements and the expansion of diversified agriculture is discussed on pages 14 through 22 in *Appendix G*.
4. The potential of establishing viable agricultural uses on the site are discussed on pages 14, 21 and 22 in *Appendix G*.
5. The broader economic and resource impact of losing prime agricultural lands is discussed on pages 14 through 22 in *Appendix G*.

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410

Page Two
January 31, 1989
Mr. Yukio Kitagawa, Chairperson
Board of Agriculture

6. The conformity of the proposed project to the State Agriculture Functional Plan and its objectives and policies is discussed on pages 23 through 25 in *Appendix G*.
7. The relationship of the proposed project to the "Hawaii State Plan" policies and priority guidelines identified in your letter are discussed on pages 23 through 25 in *Appendix G*.

Thank you for taking the time to comment on this EISPN for Royal Kunia Phase II.

Sincerely,



William E. Wanket
President

JOHN WAIHEE
GOVERNOR



CHARLES T. TOGUCHI
SUPERINTENDENT

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

OFFICE OF BUSINESS SERVICES

November 3, 1988

Mr. William E. Wanket, President
William E. Wanket, Inc.
Pacific Tower 1010
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Wanket:

SUBJECT: EIS - Royal Kunia, Phase II Development

Our review of your proposed 2,400-unit housing development indicates that it may generate the following student enrollment.

<u>SCHOOL</u>	<u>GRADE</u>	<u>APPROXIMATE ENROLLMENT</u>
Hoaeae Elem.	K-6	300 - 500
Waipahu Inter.	7-8	80 - 120
Waipahu High	9-12	150 - 200

Hoaeae Elementary School is scheduled to open on September, 1989. The Department of Education cannot assure the availability of classrooms and will require legislative appropriations to accommodate the anticipated student enrollment.

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER


Mr. William E. Wanket -2-

November 3, 1988 .

Waipahu Intermediate and Waipahu High Schools are also operating at capacity and may require legislative appropriations on a timely basis.

Please keep us informed of any changes to your development plans.

Sincerely,



Eugene S. Imai
Assistant Superintendent

ESI:MRI:jl

cc E. Nakano, Leeward Dist.

Rec'd 11-11-88

WILLIAM
E.
WANKET
INC.

Land Use Consultant

January 31, 1989

Mr. Eugene S. Imai
Assistant Superintendent
Department of Education
P. O. Box 2360
Honolulu, Hawaii 96804

**RE: Environmental Impact Statement Preparation Notice (EISPN) for
Proposed Royal Kunia Phase II Development - Response to
Comments Received**

Dear Mr. Imai:

Thank you very much for reviewing the EISPN. Your comments have been incorporated into the Draft Environmental Impact Statement.

We will continue to keep you informed on the status of the project.

Sincerely,


William E. Wanket

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410

JOHN WAIHEE
GOVERNOR OF HAWAII



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

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3376
HONOLULU, HAWAII 96801

In reply, please refer to:
EPHSD

November 16, 1988

Mr. William E. Wanket, President
William E. Wanket, Inc.
Pacific Tower 1010
1001 Bishop St.
Honolulu, Hawaii 96813

Dear Mr. Wanket:

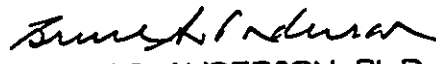
Subject: Environmental Impact Statement Preparation Notice (EISPN) for Royal
Kunia, Phase II, Hoaeae, Ewa, Oahu

Thank you for allowing us to review and comment on the subject EISPN. We provide the following air pollution comments:

The environmental impact statement for the Proposed Royal Kunia, Phase II Development should address the potential impact on the ambient air quality as a result of the increase in vehicular activity from the proposed project and all other projects which were previously approved but have not started construction. Projections on the increased traffic volume and the impact on the ambient air quality should be for the associated corridors, roadways, and highways. The results should be compared to the State and Federal ambient air quality standards. Should a potential violation be determined, the EIS should address the mitigating actions which shall be implemented.

Previous air quality study indicated that the growth of vehicular activity resulting from the development of the project area will not result in the impairment of the existing ambient air quality levels, provided programmed roadway improvements are developed in a timely manner. If this is true, the impacts to the State and Federal ambient air quality standards should be presented for the various scenarios of roadway improvements starting with no improvements.

Sincerely,


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

Rec'd 11-23-88

WILLIAM
E.
WANKET
INC.

Land Use Consultant

January 31, 1989

Mr. Bruce S. Anderson, Ph.D
Deputy Director
Environmental Health
Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801

**RE: Environmental Impact Statement Preparation Notice (EISPN) for
Proposed Royal Kunia Phase II Development - Response to
Comments Received (EPHSD)**

Dear Mr. Anderson:

Thank you very much for reviewing and commenting on the above-referenced EISPN. We respond as follows.

An Air Quality Assessment was performed by Parsons Brinckerhoff Quade and Douglas. The report has been included in the Draft Environmental Impact Statement (DEIS), *Appendix B*. In addition to air quality impacts associated as a result of vehicular activity, studies were also performed as to the air quality impacts due to the use of pesticides (DEIS, *Appendix F*).

Regarding air quality impact of the project without the roadway improvements, such an analysis was not performed, since the roadway improvements will become a prerequisite to the development.

Sincerely,



William E. Wanket

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410

JOHN WAIHEE
GOVERNOR



STATE OF HAWAII
DEPARTMENT OF HUMAN SERVICES
HAWAII HOUSING AUTHORITY
P. O. BOX 17907
HONOLULU, HAWAII 96817

EXECUTIVE DIRECTOR

IN REPLY REFER

TO:

88:PLNG/531A JT

November 22, 1988

Mr. William E. Wanket
William E. Wantet, Inc.
Pacific Tower 1010
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Wanket:

Re: Environmental Impact Statement Preparation
Notice (EISPN) for the Proposed Royal Kunia
Phase II Development

Thank you for the opportunity to review the subject EISPN.

We would like to be consulted during the preparation of the
Environmental Impact Statement for the proposed project.

Sincerely,

Mitsuo Shito
MITSUO SHITO
Executive Director

POST MARKED 11-23-88 (11-25-88)

WILLIAM
E.
WANKET
INC.

Land Use Consultant

January 31, 1989

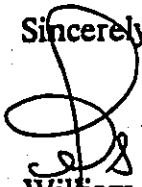
Mr. Mitsuo Shito
Executive Director
Hawaii Housing Authority
P. O. Box 17907
Honolulu, Hawaii 96817

**RE: Environmental Impact Statement Preparation Notice (EISPN) for
Proposed Royal Kunia Phase II Development - Response to
Comments Received**

Dear Mr. Shito:

Thank you very much for reviewing the above-referenced EISPN. Although you have no comments at this time concerning the project, we look forward to your review of the forthcoming Draft Environmental Impact Statement.

Sincerely,


William E. Wanket

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410

JOHN WAIHEE
GOVERNOR



JOSEPH K. CONANT
EXECUTIVE DIRECTOR

STATE OF HAWAII
DEPARTMENT OF BUSINESS AND ECONOMIC DEVELOPMENT
HOUSING FINANCE AND DEVELOPMENT CORPORATION
P. O. BOX 29360
HONOLULU, HAWAII 96820-1760

IN REPLY REFER

TO:

88:PLNG/1732B JT

November 22, 1988

Mr. William E. Wanket
William E. Wantet, Inc.
Pacific Tower 1010
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Wanket:

Re: Environmental Impact Statement Preparation
Notice (EISPN) for the Proposed Royal Kuhia
Phase II Development

Thank you for the opportunity to review the subject EISPN.

We believe that the Environmental Impact Statement should address the provision of rental and for sale housing units affordable to households earning below 140% of the area median income. More specifically, the estimated number, housing type, and range of rents and sales prices that will be made available to families earning (1) less than 80% of the median income; (2) between 80% and 120% of the median income; and (3) between 120% and 140% of the median income. We also would like to make comments during the preparation of the EIS for the proposed project.

Sincerely,


JOSEPH K. CONANT
Executive Director

POST MARKED 11-23-88 (11-25-88)

WILLIAM
E.
WANKET
INC.

Land Use Consultant

January 31, 1989

Mr. Joseph K. Conant
Executive Director
Housing Finance and Development Corporation
P. O. Box 29360
Honolulu, Hawaii 96820-1760

**RE: Environmental Impact Statement Preparation Notice (EISPN) for
Proposed Royal Kunia Phase II Development - Response to
Comments Received (88:PLNG/1732B)**

Dear Mr. Conant:

Thank you very much for reviewing and commenting on the above-referenced EISPN. The Draft Environmental Impact Statement (DEIS) will include a discussion of the concerns raised in your letter of November 22, 1988 regarding housing units affordable to households earning below 140% of median income (*Appendix I*).

We look forward to your review and comment on the DEIS.

Sincerely,


William E. Wanket

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410

JOHN WAIHEE
GOVERNOR OF HAWAII



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

NOV 23 1988

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

DEPUTIES

LIBERT K. LANDGRAF
MANABU TAGOMORI
RUSSELL N. FUKUMOTO

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

DOC. NO.: 4658E
FILE NO.: 89-245

Mr. William E. Wanket, President
William E. Wanket, Inc.
Pacific Tower 1010
1001 Bishop Street
Honolulu, Hawaii 96813

SUBJECT: EIS Preparation Notice -- Royal Kunia, Phase II
Hoaeae, Ewa, Oahu
TMKs: 9-4-02: 1 & 9-4-03: 1, 9

Dear Mr. Wanket:

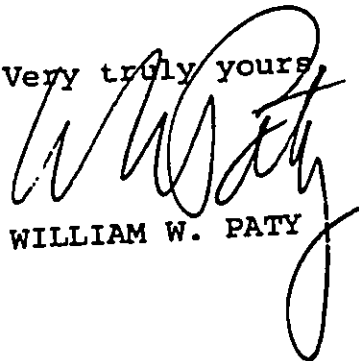
Thank you for giving our Department the opportunity to comment on this matter. We have reviewed the materials you submitted and have the following comments.

Our Department's Historic Sites Section indicates that the EIS preparation notice document states on page 17 that an archaeological survey will be conducted and the findings will be part of the Environmental Impact Statement. Our concerns, therefore, are in the process of being addressed.

The Division of Water and Land Development states that since the project is located in the Pearl Harbor Water Management Area, the EIS should include this fact and address the project's water needs and its source and the impact of this 690-acre development will have on water recharge.

Please feel free to call me or Roy Schaefer of our Office of Conservation and Environmental Affairs, at 548-7837, if you have any questions.

Very truly yours


WILLIAM W. PATY

POST MARKED 11-23-88 (11-25-88)

WILLIAM
E.
WANKET
INC.

Land Use Consultant

January 31, 1989

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

**RE: Environmental Impact Statement Preparation Notice (EISPN) for
Proposed Royal Kunia Phase II Development - Response to
Comments Received (DOC. 4658E, FILE 89-245)**

Mr. Paty:

Thank you very much for reviewing and commenting on the above-referenced EISPN. We respond as follows.

An archaeological walk-through survey was conducted by Archaeological Consultants of Hawaii (Joe Kennedy). The report has been included in the Draft Environmental Impact Statement, *Appendix A*. The Draft EIS also identifies the project as being in the Pearl Harbor Water Management Area, and a discussion of the project's water needs and its sources, as well as its impact on water recharge is included

Sincerely,


William E. Wanket

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410



OFFICE OF STATE PLANNING

Office of the Governor

JOHN WAIHEE, Governor

STATE CAPITOL, HONOLULU, HAWAII 96813 TELEPHONE: (808) 548-5893

Ref. No. P-8902

November 7, 1988

Mr. William E. Wanket, President
William E. Wanket, Inc.
Pacific Tower 1010
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Wanket:

Subject: Environmental Assessment and Preparation Notice for Royal
Kunia, Phase II - Hoaeae, Ewa, Oahu - Proposed Residential,
Industrial, Recreation, and Public Facility Development

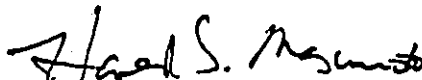
We have reviewed the Environmental Assessment (EA) for the proposed 669.9 acre development. As currently envisioned, the project consists of 1,500 single-family dwellings (272.8 acres) and 900 low density apartments (56 acres), an industrial park (130 acres), golf course (171.7 acres), public park (16 acres), and a school site (6 acres). The proposed site is located on prime agricultural land within the Central Oahu Development Plan area. Our comments concerning the proposed development are summarized as follows.

1. The Draft Environmental Impact Statement (DEIS) should clearly identify projected water use of the project, proposed water source, current groundwater allocation, and quantities of water available for the proposed project. Impact on groundwater quality resulting from residential and industrial development over the Pearl Harbor Groundwater Control Area should also be addressed.
2. The DEIS should indicate if the proposed project will require additional wastewater treatment capacity from the Honouliuli Wastewater Treatment Plant. Project phasing, coordinated with expansion of the Honouliuli WWTP, will become especially critical given the large number of Central Oahu and Ewa development projects scheduled to come on-line.
3. The DEIS should include a need assessment to determine whether the expected market acceptance of the proposed project is feasible. The Land Use Commission has recently approved the development of approximately 40,000 residential units in the Central Oahu and Ewa Development Plan areas. The need assessment should evaluate both residential and industrial proposed uses and determine how recent LUC actions will impact the viability of the proposed project.

Mr. William E. Wanket
Page 2
November 7, 1988

4. The DEIS should address the locational impact of the project relative to the continued viability of Oahu Sugar Company. We note that the proposed development is located central to some of Hawaii's most productive agricultural areas. The Land Use Commission has heard other testimony indicating that development projects located along the fringes of sugar production areas are generally less disruptive to company operations.
5. Page 18 of the EA implies that sugar production on the site will terminate after 1996, and that the proposed project is the only economically feasible alternative. The DEIS should address how this conclusion was reached and whether other alternative land uses may become economically feasible if Oahu Sugar Company does terminate operations.
6. The DEIS should consider cumulative traffic impacts to the Kunia Road/H-1 Freeway intersection, especially in light of other major developments proposed or scheduled for construction along Fort Weaver Road. Major redevelopment of this intersection may be necessary as these projects approach build-out.

Sincerely,


Harold S. Masumoto
Director

Rec'd 11-12-88

WILLIAM
E.
WANKET
INC.

Land Use Consultant

January 31, 1989

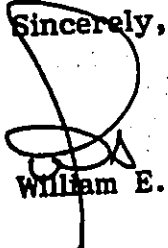
Mr. Harold S. Masumoto
Director
Office of State Planning
State Capitol
Honolulu, Hawaii 96813

RE: Environmental Impact Statement Preparation Notice (EISPN) for
Proposed Royal Kunia Phase II Development - Response to
Comments Received (P-8902)

Dear Mr. Masumoto:

Thank you very much for reviewing and commenting on the above-referenced EISPN. Your comments and concerns have been noted and will be addressed in the Draft Environmental Impact Statement. For the most part, the issues raised in your letter are discussed under Appendices E, G, I, and K of the DEIS.

Sincerely,


William E. Wanket

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410

JOHN WAIHEE
GOVERNOR



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

December 7, 1988

EDWARD Y. HIRATA
DIRECTOR

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

IN REPLY REFER TO:

HWY-PS
2.4029

Mr. William E. Wanket
President
William E. Wanket, Inc.
Pacific Tower 1010
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Wanket:

Central Oahu Development Plan Amendment
and Environmental Assessment,
Royal Kunia, Phase II, Hoaeae, Ewa, Oahu

We have reviewed the report and have the following comments:

1. The traffic impact analysis report (TIAR) to be submitted should:
 - a. Include an assessment of the impacts of the traffic generated by the project on Kunia Road, Kunia Interchange, H-1, Farrington Highway and Fort Weaver Road. The effects of this development on the downstream sections of our highway system should also be discussed.
 - b. Address the need for a new loop on ramp to H-1 from Kunia Road at Kunia Interchange.
 - c. Reflect other planned developments in the area. The forecast volumes and road layout must consider the eventual connection with adjacent developments.
 - d. Present mitigation measures required to alleviate traffic congestion and to improve safety and traffic operations, where applicable.

Mr. William E. Wanket
Page 2
December 7, 1988

HWY-PS 2.4029

2. Required highway mitigation measures such as widening, signalization, intersection improvements and other related work shall be implemented by the developer at his own expense.
3. Construction plans for the above work within our highway rights-of-way shall be submitted to our Highways Division for review and approval.
4. The developer should consider the implementation of future traffic management programs, such as ridesharing, subscription bus service, vanpools, carpool computer matching service, provision of day care facilities, etc., as appropriate.
5. A drainage report for this project should be prepared and submitted to the Highways Division for review.
6. Kunia Road should be designed and adequate right-of-way be set aside by developer/landowner in full consideration of accommodating future traffic demands.

Thank you for this opportunity to provide comments.

Very truly yours,

Edward Y. Hirata

Edward Y. Hirata
Director of Transportation

POST MARKED 12-7-88 (12-8-88)

WILLIAM
E.
WANKET
INC.

Land Use Consultant

January 31, 1989

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

**RE: Environmental Impact Statement Preparation Notice (EISPN) for
Proposed Royal Kunia Phase II Development - Response to
Comments Received (HWY-PS 2,4029)**

Dear Mr. Hirata:

Thank you for your review of the assessment and your letter of December 7, 1988. Our responses to the comments offered are:

1. A traffic impact report has been prepared for the subject project (DEIS, *Appendix K*) addressing the impacts of the proposed Development Plan Amendment. An assessment of the proposed Development Plan Amendment. An assessment of the impacts of peak hour traffic generated by the proposed project was done using forecasts which reflect all other planned development in the area. Mitigation measures have been proposed for Kunia Road, and regional ("downstairs") impacts have been addressed.

Based on the traffic forecasts, major improvements to the Kunia Interchange will be needed with or without the project which could be constructed if the requested Development Plan Amendment is granted. Our analyses indicate that a new loop onramp from Kunia Road onto eastbound H-1 freeway could alleviate a part of the problem, but other over-capacity conditions at the interchange will remain. An independent study of the interchange should be undertaken to evaluate possible alternatives to serve the forecasted traffic.

Mitigation measures to alleviate potential traffic congestion have also been discussed.

2. Mitigation measures identified along Kunia Road which are due to the proposed project will be constructed as part of the project.

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410

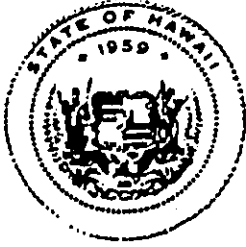
Page Two
January 31, 1989
Mr. Edward Y. Hirata
Director of Transportation

3. Construction plans for work within the State Highways Divisions rights-of-ways will be submitted at the appropriate time for review and approval.
4. The proposed development will include facilities to encourage ridesharing and other measures as appropriate to mitigate traffic impacts.
5. A drainage report will be prepared and submitted for review.
6. Improvements to Kunia Road have been identified in the traffic report and the development will plan for these improvements.

Sincerely,



William E. Wanket



STATE OF HAWAII
DEPARTMENT OF BUSINESS
AND ECONOMIC DEVELOPMENT

LAND USE COMMISSION

Room 104, Old Federal Building, 335 Merchant Street
Honolulu, Hawaii 96813 Telephone: 548-4611

JOHN WAIHEE
Governor

RENTON L.K. NIP
Chairman

LAWRENCE F. CHUN
Vice Chairman

COMMISSION MEMBERS:

Sharon R. Himeno
Teofilo Phil Tacbien
Allen Kajfoka
Robert Tamaya
Frederick P. Whittmore
Toru Suzuki
Allen K. Hoe

ESTHER UEDA
Executive Officer

October 26, 1988

Mr. William E. Wanket
President
William E. Wanket, Inc.
Pacific Tower 1010
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Wanket:

Subject: EIS Preparation Notice for Royal Kunia Phase II

We have no comments to offer at this time except that the subject proposed development is designated within the State Land Use Agricultural District.

Please include the Land Use Commission in your list of consulted agencies.

Sincerely,

ESTHER UEDA
Executive Officer

EU:to

NO RESPONSE NECESSARY

Rec'd 10-27-88

JOHN WAIHEE
GOVERNOR



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

RUSSEL S. NAGATA
COMPTROLLER

KEN KIYABU
DEPUTY COMPTROLLER

LETTER NO. (P)1961.8

NOV 2 1988


Mr. William E. Wanket, President
William E. Wanket, Inc.
Pacific Tower, Suite 1010
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Wanket:

Subject: Environmental Impact Statement
Preparation Notice for the
Proposed Royal Kunia, Phase II

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

Very truly yours,


TEUANE TOMINAGA
State Public Works Engineer

SM:jk

NO RESPONSE NECESSARY

Rec'd 11-4-88

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU

630 SOUTH BERETANIA STREET

HONOLULU, HAWAII 96843



FRANK F. FASI, Mayor

DONNA B. GOTH, Chairman
JOHN K. TSUI, Vice Chairman
SISTER M. DAVILYN AH CHICK, O.S.F.
EDWARD Y. HIRATA
ALFRED J. THIEDE
ERNEST A. WATARI
MAURICE H. YAMASATO

KAZU HAYASHIDA
Manager and Chief Engineer

November 21, 1988

Mr. William E. Wanket, President
William E. Wanket, Inc.
Pacific Tower 1010
1001 Bishop Street
Honolulu, Hawaii 96816

Dear Mr. Wanket:

Subject: Environmental Impact Statement Preparation Notice
for Royal Kunia, Phase II, TMK: 9-4-02: Por. 1;
9-4-03: Por. 1 and 9

We have the following comments on the proposed project:

1. The capacity from Kunia Wells II is already fully committed.
2. The developer should either develop a new water source or construct the improvements to connect up to our Waipahu-Ewa 228 reservoir system.
3. The availability of water from the Waipahu-Ewa 228 reservoir system is on a first-come/first-serve basis and will be determined when the building permit applications are submitted for our review and approval. If water is made available, the applicant will be required to pay our Water System Facilities Charges for source and transmission.
4. Municipal water will not be made available for irrigating the proposed golf course. Brackish water should have a chloride content equal to or lower than the chloride content of the water in the aquifer over which the brackish water is to be applied for irrigating the golf course. The developer should consider obtaining the golf course irrigation water from Oahu Sugar Company's irrigation system.

Mr. William E. Wanket
Page 2
November 21, 1988

5. The proposed water system improvements are based on the Village Park's master plan and not on the Board of Water Supply's master plan as stated in the environmental assessment.
6. The impact of reducing existing groundwater recharge areas through urbanization of agricultural lands should be addressed.

If you have any questions on this matter, please contact Lawrence Whang at 527-6138.

Very truly yours,



KAZU HAYASHIDA
Manager and Chief Engineer

POST MARKED 11-23-88 (11-25-88)

WILLIAM
E.
WANKET
INC.

Land Use Consultant

January 31, 1989

Mr. Kazu Hayashida
Manager and Chief Engineer
Board of Water Supply
630 South Beretania Street
Honolulu, Hawaii 96843

**RE: Environmental Impact Statement Preparation Notice (EISPN) for
Proposed Royal Kunia Phase II Development - Response to
Comments Received**

Dear Hayashida:

Thank you very much for reviewing and commenting on the above-referenced EISPN. Your comments are noted. Regarding groundwater recharge, infiltration should be minimal due to the relative low rainfall of the project area and the less likelihood of the residential, industrial or golf course to over-water. The quantity of both fertilizers and herbicides that may be used by the residential, industrial or golf course should be less than that used on a comparable area of sugar cane. Therefore, there should be minimal impact on ground water quality resulting from the development over the Pearl Harbor Groundwater Control Area.

Sincerely,

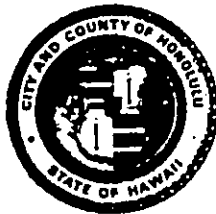


William E. Wanket

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410

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

LIONEL E. CAMARA
DEPUTY FIRE CHIEF

November 23, 1988

Mr. William E. Wanket, President
William E. Wanket, Inc.
Pacific Tower 1010
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Wanket:

SUBJECT: Environmental Impact Statement Preparation Notice (EISPN)
Royal Kunia, Phase II, Hoaeae, Ewa, Oahu
Tax Map Key: 9-4-02: por. 1 and 9

We have reviewed the subject material and have no objections to the proposed project. Primary fire protection will be provided by an engine and ladder companies from the Waipahu Fire Station with twelve on-duty personnel. Secondary service is available from Pearl City, Waiiau and Makakilo Fire Stations. As stated in previous comments on the Village Park project, existing fire protection is considered marginal and we are projecting the need for a new fire station to house an engine company in the Kunia area.

Should you have any questions, please contact Battalion Chief Kenneth Word of our Administrative Services Bureau at 943-3838.

Very truly yours,

A handwritten signature in cursive script, appearing to read "Frank K. Kahooanohano".

FRANK K. KAHOOHANOHANO
Fire Chief

FKK/KAW:1m

POST MARKED 11-25-88 (11-26-88)

WILLIAM
E.
WANKET
INC.

Land Use Consultant

January 31, 1989

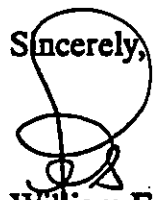
Mr. Frank Kahoohanohano
Fire Chief
Fire Department
1455 S. Beretania Street
Room 305
Honolulu, Hawaii 96814

**RE: Environmental Impact Statement Preparation Notice (EISPN) for
Proposed Royal Kunia Phase II Development - Response to
Comments Received**

Dear Mr. Kahoohanohano:

Thank you very much for reviewing and commenting on the above-referenced EISPN. Your comments will be incorporated into the Draft Environmental Impact Statement. With respect to a new fire station in the Kunia area, I contacted Battalion Chief Kenneth Word and was advised that the Royal Kunia Phase II development will not require a new fire station, but that a fire station site will be needed for any further mauka developments. We will continue to coordinate our development with your office to ensure adequate fire protection services for the project.

Sincerely,



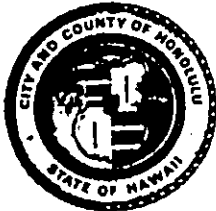
William E. Wanket

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

630 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4161

FRANK F. FASI
MAYOR



MIKE MOON
DIRECTOR

Michael N. Scarfone
DEPUTY DIRECTOR

November 21, 1988

Mr. William E. Wanket, President
William E. Wanket, Inc.
Pacific Tower 1010
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Wanket:

Subject: Central Oahu Development Plan Amendment
and Environmental Assessment
Royal Kunia, Phase 2

We have reviewed the subject Central Oahu Development Plan Amendment and Environmental Assessment.

A primary concern of this Department is the provision of housing opportunities to a wide range of income groups, particularly to those households with low and moderate incomes. We recommend that the Environmental Impact Statement for this project contain, in as much detail as possible, a description of the types and price ranges of the housing units proposed for the project and a discussion of the affordability of the units for households of various income groups.

We note that a zone change is required for this project. The Department's current policy is to request that ten percent of the residential units in a proposed project be set-aside for low- and moderate-income households or that the developer contribute in-kind toward the development of such housing. This policy up to now has only affected residential projects, however, all developments requesting zone change actions would be subject to some kind of requirement under a Bill for a Community Benefit Ordinance currently before the City Council. The Department will inform the developer of any requirements should the Community Benefit Assessment Bill be enacted.

Thank you for the opportunity to comment.

Sincerely,

A handwritten signature in black ink, appearing to read "Mike Moon".

MIKE MOON
Director

POST MARKED 11-23-88 (11-25-88)

WILLIAM
E.
WANKET
INC.

Land Use Consultant

January 31, 1989

Mr. Michael Scarfone
Director
Department of Housing and Community Development
Municipal Office Building, 5th Floor
650 South King Street
Honolulu, Hawaii 96813

**RE: Environmental Impact Statement Preparation Notice (EISPN) for
Proposed Royal Kunia Phase II Development - Response to
Comments Received**

Dear Mr. Scarfone:

Thank you very much for reviewing and commenting on the above-referenced EISPN.

The Royal Kunia Phase II project has been planned to offer a variety of housing types and prices, with 50% of the units being affordable to households earning below 140% of median income. A full discussion on the housing issues will be presented in *Appendix I* (Market Assessment, John Zapotocky) of the Draft Environmental Impact Statement.

We appreciate, also, your comments with reference to the proposed Community Benefit Assessment Bill.

Sincerely,



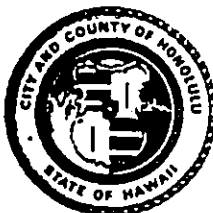
William E. Wanket

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410

OFFICE OF HUMAN RESOURCES
CITY AND COUNTY OF HONOLULU

HONOLULU MUNICIPAL BUILDING, 6TH FLOOR
650 SOUTH KING STREET
HONOLULU, HAWAII 96813 • (808) 523-4541

FRANK F. FASI
MAYOR



MARIA VICTORIA R. BUNYE
DIRECTOR

VICTOR D. GUILLERMO, JR.
DEPUTY DIRECTOR

November 14, 1988

Mr. William E. Wanket, President
William E. Wanket, Inc.
Pacific Tower 1010
1001 Bishop Street
Honolulu, Hawaii 96813


Dear Mr. Wanket:

Persuant to your request for comment on the Environmental Assessment for Royal Kunia, Phase II, the Office of Human Resources, offers the following comments:

1. It would appear from the size of both Royal Kunia, Phases I and II, i.e. 7,000 units, that some space will be needed for a Park-And-Ride facility and an adjacent child care center.
2. The Office of Human Resources, therefore, reserves the right to make definitive comments and recommendations at the time of your application for a change in zoning for Phase II.
3. We recommend that you seek comments from the Department of Transportation Services relative to a Park-And-Ride facility, bus routes, and traffic impacts.

Thank you for the opportunity to comment in this matter.

Very truly yours,


MARIA VICTORIA R. BUNYE, Director
Office of Human Resources

MVRB:kt

cc: Department of Transportation Services

Rec'd 11-19-88

WILLIAM
E.
WANKET
INC.

Land Use Consultant

January 31, 1989

Ms. Maria Victoria R. Bunye
Director
Office of Human Resources
municipal Office Building, 6th Floor
650 South King Street
Honolulu, Hawaii 96813

**RE: Environmental Impact Statement Preparation Notice (EISPN) for
Proposed Royal Kunia Phase II Development - Response to
Comments Received**

Dear Ms. Bunye:

Thank you very much for reviewing the subject EISPN. With respect to your comment we offer the following responses:

SIZE OF THE DEVELOPMENT: Royal Kunia Phase I and Phase II will provide about 4900 residential units (instead of the 7,000 units cited in your letter).

PARK AND RIDE AND CHILD CARE FACILITIES: Increment 1 of Phase I has provided land for a Park and Ride and Child Care Facilities as part of an Unilateral Agreement filed in conjunction with a recent zone change. The size and location of these facilities have been coordinated with you office and the Department of Transportation Services. We will continue to coordinate your office and the DOTS as we proceed further with this project.

Sincerely,



William E. Wanket

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410

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

BENJAMIN B. LEE
DEPUTY DIRECTOR

LU10/88-7420(mstm)

November 22, 1988

William E. Wanket, Inc.
Pacific Tower 1010
1001 Bishop Tower
Honolulu, Hawaii 96813

Dear Mr. Wanket:

Environmental Impact Statement
Preparation Notice (EISPN)
Royal Kunia Phase II, Hoaeae, Ewa
Tax Map Key 9-4-02: portion of 1
9-4-03: portions of 1 and 9

Thank you for the opportunity to review the EISPN for Phase II of Royal Kunia. The Department of Land Utilization (DLU) recommends that the EIS address the following issues and concerns:

1. The zoning application will require a detailed breakdown of projects within the five-year development phase.
2. The impact of the displacement of cane land and the urbanization of approximately 670 acres should be thoroughly studied.
3. The impact of increased drainage discharge into Pearl Harbor and receiving waters via Waikele Stream should be studied.
4. The Traffic Impact Analysis should analyze levels of service for Kunia Road and the Kunia Interchange of H-1.

It appears that most of our other concerns will be addressed in the preparation of the EIS. Thank you for the opportunity to comment. If you have any questions, please contact Maureen St. Michel of our staff at 527-5349.

Very truly yours,

A handwritten signature in cursive script, appearing to read "John P. Whalen".

JOHN P. WHALEN
Director of Land Utilization

JPW:sl
0285N

Rec'd 11-23-88

WILLIAM
E.
WANKET
INC.

Land Use Consultant

January 31, 1989

Mr. John P. Whalen
Director
Department of Land Utilization
Municipal Office Building, 7th Floor
650 South King Street
Honolulu, Hawaii 96813

**RE: Environmental Impact Statement Preparation Notice (EISPN) for
Proposed Royal Kunia Phase II Development - Response to
Comments Received (LU10/88-7420)**

Dear Mr. Whalen:

Thank you very much for reviewing and commenting on the above-referenced EISPN. We respond as follows:

1. We acknowledge that the zoning application will require a detailed breakdown of the project within the five year development phase. For your information the absorption schedule for the project is included in the Draft Environmental Impact Statement (DEIS).
2. The project's impact on agriculture is included in the DEIS as *Appendix G*.
3. Storm runoff will be handled by onsite improvements. Flow levels and water quality of Waikele Stream are not expected to be altered or changed to any noticeable or measurable degree. A drainage master plan has been submitted to and accepted by the Department of Public Works.
4. A Traffic Assessment has been performed for the project by Parsons Brinckerhoff Quade and Douglas and the full report is included as *Appendix K* in the DEIS.

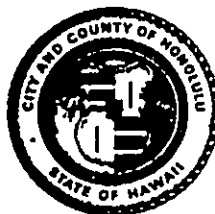
Sincerely,


William E. Wanket

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410

DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813



FRANK F. FASI
MAYOR

HIRAM K. KAMAKA
DIRECTOR

WALTER M. OZAWA
DEPUTY DIRECTOR

November 10, 1988

Mr. William E. Wanket, President
William E. Wanket, Inc.
Pacific Tower 1010
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Wanket:

Subject: Environmental Impact Statement Notice (EISPN)
Royal Kunia, Phase II Development - Hoaeae
Tax Map Key 9-4-02 and 9-4-03

We have reviewed the environmental assessment for the Royal Kunia Phase II development in Hoaeae and offer the following comments and recommendations.

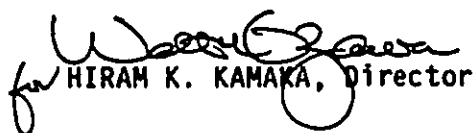
We have determined that the recreational needs and requirements for the proposed development have been adequately addressed in the EISPN. The establishment of the 12-acre public park, as shown on the Land Use Map, Exhibit 3, is conceptually acceptable.

Discussion with our department will be necessary to establish the location and configuration of the park site to meet City standards and park dedication requirements. These matters must be resolved prior to submittals of development plan and zoning applications to the City.

Should you have any questions, please contact Mr. Jason Yuen of our Advance Planning Branch at 527-6315.

Thank you for the opportunity to comment on the EISPN.

Sincerely,


HIRAM K. KAMAKA, Director

HKK:ei

Rec'd 11-15-88

WILLIAM
E.
WANKET
INC.

Land Use Consultant

January 31, 1989

Mr. Walter Ozawa
Director
Department of Parks and Recreation
Municipal Office Building, 10th Floor
650 South King Street
Honolulu, Hawaii 96813

**RE: Environmental Impact Statement Preparation Notice (EISPN) for
Proposed Royal Kunia Phase II Development - Response to
Comments Received**

Dear Mr. Ozawa:

Thank you very much for reviewing the subject EISPN. Your comments referring to the 16-acre proposed park as being "conceptually acceptable", but requiring further discussion with your staff with regards to establishing the specific location and configuration of the park has been incorporated into the Draft Environmental Impact Statement.

Sincerely,



William E. Wanket

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410

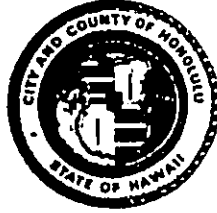
POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU

1455 SOUTH BRETANIA STREET
HONOLULU, HAWAII 96814 - AREA CODE (808) 943-3111

FRANK F. FASI
MAYOR

DOUGLAS G. GIBB
CHIEF

WARREN FERREIRA
DEPUTY CHIEF



OUR REFERENCE SS-LK

November 16, 1988

Mr. William E. Wanket, President
William E. Wanket, Inc.
Pacific Tower 1010
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Wanket:

Subject: Environment Impact Statement Preparation Notice (EISPN) for the
proposed Royal Kunia, Phase II, Kunia Road, Hoaeae, Ewa, Oahu

We have reviewed the EISPN for the above proposed project and offer the following comments.

Along with other proposed developments occurring in the Kunia and Ewa districts, the increase in population and traffic will definitely have an impact on our operations. Major Lee Donohue, district commander of the Pearl City Police Station, believes additional manpower will be needed to accommodate the new developments in the areas. Also, the increase in traffic on Kunia Road and the H-1 will further burden the roadways which are already functioning at maximum capacity.

During the construction phases of the project, we recommend that adequate warning signs and safety barricades be installed to insure the safety of passing motorists. You may consider the hiring of special duty officers to help guide traffic during the initial stages of the construction.

The need for a police facility in the Ewa Plain has been expressed by the surrounding communities. Developers presently improving the land in the area may want to consider how a new police facility could be integrated into their plans.

Sincerely,

DOUGLAS G. GIBB
Chief of Police

By


RONALD SOUZA
Assistant Chief of Police
Support Services Bureau

Rec'd 11-19-88

WILLIAM
E.
WANKET
INC.

Land Use Consultant

January 31, 1989

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

**RE: Environmental Impact Statement Preparation Notice (EISPN) for
Proposed Royal Kunia Phase II Development - Response to
Comments Received - (SS-LK)**

Dear Mr. Gibb:

Thank you very much for reviewing the above-referenced EISPN.

Your comments have been incorporated into the Draft Environmental Impact Statement, Section 2.3.7.

Sincerely,

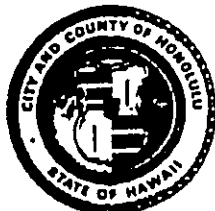


William E. Wanket

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813



FRANK F. FASI
MAYOR

ALFRED J. THIEDE
DIRECTOR AND CHIEF ENGINEER

In reply refer to:
PRO 88-324(448)

November 18, 1988

Mr. William E. Wanket, President
William E. Wanket, Inc.
Pacific Tower 1010
1001 Bishop Street
Honolulu, Hawaii 96813

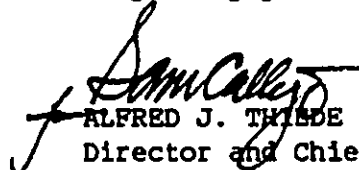
Dear Mr. Wanket:

Subject: EIS Preparation Notice (EISPN)
Royal Kunia, Phase II
TMK: 9-4-02: Por. 1; 9-4-03: Por. 1 & 9

We have reviewed the subject EISPN and have the following comments:

1. Before the proposed development can be served, the Waipahu Wastewater Pump Station and the Honouliuli Wastewater Treatment Plant will have to be expanded.
2. Our sewer allocation policy requires that after the sewer adequacy for the proposed project has been granted, the final construction plans have to be completed and approved by the City within two (2) years and that construction shall commence within a year thereafter. If the project fails to meet its schedule, then the wastewater commitment will be withdrawn.
3. For your information, the City has applied for and received tentative approval of a waiver from secondary treatment requirements for the Honouliuli WWTP. This waiver discharge permit sets standards for effluent quality as well as maximum flow limits. Should these limits be surpassed, we may have to disallow sewer connection of the development in order to avoid permit violations and possible loss of the waiver.

Very truly yours,


ALFRED J. THIEDE
Director and Chief Engineer

Rec'd 11-22-88

WILLIAM
E.
WANKET
INC.

Land Use Consultant

January 31, 1989


Mr. Sam Callejo
Director and Chief Engineer
Department of Public Works
Municipal Office Building, 11th Floor
Honolulu, Hawaii 96813

**RE: Environmental Impact Statement Preparation Notice (EISPN) for
Proposed Royal Kunia Phase II Development - Response to
Comments Received - (PRO 88-324 [448])**

Dear Mr. Callejo:

Thank you very much for reviewing the above-referenced EISPN. We acknowledge that the Waipahu Wastewater Pump Station and the Honouliuli Wastewater Treatment Plant will need to be expanded. We also thank you for advising us of the sewer allocation policy and the City's application for a waiver from secondary treatment requirements for the Honouliuli WWTP.

Sincerely,



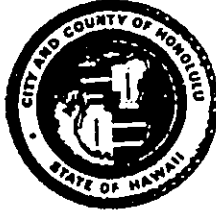
William E. Wanket

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410

BUILDING DEPARTMENT
CITY AND COUNTY OF HONOLULU

HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR



HERBERT K. MURAOKA
DIRECTOR AND BUILDING SUPERINTENDENT

PB 88-974

October 28, 1988

William E. Wanket, Inc.
Pacific Tower 1010
1001 Bishop Street
Honolulu, Hawaii 96813

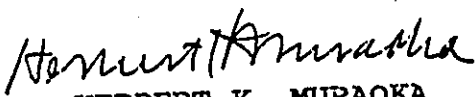
Gentlemen:

Subject: Environmental Impact Statement Preparation Notice
for Proposed Royal Kunia, Phase II
TMK: 9-4-02:1 (Por) & TMK: 9-4-03:Por. of 1 & 9

We have no comments on the proposed Royal Kunia, Phase II project.

Thank you for the opportunity to review the Environmental Impact Statement Preparation Notice.

Very truly yours,


HERBERT K. MURAOKA
Director and Building Superintendent

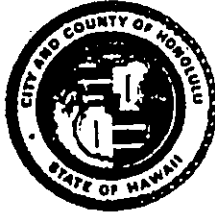
cc: J. Harada

NO RESPONSE NECESSARY

Rec'd 11-1-88

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

TE-7094
PL1.1340

November 25, 1988

Mr. William E. Wanket, President
William E. Wanket, Inc.
1001 Bishop Street
Suite 1010
Honolulu, Hawaii 96813

Dear Mr. Wanket:

Subject: Royal Kunia Phase II
Environmental Impact Statement - Preparation Notice
TMK: 9-4-02: Por. 1
9-4-03: Por. 1 & 9

We have reviewed the subject Environmental Impact Statement Preparation Notice as requested in your letter dated October 23, 1988 and have no comments at this time. We will comment on the transportation related issues when we review the Traffic Impact Analysis which will be part of the Environmental Impact Statement.

Sincerely,


JOSEPH M. MAGALDI, JR.
Acting Director

NO RESPONSE NECESSARY

POST MARKED NOV 28 (11-29-88)



ENV 2-1
JA/G

November 16, 1988

Mr. William E. Wanket, President
William E. Wanket, Inc.
Pacific Tower 1010
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Wanket:

Subject: Draft Environmental Impact Statement for the Proposed
Royal Kunia, Phase II development along Kunia Road in
Hoeaee, Ewa, Oahu

We have reviewed the above subject document and have the following
comments:

1. The proposed development does not appear to impact our exist-
ing 138kv transmission lines. However, if construction
crosses or comes in close proximity to our lines, then the
following requirements shall apply:
 - a. The Contractor is to exercise extreme caution when
excavation and construction crosses or is in close
proximity of our lines and is to maintain 13'-0" clear-
ance for his equipment while working close to and/or
under the overhead facilities.
 - b. The contractor is to comply with the directions of the
State of Hawaii Occupational Safety and Health Law
(DOSH).
 - c. When excavation is adjacent to or under existing struc-
tures or facilities, the contractor is responsible for
properly sheeting and bracing the excavation and stabi-
lizing the existing ground to render it safe and secure
from possible slides, cave-ins and settlement, and for
properly supporting existing structures and facilities
with beams, struts or underpinning to fully protect them
from damage.

Mr. William E. Wanket, President
November 16, 1988
Page 2

- d. Should it become necessary, any work required to relocate HECO facilities shall be done by HECO. The contractor shall be responsible for all costs and coordination.
- e. The Contractor shall be liable for any damages to HECO's facilities.
- f. The contractor shall report any damages to HECO's facilities to the the HECO Trouble Dispatch at phone no. 543-7364.
- g. Service roads and/or trails leading to and from HECO's facilities shall remain accessible for HECO's use at all times.
- h. The developer shall indemnify HECO against all claims resulting from the proposed Royal Kunia development.

Sincerely,



William A. Bonnet
Manager, Environmental Department



Rec'd 11-19-88

WILLIAM
E.
WANKET
INC.

Land Use Consultant

January 31, 1989

Mr. William A. Bonnet
Manager, Environmental Department
Hawaiian Electric Company
P.O. Box 2750
Honolulu, Hawaii 96840-0001

**RE: Environmental Impact Statement Preparation Notice (EISPN) for
Proposed Royal Kunia Phase II Development - Response to
Comments Received (EPHSD)**

Dear Mr. Bonnet:

Thank you very much for reviewing the subject EISPN. The comments listed in your letter will be incorporated in the preparation of the Draft Environmental Impact Statement.

Sincerely,



William E. Wanket

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410

November 2, 1988

William E. Wanket, Inc.
Pacific Tower Suite 1010
1001 Bishop Street
Honolulu, Hawaii 96813

Attention: Mr. William E. Wanket

Dear Mr. Wanket:

**Environmental Impact Statement Preparation
Notice for the proposed Royal Kunia,
Phase II Development along Kunia Road**

We have reviewed the preliminary EIS dated October 23, 1988 and would like to correct two items in the utilities section on page 15.

Item 1 - HTC will require a 6,000 square feet parcel in the Royal Kunia Extension Phase I project for the installation of a remote switching unit.

Item 2 - HTC needs to relocate existing aerial and direct buried cable facilities along Kunia Road to underground.

If you have any questions, please call me at 834-6221.



Walter M. Matsumoto
Oahu Engineering and
Construction Manager

LK/SS/st(048)

Rec'd 11-5-88

WILLIAM
E.
WANKET
INC.

Land Use Consultant

January 31, 1989

Mr. Walter M. Matsumoto
Oahu Engineering and
Construction Manager
Hawaiian Telephone
P. O. Box 2200
Honolulu, Hawaii 96841

**RE: Environmental Impact Statement Preparation Notice (EISPN) for
Proposed Royal Kunia Phase II Development - Response to
Comments Received**

Dear Mr. Matsumoto:

Thank you for reviewing and commenting on the above referenced EISPN.
Your comments including the need for a 6,000 square foot parcel in Phase I
development for the installation of a remote switching unit has been
incorporated into the draft environmental impact statement.

Sincerely,


William E. Wanket

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410

DISTRIBUTION LIST

E.A.
 APPLICANT ACTION
 AGENCY ACTION

EIS
 APPLICANT ACTION
 AGENCY ACTION

Title: Royal Kunia Phase II

Location: Hoaeae, Ewa, Oahu

Proposing Agency/Applicant: Halekua Development Corp.

Accepting Authority/Approving Agency: Dept. of General Planning. City & County of Honolulu

Deadline for Comments: March 25, 1989

Date Sent/By: February 8, 1989

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Dept. of Agriculture	1	
Dept. of Accounting and General Services	1	
Dept. of Defense	1	
Dept. of Education (a)*		
Dept. of Hawaiian Home Lands (a)*		
Dept. of Health	1	
Dept. of Land and Natural Resources	3	
DLNR State Historic Preservation Officer	1	
Dept. of Business and Economic Development	1	
DBED Library	1	
Housing Finance & Development Corporation	1	
Dept. of Transportation	3	
State Archives	1	
State Energy Office	1	
<u>UNIVERSITY OF HAWAII</u>		
Environmental Center	4	
Marine Programs (a)*		
Water Resources Research Center	1	
<u>FEDERAL</u>		
Army-DAFE (Facilities Eng.-USASCH)	1	
Environmental Protection Agency (a)*		
Navy	1	
Soil Conservation Service	1	
U.S. Army Corps of Engineers	1	
U.S. Coast Guard	1	
U.S. Fish and Wildlife Service	1	
U.S. Geological Survey (a)*		

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 Total Received: _____ Copy of Distribution List Sent to: _____
 Total Distributed: _____ Date: _____
 File Copy: _____

(a)* Copy desired only if project involves the agency's responsibilities.

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Wailuku Regional Library	1	
Lihue Regional Library		
OAHU:		
Aiea Library		
Aina Haina Library		
Ewa Beach Community-School Library	1	
Hawaii Kai Library		
Kahuku Community-School Library		
Kailua Library		
Kalihi-Palama Library		
Liliha Library		
Manoa Library		
McCully-Moiliili Library		
Millilani Library		
Wahiawa Library		
Waialua Library	1	
Waianae Library		
Waikiki-Kapahulu Library		
Waimanalo Community-School Library	1	
Waipahu Library		
HAWAII		
Bond Memorial (Kohala) Library		
Holualoa Library		
Honokaa Library		
Kailua-Kona Library		
Keau Community-School Library		
Kealahou Library		
Laupahoehoe Community-School Library		
Mountain View Community-School Library		
Pahala Community-School Library		
Pahoa Community-School Library		
Thelma Parker Memorial Library/Waimea Area Library		
MAUI		
Kahului Library		
Lahaina Library		
Makawao Library		
MOLOKAI		
Molokai Library		
LANAI		
Lanai Community-School Library		
KAUAI		
Hanapepe Library		
Kapaa Library		
Koloa Community-School Library		
Waimea Library		

NEWS MEDIA

Honolulu Star-Bulletin	1	
Honolulu Advertiser	1	
Sun Press	1	
Hawaii Tribune Herald (b)**		
West Hawaii Today - Kona (b)**		
The Garden Island Newspaper - Kauai (b)**		
Maui News (b)**		
Ka Molokai (b)**		

CITY AND COUNTY OF HONOLULU (b)**

Board of Water Supply	1	
Building Dept.	1	
Dept. of Housing and Community Development	1	
Dept. of General Planning		
Dept. of Land Utilization	1	
Dept. of Parks and Recreation	1	
Dept. of Public Works	1	
Dept. of Transportation Services	1	
Fire Dept.	1	
Municipal Reference and Records Center (Oahu only)	1	
Police Dept.	1	

COUNTY OF HAWAII (b)**

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

COUNTY OF MAUI (b)**

Planning Dept.		
Dept. of Parks and Recreation		
Dept. of Public Works		
Dept. of Water Supply		
Economic Development Agency		
Maui Community College Library		

COUNTY OF KAUAI (b)**

Planning Dept.		
Dept. of Public Works		
Dept. of Water Supply		
Kauai Community College Library		

NON-GOVERNMENTAL AGENCIES

American Lung Association	1	
Hawaiian Electric Company	1	
Office of Hawaiian Affairs	1	

LIBRARIES

U.H. Hamilton Library, Hawaiian Collection	1	
Legislative Reference Bureau	1	

(b)** Copy desired only if project is in respective county.



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

March 22, 1989

REPLY TO
ATTENTION OF:
Planning Branch

Mr. Donald A. Clegg
Department of General Planning
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96814

Dear Mr. Clegg:

Thank you for the opportunity to review the Draft Environmental Impact Statement (DEIS) for Royal Kunia Phase II, Hoaeae, Ewa, Oahu. Our previous comments in response to the EIS Preparation Notice (letter dated November 16, 1988) have been incorporated into the DEIS. We have no additional comments.

Sincerely,

C. Fujii
Clarence Fujii
Acting Chief
Engineering Division

Copy Furnished:

Dr. Marvin Miura
Office of Environmental Quality Control
465 South King Street, Room 104
Honolulu, Hawaii 96814

✓ William E. Wanket, Inc.
Pacific Tower 1010
1001 Bishop Street
Honolulu, Hawaii 96792

WILLIAM
E.
WANKET
INC.

Land Use Consultant

April 3, 1989

Mr. Clarence Fujii
Acting Chief
Engineering Division
U.S. Army Engineer District
Department of the Army
Building 230
Ft. Shafter, Hawaii 96858-5440

Dear Mr. Fujii:

**Draft Environmental Impact Statement (DEIS)
Royal Kunia Phase II
Hoeaee, Ewa, Oahu**

Thank you very much for the copy of your letter of March 23, 1989 to Mr. Donald A. Clegg, Chief Planning Officer of the Department of General Planning regarding the DEIS for the referenced project. We appreciate your efforts in reviewing the DEIS.

For your information, your letter, together with this response, will be published in the Final EIS.

Sincerely,


William E. Wanket

cc: Donald A. Clegg, Chief Planning Officer

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410



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

IN REPLY REFER TO

11010
Ser 03(09P2)/516
1 March 1989

Mr. Donald Clegg
Department of General Planning
650 S. King St.
Honolulu, Hawaii 96813

Dear Mr. Clegg:

DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) FOR ROYAL KUNIA PHASE II

We have reviewed the DEIS for the Royal Kunia Phase II dated February 1989.

We are pleased that our comments on the blast zone and drainage, as expressed in our 5 December 1988 letter to William E. Wanket, Inc., have been included in the DEIS. We have no further comments to offer.

Thank you for the opportunity to review the DEIS.

The Navy's point of contact is Mr. Bill Liu, telephone 471-3324.

Sincerely,

W. K. LIU
Assistant Base Civil Engineer
in direction of
Commander

Copy to:
✓ William E. Wanket, Inc.
OEQC

REPRODUCED AT GOVERNMENT EXPENSE

WILLIAM
E.
WANKET
INC.

Land Use Consultant

April 3, 1989

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

Dear Mr. Liu:

**Draft Environmental Impact Statement (DEIS)
Royal Kunia Phase II
Hoaeae, Ewa, Oahu**

Thank you very much for the copy of your letter of March 1, 1989 to Mr. Donald A. Clegg, Chief Planning Officer of the Department of General Planning regarding the DEIS for the referenced project (11010 Ser 03[09P2]/516). We appreciate your efforts in reviewing the DEIS.

For your information, your letter, together with this response, will be published in the Final EIS.

Sincerely,


William E. Wanket

cc: Donald A. Clegg, Chief Planning Officer

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410

UNITED STATES
DEPARTMENT OF
AGRICULTURE

SOIL
CONSERVATION
SERVICE

P. O. BOX 50004
HONOLULU, HAWAII
96850

March 28, 1989

Mr. Donald Clegg, Director
Department of General Planning
City and County of Honolulu
650 S. King Street
Honolulu, HI 96813

Dear Mr. Clegg:

Subject: Draft Environmental Impact Statement (DEIS) -
Royal Kunia Phase II, Hooeae, Ewa, Oahu

The above-mentioned document has been reviewed as requested.

The EIS states that the development will not adversely affect Oahu Sugar Company's operation or the development of diversified agriculture.

However, it does not discuss any possible relationship to the effect of the combined loss of prime agricultural lands from all of the proposed developments for central Oahu at the present time.

This combined effect could present a much more serious effect or problem than this EIS and those discussing other developments singularly address.

Sincerely,



WARREN M. LEE
State Conservationist

cc:
Dr. Marvin Miura, Director, Office of Environmental Quality Control,
465 S. King Street, Rm. 104, Honolulu, HI 96813
Mr. William E. Wanket, Inc., Pacific Tower 1010, 1001 Bishop Street,
Honolulu, HI 96813.

Rec'd 3-30-89
POST MARKED 3-29-89

WILLIAM
E.
WANKET
INC.

Land Use Consultant

April 6, 1989

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

Dear Mr. Lee:

**Draft Environmental Impact Statement (DEIS)
Royal Kunia Phase II
Hoaeae, Ewa, Oahu**

Thank you very much for the copy of your letter of March 28, 1989 to Mr. Donald A. Clegg, Chief Planning Officer of the Department of General Planning regarding the DEIS for the referenced project. Please note, however, that your letter was received postmarked March 29, 1989, four days pass the public review deadline of March 25, 1989 established by OEQC. Your late comments, however, are addressed below.

Comment

"The EIS states that the development will not adversely affect Oahu Sugar Company's operation or the development of diversified agriculture. However, it does not discuss any possible relations to the effect of the combined loss of prime agricultural lands from all of the proposed developments for central Oahu at the present time. This combined effect could present a much more serious effect or problem that this EIS and those discussing other developments singularly address."

Response

To clarify the analysis summarized in the Draft Environmental Impact Statement and contained in *Appendix G*, the agricultural impacts of

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410

the proposed Royal Kunia, Phase II are assessed in combination with other planned and proposed projects that would impact sugarcane lands in the Ewa and Central Oahu area.

Again, thank you for your comments. Your letter, together with this response, will be published in the Final EIS.

Sincerely,



William E. Wanket

cc: Donald A. Clegg, Chief Planning Officer

11-11-11 11:11:11 AM



United States Department of the Interior

FISH AND WILDLIFE SERVICE
PACIFIC ISLANDS OFFICE

P.O. BOX 50167
HONOLULU, HAWAII 96850

ES
Room 6307

GENERAL PLANNING
OFFICE HONOLULU

Mr. Donald Clegg
Department of General Planning
650 South King Street
Honolulu, Hawaii 96813

Re: Draft Environmental Impact Statement, Royal Kunia Phase II,
Hoaeae, Ewa, Oahu

Dear Mr. Clegg:

This responds to your letter of February 1989. To the best of our knowledge, no listed or proposed endangered species, migratory birds, or anadromous fishes within our jurisdiction occur in the proposed project area(s). However, due to current manpower and budget restrictions, the Office of Environmental Services cannot devote the time necessary to conduct a thorough review of fish and wildlife concerns associated with the referenced action at this time. We strongly recommend that you consult directly with the State Department of Land and Natural Resources.

Please be advised that this notification does not represent Service approval of, or support for, the proposed activity. The Service may review future actions related to this proposal should administrative constraints be alleviated or if adverse impacts to significant fish and wildlife resources are identified. Please continue to keep this office apprised of the project's status.

Sincerely yours,

Ernest Kosaka
Field Office Supervisor
Environmental Services

cc: DLNR
OEQC
William Wanket, Inc.

WILLIAM
E.
WANKET
INC.

Land Use Consultant

April 4, 1989

Mr. Ernest Kosaka
Field Office Supervisor
Environmental Services
Fish and Wildlife Services
P. O. Box 50167
Honolulu, Hawaii 96850

Dear Mr. Kosaka:

**Draft Environmental Impact Statement (DEIS)
Royal Kunia Phase II
Hoaeae, Ewa, Oahu**

Thank you very much for the copy of your letter (ES Room 6307) to Mr. Donald A. Clegg, Chief Planning Officer of the Department of General Planning regarding the DEIS for the referenced project. We appreciate your efforts in reviewing the DEIS.

For your information, a copy of the DEIS has been forwarded to the State Department of Land and Natural Resources for review and comment. Also, as the project progresses through the various governmental approval processes, e.g., development plan amendment and zone change, additional opportunities will be available for you to make comments on the project.

Again, thank you for your comments. Your letter, together with this response, will be published in the Final DEIS.

Sincerely,



William E. Wanket

cc: Donald A. Clegg, Chief Planning Officer

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410

FEB 14 1989

(P)1124.9

Mr. Donald Clegg
Director
Department of General Planning
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Office of Environmental
Quality Control
465 South King Street, Room 104
Honolulu, Hawaii 96813

Gentlemen:

Subject: Draft Environmental Impact Statement
for Royal Kunia Phase II

We have reviewed the subject Draft Environmental Impact Statement and offer the following comments:

1. The EIS should address the impacts that the spraying of pesticides and herbicides on the proposed golf course upwind of the proposed park/school site will have on the students and staff.
2. The area set aside for the school site probably should be increased to 8 acres to accommodate terracing of the site and fire truck access to within 150 feet of all buildings.

Thank you for the opportunity to comment on this project.

Very truly yours,


TEUANE TOMINAGA
State Public Works Engineer

LO:jk
cc: William E. Wanket, Inc.
Mr. Eugene Imai

WILLIAM
E.
WANKET
INC.

Land Use Consultant

April 4, 1989

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

Dear Mr. Tominaga:

**Draft Environmental Impact Statement (DEIS)
Royal Kunia Phase II
Hoeaee, Ewa, Oahu**

Thank you very much for the copy of your letter of February 14, 1989 to Mr. Donald A. Clegg, Chief Planning Officer of the Department of General Planning regarding the DEIS for the referenced project ([P]1124.9). We appreciate your efforts in reviewing the DEIS. We respond as follows:

Impact of Pesticides/Herbicides

To address your concerns, we asked Dr. Charles L. Murdoch, who together with Dr. Richard E. Green prepared the Environmental Impact Study of Fertilizer, Herbicides and Pesticide Use (*Appendix F* of the DEIS), to review whether there would be an impact on school students or staff, or on people using the proposed park. His response follows:

"In my opinion, there will be no effect of pesticide sprays on the school children or staff, or on people using the park. This concern was covered in Section IV, C, pages 6-9 of our report "Environmental Impact of Fertilizer, Herbicide and Pesticide use on the Proposed Royal Kunia Phase II Golf Course". This section of our report addressed the volatility and potential for drift of pesticide sprays applied in management of the proposed golf course. Some of the reasons why we reached the conclusion that there will be no negative environmental impact of pesticides sprays applied to the proposed

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golf course on air quality are summarized below. I use the term "pesticide" to include any material applied to control biological pests. These generally include herbicides, insecticides, and fungicides.

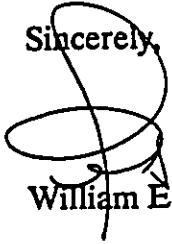
1. Most pesticides used on golf courses are of relatively low mammalian toxicity, ranging from hundreds to several thousand mg/kg of body weight.
2. Pesticides used on golf courses are not highly volatile and are applied in dilute sprays (50 to 100 gallons of spray solution per acre) to open areas. There is therefore little likelihood of volatility once the sprays are applied.
3. Golf course pesticide sprays are applied with ground equipment. Boom height is less than one meter. Low spray pressures and coarse spray droplets further reduce the drift potential of sprays applied to golf courses. Data were presented in our report (Table 4, page 8) which shows that 99% or more of the spray volume from ground operated agricultural spray equipment is deposited within 17 feet of the boom when operated at a boom height of 18 inches and with a wind speed of approximately 10 MPH. Sufficient buffer space appears to be present between the golf course and the school and park to prevent negative impact from drift of spray particles. There is approximately 250 feet between the nearest maintained area of the golf course and the park and approximately 750 to 1,000 feet between the nearest maintained area of the golf course and the school.
4. To facilitate spray operations and to comply with label instructions of some pesticides, spray applications are made in later afternoon or early morning when wind speeds are low and when golfers are not on the course. This would also be hours when school children and staff would not be present at the school and when use of the park would be lowest.
5. As a further precaution against spray drift, we recommended the planting of dense, tall vegetation, such as a hedge, at the boundary of the golf course opposite the park. Although the recommendations in our report (*Section VI*, page 12) did not include this vegetation barrier, we did state (page 9) that tall vegetation between the golf course and housing sites and facilities used by people would further reduce the risk of drift of pesticide sprays. It is common practice to screen golf courses from roads, public areas, houses, etc. with tall, dense hedges for the purpose of privacy and to protect people from mishit golf balls."

School Site

Regarding acreage size and fire truck access, we will work with the Department of Education on these issues as the project progresses.

Thank you very much for your comments. Your letter, together with this response, will be published in the Final EIS.

Sincerely,

A handwritten signature in black ink, appearing to read 'Wanket', with a large loop at the end of the signature.

William E. Wanket

cc: Donald A. Clegg, Chief Planning Officer

2008 FEB 11 10 51 AM

JOHN WAIHEE
GOVERNOR



YUKIO KITAGAWA
CHAIRPERSON, BOARD OF AGRICULTURE

SUZANNE D. PETERSON
DEPUTY TO THE CHAIRPERSON

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

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

March 24, 1989

COPY

Mr. Donald A. Clegg, Chief Planning Officer
Department of General Planning
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Clegg:

Subject: Draft Environmental Impact Statement (DEIS) for
Royal Kunia - Phase II
Halekua Development Corporation
TMK: 9-4-02: por. 1
9-4-03: por. 1 and 9 Hoaeae, Ewa, Oahu
Area: 669.9 acres

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

The applicant is seeking to amend the subject site's Central Oahu Development Plan map designation from "Agriculture" to "Residential", "Low Density Apartment", "Industrial", "Recreation", and "Public Facilities". The site is leased to Oahu Sugar Company and is in sugarcane cultivation. The proposed project will require about 1.718 million gallons of water per day.

According to Oahu Sugar Company (OSC), Fields 220, 221, 225, and 230 which comprise most or all of the subject area are drip-irrigated with pumped groundwater mixed with water from Waiahole Ditch.

The subject area is immediately north of the Royal Kunia Phase I site (691.5 acres) for which we strenuously opposed the petition for amendment from the Agricultural to the Urban District in May of 1986 (Land Use Commission, Docket No. A86-600, Waitec Development, Inc.).



Mr. Donald A. Clegg
March 24, 1989
Page -2-

References in the DEIS to the Agricultural Lands of Importance to the State of Hawaii (ALISH) system, the Soil Conservation Service Soil Survey for Oahu, and the Land Study Bureau's Detailed Land Classification for Oahu are correct.

Specific Comments

Impact on Oahu Sugar Company

Page 70 of the DEIS states that "...Royal Kunia, Phase II, in combination with other approved and proposed projects, is not expected to threaten the economic viability of OSC before the major leases expire in the mid-1990's..." (emphasis added). From the information provided in Appendix G ("Proposed Royal Kunia, Phase II - Impact on Agriculture", Decision Analysts Hawaii, Inc.; December, 1988), the subject project, and the other projects affecting OSC operations that are planned or have received State and/or County zoning approvals, will eventually have a very significant adverse impact on OSC.

The projected cumulative intermediate (to the year 1995) impact of multiple project development in Central Oahu and Ewa of about 2,000 acres (Appendix G, page 9) should not be used to diminish the full impact of the eventual urbanization of sugarcane cultivated lands. The intermediate impact will reduce OSC acreage under cultivation to 11,490 acres, which is perilously close to the minimum acreage needed for the plantation to remain economically viable in a single mill configuration (estimated to be about 10,669 acres at 14.06 tons of sugar per acre).

In the long run, the significant impact on OSC will be that the cultivable acreage available to OSC after full project development (about 8,100 acres) will be far below the minimum acreage needed to remain economically viable in a single-mill operation and much less than the acreage required for the present double-mill configuration. Sugar yields (expressed in tons of sugar per acre or TSA) would have to increase by about 32 percent over the 1987 OSC average yield to 18.5 TSA.

In either case, OSC will be forced to modify its operations and increase the yields from its remaining fields to forestall the inevitable situation when the company finds it no longer economic to remain in operation. However, if productive fields such as those directly affected by the subject proposal are removed from production, this would hasten the demise of OSC. Fields 220, 221, 225 and 230 averaged 16.6 TSA over the past

Mr. Donald A. Clegg
March 24, 1989
Page -3-

three crop cycles, which is 18 percent better than the 1987 average.

The long-term adverse impact will be moot if (1) renegotiations of the major land leases result in unfavorable terms and rents, (2) sugar prices fall and/or (3) federal price supports for sugar are inadequate to cover costs of production.

Consistency with State Plans

From the above discussion, it is clearly evident that the project is inconsistent with the objectives, policies and guidelines relating to agriculture in the Hawaii State Plan and the State Agriculture Functional Plan (June, 1985) (Appendix G, Table 6, pages 24-25).

Impact on Diversified Agriculture

The DEIS states that "...it is extremely doubtful that the project would adversely affect the growth of diversified agriculture in Hawaii" (DEIS, page 71-72). This conclusion is based on the supposed relative abundance of arable lands formerly in sugarcane and pineapple cultivation, the supposed availability of these lands for profitable replacement crops, and the very small amount of lands and water required to grow diversified crops.

Appendix G states that the Land Evaluation and Site Assessment (LESA) Commission projections for acreage needed for diversified agriculture is "...excessively high" (page 19) and that the total additional acreage needed to accommodate diversified agriculture to the year 1995 is about 1,500 acres for the State as compared to the LESA estimate of 2,314 for Oahu alone (Appendix G, pages 19-20). In fact, the additional acreage required on Oahu for diversified crops by 1995 (including export crops) is closer to 5,100 acres, based on the LESA report.

Our comment on the Waitec Development, Inc. boundary amendment petition remains applicable: "The LESAC Report takes a more optimistic and broad view of the future of diversified agriculture in Hawaii than does the [DEIS]. In the determination and protection of 'important agricultural lands', it is the State's duty to assure the availability of agriculturally suitable lands. Therefore, it is appropriate that the State take a conservative, long range view and maintain what appears to be a surplus of productive lands as compared to the [DEIS'] findings. Incremental losses of a resource like

Mr. Donald A. Clegg
March 24, 1989
Page -4-

arable lands, if left uncontrolled, will have a devastating and irreversible cumulative effect on the viability of agriculture. Once agricultural lands are urbanized there is no return. This cannot be overemphasized" (memorandum to Department of Planning and Economic Development, dated May 16, 1986).

Thank you for the opportunity to comment. We would like to have a copy of the Final EIS.

Sincerely,



YUKIO KITAGAWA
Chairperson, Board of Agriculture

cc: OEQC
William E. Wanket, Inc.
OSP (attn. LUD)

Rec'd 3-30-89
POST MARKED 3-29-89

WILLIAM
E.
WANKET
INC.

Land Use Consultant

April 6, 1989

Mr. Yukio Kitagawa
Chairperson, Board of Agriculture
P. O. Box 22159
Honolulu, Hawaii 96822-0159

Dear Mr. Kitagawa:

**Draft Environmental Impact Statement (DEIS)
Royal Kunia Phase II
Hoaeae, Ewa, Oahu**

Thank you very much for the copy of your letter of March 24, 1989 to Mr. Donald A. Clegg, Chief Planning Officer of the Department of General Planning regarding the DEIS for the referenced project. Please note, however, that your letter was received postmarked March 29, 1989, four days past the public review deadline of March 25, 1989 established by OEQC. Your late comments, however, are addressed below.

OAHU SUGAR COMPANY

Comment

The DOA reasons that if all the proposed developments are approved and proceed to full development within a 20-year period, and if OSCo is still in existence at that time, then urbanization could threaten OSCo.

Response

As noted in the DEIS, the long-term future of OSCo is uncertain. This uncertainty stems primarily from the problems associated with renewal of the major leases and whether Federal price supports for sugar will be sufficiently high to allow profitable operations. If OSCo survives these threats, and if all planned and proposed developments are approved and proceed relatively rapidly to full development, then it is possible that OSCo's survival could be threatened; however, it is unlikely that all these suppositions will in fact occur.

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IMPACT ON DIVERSIFIED AGRICULTURE

Comments

- 1) The DOA states that 5,100 acres are required for diversified crops, while the DEIS indicates that only 2,314 acres are required, with both assertions being based on the LESA report.
- 2) The State should maintain a surplus of [potentially] productive agricultural lands. "Incremental losses of a resource like arable lands, if left uncontrolled, will have a devastating and irreversible cumulative effect on the viability of agriculture."

Response

- 1) As clarified in *Appendix G* and more specifically in *Table 5*, the DOA figure covers all diversified agriculture, whereas the DEIS figure is for those crops and activities which generally require prime agricultural lands, and exclude those which generally do not. The DEIS addresses the impact on prime agricultural lands because inferior agricultural land is by definition less valuable, and the supply is greater and more readily available.
- 2) As discussed in the DEIS, a very large surplus of prime agricultural lands exists and, given the poor economic health of the sugar industry, this surplus is expected to grow. When the Royal Kunia, Phase II is combined with other planned and proposed urban projects, the amount of urban land required is far too small to adversely affect this large and growing surplus of prime agricultural land.

Again, thank you for your comments. Your letter, together with this response, will be published in the Final EIS.

Sincerely,



William E. Wanket

cc: Donald A. Clegg, Chief Planning Officer

JOHN WAIHEE
GOVERNOR



JOSEPH K. CONANT
EXECUTIVE DIRECTOR

STATE OF HAWAII
DEPARTMENT OF BUSINESS AND ECONOMIC DEVELOPMENT
HOUSING FINANCE AND DEVELOPMENT CORPORATION
P. O. BOX 28360
HONOLULU, HAWAII 96820-1760

IN REPLY REFER

TO:

89:PLNG/889B JT

March 14, 1989

MEMORANDUM

TO: Dr. Marvin Miura
Office of Environmental Quality Control

FROM: Joseph K. Conant

SUBJECT: Draft EIS for Royal Kunia, Phase II

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

The draft State Housing Functional Plan recognizes that Hawaii's residents have a wide range of housing needs. There is a need for affordable homeownership opportunities, as well as affordable rental housing opportunities for families and persons with special housing needs.

It appears that the applicant is committed to the provision of affordable housing, with 50 percent of the units in the proposed project targeted for people earning below 140% of median income. However, the proposed distribution of housing units affordable to families of different income levels is not clearly stated in the report. For example, approximately how many units are proposed to be affordable to families with the following income ranges: (1) 50% to 80%, (2) 80% to 120%, and (3) 120% to 140% of the area median income?

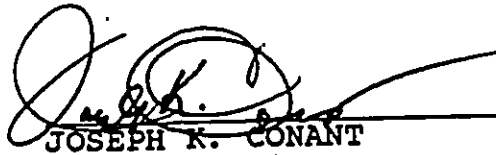
Additionally, Policy C(7) of the draft State Housing Functional Plan calls for the integration of special needs housing* in new and existing neighborhoods. To implement this proposed policy, Implementing Action C(7)(b) suggests that, as

*Special needs housing means housing for persons for whom social problems, age, or physical or mental handicaps impair their ability to live independently and for whom such ability can be improved by more suitable housing conditions.

Dr. Marvin Miura
March 14, 1989
Page 2

part of any affordable housing condition to land use approvals, developers of residential projects should be required to make at least one percent of the total number of units in the project available to special needs groups. (This action is not intended to exclude the provision of housing for individuals with special needs who are capable of living independently, such as paraplegics.) We therefore recommend that special needs housing also be included as part of the affordable housing component of the proposed project.

Thank you for the opportunity to comment.



JOSEPH K. CONANT
Executive Director

cc: Department of General Planning
William E. Wanket, Inc.

WILLIAM
E.
WANKET
INC.

Land Use Consultant

April 3, 1989

Mr. Joseph K. Conant
Executive Director
Department of Business and Economic Development
Housing Finance and Development Corporation
P. O. Box 29360
Honolulu, Hawaii 96820-1760

Dear Mr. Conant:

**Draft Environmental Impact Statement (DEIS)
Royal Kunia Phase II
Hoaeae, Ewa, Oahu**

Thank you very much for the copy of your memorandum of March 14, 1989 to Dr. Marvin Miura, Director of the Office of Environmental Quality Control regarding the DEIS for the referenced project. We appreciate your efforts in reviewing the DEIS, and we respond as follows.

The applicant is committed to the provision of 50 percent of the units for people earning below 140 percent of median income. The intent is to distribute the units to meet various targeted groups. At this preliminary planning stage, however, we are unable to define the exact distribution. Through the legislative processes of seeking State Land Use Commission approval and City Council approval of a development plan amendment and a zone change, we will work with the various governmental bodies to refine and determine the affordable housing requirements, including the amount, type, distribution, and unit prices. Your agency, as well as the City's Department of Housing and Community Development, is expected to play a major role in this regard.

Again, thank you for your comments. Your memorandum, together with this response will be published in the Final EIS.

Sincerely,


William E. Wanket

cc: Donald A. Clegg, Chief Planning Officer

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1001 Bishop Street
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FAX 521-5410



DEPARTMENT OF BUSINESS
AND ECONOMIC DEVELOPMENT

ENERGY DIVISION, 335 MERCHANT ST., RM. 110 HONOLULU, HAWAII 96813 FAX (808) 531-5243

JOHN WAIHEE
GENERAL MANAGER
ROGERA ULVELING
DEPUTY GENERAL MANAGER
BARBARA KIM STANION
DEPUTY GENERAL MANAGER
LESLIE S. MATSUBARA
DEPUTY GENERAL MANAGER

89:0703e

March 22, 1989

Mr. Donald Clegg
Chief Planning Officer
Department of General Planning
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Clegg:

Subject: Draft Environmental Impact Statement for Royal Kunia Phase II

The Energy Division has received the above-referenced Draft Environmental Impact Statement (DEIS) and has the following comments:

We note that the DEIS contains minimal discussion of energy impacts that will result from the proposed project. The DEIS contains neither an estimate of total electricity consumption within the project nor a discussion of energy conservation or renewable energy sources that might help meet the project's energy requirements.

We believe that this DEIS should include a fuller discussion and evaluation of the amount of energy consumption anticipated, the planned application of energy conservation devices, and the availability of renewable energy sources. The requirement for such an evaluation is spelled out in the enclosed excerpt from the OEQC BULLETIN.

Thank you for the opportunity to provide these comments. We hope they will be useful to you.

Sincerely,

Maurice H. Kaya
Energy Program Administrator

MHK/PE:ef

Enclosure

cc: Mr. William E. Wanket

WILLIAM
E.
WANKET
INC.

Land Use Consultant

April 5, 1989

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

Dear Mr. Kaya:

**Draft Environmental Impact Statement (DEIS)
Royal Kunia Phase II
Hoaeae, Ewa, Oahu**

Thank you very much for the copy of your letter of March 22, 1989 to Mr. Donald A. Clegg, Chief Planning Officer of the Department of General Planning regarding the DEIS for the referenced project. We appreciate your efforts in reviewing the DEIS.

Based on your comments, we will include in the Final EIS a fuller discussion on anticipated energy consumption, energy conservation devices and renewable energy sources. This discussion will be included under Section 2.3.6 of the Final EIS. For your information, the anticipated consumption of energy for the project is forecasted to be 162,534,528 KWH/year.

Again, thank you for your comments. Your letter, together with this response, will be published in the Final EIS.

Sincerely,



William E. Wanket

cc: Donald A. Clegg, Chief Planning Officer

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1001 Bishop Street
Honolulu, HI 96813
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STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE ASSISTANT SECRETARY
FOR OPERATIONS AND LOGISTICS
1000 KALANOA'OLE DRIVE, HONOLULU, HAWAII 96813

FEB 13 1989

Engineering Office

Mr. Donald Clegg
Dept. of General Planning
650 S. King Street
Honolulu, Hawaii 96813

OEQC
465 S. King Street, Room 104
Honolulu, Hawaii 96813

Dear Mr. Clegg:

Royal Kunia Phase II
Oahu, Hoaeae, Ewa
TIK: 9-4-02:Por 1; 9-4-03:Por 1 & 9

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

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

Sincerely,

SIGNED

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

Enclosures

cc: William E. Wanket, Inc. ✓

WILLIAM
E.
WANKET
INC.

Land Use Consultant

April 3, 1989

Mr. Jerry M. Matsuda
Major, Hawaii Air National Guard
Department of Defense
Office of the Adjutant General
3949 Diamond Head Road
Honolulu, Hawaii 96816-4495

Dear Major Matsuda:

**Draft Environmental Impact Statement (DEIS)
Royal Kunia Phase II
Hoaeae, Ewa, Oahu**

Thank you very much for the copy of your letter of February 9, 1989 to Mr. Donald A. Clegg, Chief Planning Officer of the Department of General Planning regarding the DEIS for the referenced project. We appreciate your efforts in reviewing the DEIS.

For your information, your letter, together with this response, will be published in the Final EIS.

Sincerely,



William E. Wanket

cc: Donald A. Clegg, Chief Planning Officer

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1001 Bishop Street
Honolulu, HI 96813
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(808) 533-4937
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JOHN WAIHEE
GOVERNOR OF HAWAII



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

STATE OF HAWAII
DEPARTMENT OF HEALTH

P. O. BOX 3378
HONOLULU, HAWAII 96801

March 17, 1989

In reply, please refer to:
EPHSD

MEMORANDUM

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

From: Deputy Director for Environmental Health

Subject: Draft Environmental Impact Statement (DEIS) for Royal Kunia, Phase II,
Hoaaee, Ewa, Oahu, Tax Map Key 9-4-02: Por. 1; 9-4-03: Por. 1 and 9

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

Drinking Water

1. The Department's Administrative Rules, Title 11, Chapter 20, "Potable Water Systems," Section 11-20-30 requires that new or substantially modified distribution systems for public water systems be approved by the Director. However, if the water system is under the jurisdiction of the City and County of Honolulu, the Board of Water Supply will be responsible for the review and approval of the plans.
2. The project site lies above the Underground Injection Control (UIC) line. Land areas above the UIC line are considered to contain underground sources of drinking water. Various activities associated with golf courses should not be allowed to contaminate groundwater. Activities of concern include:
 - a. Application of biocides and fertilizers
 - b. Storage of fuel for vehicles
 - c. Maintenance of vehicles and equipment (cleaning, refueling, lubrication, etc.)

Wastewater Disposal

We have reviewed the subject DEIS and determined that the wastewater generated from the subject development must be treated at the City and County of Honolulu's Honouliuli STP via the Waipahu Sewage Pump Station. The Honouliuli STP is rapidly reaching its design capacity and may not be able to accommodate the approximately 1.77 mgd flow from the project. The Waipahu Sewage Pump Station may also have to be expanded to handle the proposed increase in flow. Therefore, we recommend that the developer consult and work closely with the City and County of Honolulu regarding the future expansion of the Honouliuli STP and Waipahu Sewage Pump Station prior to developing the proposed project.

Dr. Marvin T. Miura
March 17, 1989
Page 2

Hazardous Waste Program

Businesses in the proposed industrial park and the golf course may generate hazardous waste as defined in federal regulations. Any hazardous waste generated must be properly managed in accordance with 40 CFR Part 260 to 270.

Underground Storage Tank Program

If the businesses in the proposed industrial park or the golf course intend to use underground storage tanks for fuel and/or hazardous substances, the developer/owner must comply with applicable federal regulations (40 CFR Parts 280 and 281) governing the design, installation and operation of these tanks.

Air Pollution

The air quality assessment provided with the DEIS for the proposed Royal Kunia, Phase II Development concluded exceedances of the State eight-hour carbon monoxide standard may occur under worst case meteorological conditions. The model indicated that the State one-hour carbon monoxide standard will be met and that the eight-hour standard can also be met provided the receptor distance from the curb is increased from 8-13 feet. These conclusions are questionable since the ambient or existing carbon monoxide concentrations were assumed at 1.7 and 1.2 milligrams per cubic meter for the one-hour and eight-hour analysis, respectively. Clarification is required as to how these values were determined. The ambient impact should be calculated using the carbon monoxide emissions attributed from the existing traffic and any future traffic associated with projects already approved for the area. Due to the potential exceedances, mitigating actions should be discussed along with the corresponding air quality impact reduction. A monitoring program should be seriously considered by the applicant to verify that the State standards, in fact, will not be exceeded.

Vector Control

This is cane land and huge rodent populations are not uncommon. All requirements of Title 11, Chapter 26, paragraph 35 (Rodents; demolishing of structure and clearing of vacant sites and vacant lots), must be strictly adhered to.

In addition to the above comments, attached are 11 conditions applicable to all new golf course developers. The developer should also address and meet these conditions.


BRUCE S. ANDERSON, Ph.D.

Attachment

cc: William E. Wanket, Inc. ✓

January 31, 1989

ELEVEN (11) CONDITIONS APPLICABLE TO NEW GOLF COURSE DEVELOPMENTS

Conditions:

1. Owner/developer shall obtain a written statement from the Board of Water Supply regarding their intentions to utilize or not utilize groundwaters beneath and downgradient of the project site for potable drinking water, now and in the future.
2. Owner/developer shall obtain a written statement from the State Department of Land and Natural Resources that they will not issue any private water well permits beneath and downgradient of the project sites whose uses are intended for potable drinking water, now and in the future.
3. In the event that the Board of Water Supply and/or the Department of Land and Natural Resources considers the groundwaters below or downgradient of the project site to be, now or in the future, a source of potable drinking water, the owner/developer and all subsequent owners shall establish a groundwater monitoring plan and system which shall be presented to the State Department of Health for its approval. The groundwater monitoring plan and system shall minimally describe the following components:
 - a. A system of monitoring wells constructed throughout the site. These monitoring wells shall extend approximately ten (10) feet below the water table.
 - b. A routine groundwater monitoring schedule of at least once every six (6) months and more frequently, as required by the State Department of Health, in the event that the monitoring data indicates a need for more frequent monitoring.
 - c. A list of compounds which shall be tested for as agreed to by the State Department of Health. This list may include, but not be limited to the following: total dissolved solids; chlorides; PH; nitrogen; phosphorus; or any other compounds associated with fertilizers, biocides or effluent irrigation.
4. If Condition #3 is in effect, baseline groundwater data shall be established as described in this paragraph. Once the test well sites and list of compounds to be monitored for have been determined and approved by the State Department of Health, the owner/developer shall contract with an independent third-party professional (approved by the State Department of Health) to have the groundwater sampled and its data reported to the State Department of Health. Testing of the groundwater shall be done by a certified laboratory.

5. If Condition #3 is in effect and the data from the monitoring wells indicate the presence of the measured compound and/or the increased level of such compound, the State Department of Health can require the owner/developer or subsequent owner to take immediate mitigating action to stop the cause of the contamination. Subsequently, the developer/owner or subsequent owner shall mitigate any adverse effects caused by the contamination.
6. Owner/developer shall provide sewage disposal by means of connection to the public sewer system; or by means of a wastewater treatment works providing treatment to a secondary level with chlorination. Effluent from this wastewater treatment works may be used for golf course irrigation, subject to Condition #5. The entire system shall be approved by the State Department of Health.
7. If a wastewater treatment works with effluent reuse becomes the choice of wastewater disposal, then the owner/developer and all subsequent owners shall develop and adhere to a Wastewater Reuse Plan which shall address as a minimum, the following items:
 - a. Management Responsibility. The managers of the irrigation system using reclaiming wastewater shall be aware of the possible hazards and shall evaluate their system for public health, safety, and efficiency. They must recognize that contact with the reclaimed wastewater from treated domestic sewage poses potential exposure to pathogenic organisms which commonly cause infectious diseases (bacteria, viruses, protozoa, and helminths or worms).
 - b. General Recommendations
 - 1) Irrigated areas should be no closer than 500 feet from potable water wells and reservoirs.
 - 2) Irrigated areas should be no closer than 100 feet from any private residence.
 - 3) Application rates should be controlled to minimize ponding. Excess irrigation tailwater in the reclaimed wastewater irrigation area shall be contained and properly disposed. An assessment should be made of the acceptable time and rate of application based on factors such as type of vegetation, soil, topography, climate and seasonal variations.
 - 4) Effluent holding/mixing ponds shall be designed to prevent the infiltration of the wastewater into the subsurface. The holding/mixing ponds shall be made impervious.
 - 5) Irrigation shall be scheduled such that the public is not in the vicinity and the soil is sufficiently dry to accept the irrigation water.
 - 6) Permanent fencing or barriers shall be erected around polishing or holding ponds to prevent public entry or stray feral and tame animals from gaining access to the ponds.

- 7) Adequate irrigation records shall be maintained. Records should include dates when the fields are irrigated, rate of application, total application and climatic conditions. Records should also include any operational problems, diversions to emergency storage or safe disposal and corrective or preventive action taken.
 - 8) The holding/mixing ponds shall be periodically monitored for the purpose of detecting leakage into the subsurface. If leakage is detected, corrective action shall be immediately taken.
- c. Adequate Notice. Appropriate means of notification shall be provided to inform the employees and public that reclaimed wastewater is being used for irrigation on the site.
- 1) Posting of conspicuous signs with sufficient letter size for clear visibility with proper wording should be distributed around the use areas.
 - 2) Signs shall be securely fastened. Periodic surveillance shall be conducted to assure permanent posting at all times. Immediate replacements shall be made when necessitated by deterioration, vandalism or misuse.
- d. Adequate Employee Education. Employees or users should be cautioned and warned of the potential health hazards associated with the ingestion of reclaimed wastewater being used at the site.
- 1) Employees should be warned that the ingestion of reclaimed wastewater is unsafe.
 - 2) Employees should be protected from direct contact of the reclaimed wastewater. If necessary, protective clothing should be provided.
 - 3) Employees should be informed of the following:
 - o The irrigation water is unsafe for drinking or washing.
 - o Avoid contact of the water or soil with any open cuts or wounds.
 - o Avoid touching the mouth, nose, ear or eyes with soiled hands, clothes or any other contaminated objects.
 - o Be aware that inanimate objects such as clothes or tools can transport pathogenic organisms.
 - o Always wear shoes or boots to protect feet from the pathogenic organisms in the soil or irrigation water.
8. Use of electrical golf carts is recommended. It is recognized that underground storage tank(s) to store gasoline for gas driven golf carts will impose potential risks to the groundwater. If gasoline-driven golf carts are to be utilized, the developer/owner must meet all federal requirements in the installation of any underground storage tank.

9. On- and off-site wells will be utilized for irrigation purposes only. Potable water will be accommodated by the Board of Water Supply transmission lines.
10. Buildings designated to house the fertilizer and biocides shall be bermed to a height sufficient to contain a catastrophic leak of all fluid containers. It is also recommended that the floor of this room be made waterproof so that all leaks can be contained within the structure for cleanup.
11. A golf course maintenance plan and program will be established based on "Best Management Practices (BMP)" in regards to utilization of fertilizers and biocides as well as the irrigation schedule. BMP's will be revised as an ongoing measure. The golf course maintenance plan will be reviewed by the State Department of Health prior to implementation.

If there are any questions regarding the eleven (11) conditions mentioned here, please contact Mr. James K. Ikeda at 548-6455. We ask your cooperation in the protection of Hawaii's valuable groundwater resource.

WILLIAM
E.
WANKET
INC.

Land Use Consultant

April 4, 1989

Mr. Bruce S. Anderson
Deputy Director, Environmental Health
Department of Health
P. O. Box 3378
Honolulu, Hawaii 96801

Dear Mr. Anderson:

**Draft Environmental Impact Statement (DEIS)
Royal Kunia Phase II
Hoaeae, Ewa, Oahu**

Thank you very much for the copy of your memorandum of March 17, 1989 to Mr. Marvin T. Miura, Director of the Office of Environmental Quality Control regarding the DEIS for the referenced project. We appreciate your efforts in reviewing the DEIS. We respond as follows.

Drinking Water

1. The construction plans for the water system will be submitted for review and approval by the Department of Health and the Board of Water Supply.
2. We agree that the various activities associated with golf course must not be allowed to contaminate groundwater. With response to your "Conditions Applicable to new Golf Course Developments" under Condition 3, sub-section c, the proposal to monitor groundwater quality at several sites below the areas of chemical application on a golf course makes sense where the water table is relatively close to the land surface. According to our consultant (Green and Murdoch), it is questionable whether such sampling will provide definitive results when the groundwater depth exceeds 100 feet, especially when the golf course is surrounded by agricultural fields in which fertilizers and biocides are applied. However, if this requirement must be met, nitrate nitrogen (NO_3) would be the logical compound for which to test. Although we do not expect NO_3 to reach the

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FAX 521-5410

water table, as discussed in Appendix F of the DEIS, if it did show up at levels above background, a recommendation for specific biocides for which to monitor could be made at that time based on records of pesticide application to the golf course. Since NO_3 movement in soil is more rapid by orders of magnitude than that of commonly used biocides in golf course management, there is little likelihood of a biocide reaching groundwater before an increase in NO_3 indicated that leaching was occurring.

With reference to Condition 8, the applicant proposes to use electrical golf carts as recommended. Gasoline-driven golf carts are not being proposed.

Wastewater Disposal

The developer is working closely with the City and County of Honolulu regarding the future expansion of the Honouliuli WWTP and Waipahu Sewage Pump Station.

Hazardous Waste Program

The development is not expected to generate hazardous waste. If any hazardous waste is generated, it will be strictly managed in accordance with federal regulations, 40 CFR Part 260 to 270.

Underground Storage Tank Program

Installation of any underground storage tank will be designed, installed and operated in strict compliance with applicable federal regulations (40 CFR Parts 280 and 281).

Vector Control

All requirements of Title 11, Chapter 26, paragraph 35 (Rodents; demolishing of structure and clearing of vacant sites and vacant lots) will be strictly adhered to.

Air Pollution

The conclusions of the air quality study are based on the results of the CALINE3 modelling of the future traffic volumes on Kunia Road; these volumes include existing traffic, traffic due to other development, and traffic generated by the proposed project. The "ambient" levels used in the dispersion model, which are background pollutant levels that would exist in the absence of traffic, were based on data collected by the State Department of Health. Because the CO concentrations for this traffic assignment would meet the air quality standards, other cases with lower traffic volumes on Kunia Road, which would have lower CO concentrations, were not modelled.

The Air quality study identified CO concentrations at sensitive locations: for a one-hour exposure, a point along the property line

was considered to be the sensitive receptor location, while the sensitive receptor location for eight-hour exposures was assumed to be five feet beyond the property line. A distance of eight feet was assumed between the edge of the travel lane and the property line; as indicated in the air quality report, a greater separation between the traffic lanes and sensitive receptors would result in lower CO concentrations.

Other mitigation measures include programs to encourage ridesharing, transit service improvements, or other measures to decrease traffic demand and congestion. Also, the applicant will cooperate with the appropriate governmental agencies to determine if standards are being met.

Eleven (11) Conditions Applicable to New Golf Course Developments

A couple of the conditions are discussed under the above section, Drinking Water. With reference to other conditions, we have forwarded a copy to the Board of Water Supply and the Department of Land and Natural Resources for their input and comments, since these agencies are involved in conditions 1, 2, 3 and 4. Regarding conditions relating to the use of reclaimed wastewater, the proposal does not involve such use, but will, instead, use not-potable water from Waikele Stream. Permit for such use has been filed with the Department of Land and Natural Resources. Conditions 10 and 11 relating to fertilizer storage and maintenance plan and program will be met.

Again, thank you for your comments. Your memorandum, together with this response, will be published in the Final EIS.

Sincerely,



William E. Wanket

cc: Donald A. Clegg, Chief Planning Officer

JOHN WAIHEE
GOVERNOR OF HAWAII



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

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

In reply, please refer to:
EPHSD

May 31, 1989

Mr. William E. Wanket
William E. Wanket, Inc.
Pacific Tower, Suite 1010
1001 Bishop St.
Honolulu, Hawaii 96813

Dear Mr. Wanket:

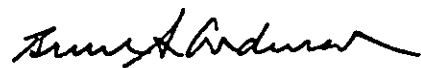
Subject: Draft Environmental Impact Statement (DEIS) for Royal Kunia Phase II,
Hoaaee, Ewa, Oahu

We have reviewed your response to our DEIS comments and have the following comments:

1. Because of the location of the Board of Water Supply's Kunia I wells downgradient of the proposed site, it is essential that a groundwater monitoring program be instigated by the owner/developer.
2. The design and siting of the monitoring wells should be reviewed by the Department of Health (DOH). The wells should be sited throughout the golf course in areas downgradient from biocide and fertilizer application.
3. The DOH is in the process of developing monitoring recommendations for golf course developments in terms of frequency of sampling and parameters sampled. We are consulting with the State Department of Agriculture in order to determine the kinds of biocides and fertilizers that are being applied to golf courses. It is not sufficient to monitor only for nitrates. Baseline concentrations must be established for the compounds being applied.

Please contact the Drinking Water Program at 548-2235 for questions on the above comments.

Sincerely,


BRUCE S. ANDERSON, Ph.D.
Deputy Director for Environmental
Health Administration

cc: Mr. Donald A. Clegg
Dr. Marvin T. Miura

WILLIAM
E.
WANKET
INC.

Land Use Consultant

July 3, 1989

Mr. Bruce S. Anderson, Ph.D
Deputy Director
Environmental Health
Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801

Dear Mr. Anderson:

Draft Environmental Impact Statement (DEIS)
Royal Kunia, Phase II
Hoaeae, Ewa, Oahu

Thank you very much for your follow-up letter of May 31, 1989 regarding the DEIS for the referenced project.

We will comply with all the requirements of the Department of Health, including the eleven (11) conditions applicable to new golf course developments.

Again, thank you for your follow up comments. Your letter, together with this response, will be published in the Final EIS.

Sincerely,



William E. Wanket

cc: Mr. Donald A. Clegg
Dr. Marvin T. Miura

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Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410

JOHN WAINEE
GOVERNOR OF HAWAII

RECEIVED



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

DEPUTIES

LIBERT K. LANDGRAF
MANABU TAGOMORI
RUSSELL N. FUKUMOTO

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

P. O. BOX 521
HONOLULU, HAWAII 96809

REF: OCEA:SOR

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

DOC. NO.: 5277E
FILE NO.: 89-413

MAR 14 1990

MEMORANDUM

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

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

SUBJECT: Draft E.I.S. - Royal Kunia Phase II
Hoaeae, Ewa, Oahu
TMK: 9-4-02: Por. 1; 9-4-03: Por. 1 and 9

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

Our Department's Historic Sites Section notes that an archaeological survey was carried out and no sites were located. Given the past and present agricultural use of the land, we believe that the survey was adequate and correct in stating that no sites remain.

We therefore concur with a determination of "no effect" on significant historic sites relative to this project.

From our Aquatic Resources Division standpoint, we have no objection to the proposal provided the appropriate mitigating measures are implemented to reduce erosion and silt-laden runoff of exposed areas, and to prevent release of petroleum products, building materials (including concrete) and other pollutants into Waikele Gulch/Stream and Village Park drainage system during construction.

Once developed, the project is expected to reduce sediment loads entering Pearl Harbor from sugar cane cultivation/harvesting activities that presently occur.

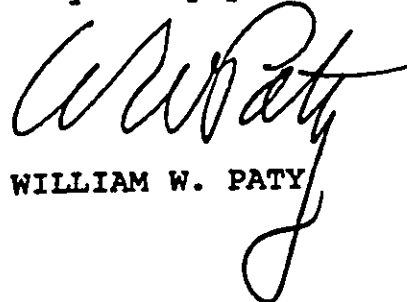
Honorable Marvin T. Miura

- 2 -

DOC. NO.: 5277E

Please feel free to call me or Roy Schaefer of our Office of Conservation and Environmental Affairs, at 548-7837, if you have any questions.

Very truly yours,

A handwritten signature in cursive script, appearing to read 'W. Paty', written in dark ink.

WILLIAM W. PATY

cc: Honorable Donald A. Clegg

WILLIAM
E.
WANKET
INC.

Land Use Consultant

April 4, 1989

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

Dear Mr. Paty:

**Draft Environmental Impact Statement (DEIS)
Royal Kunia Phase II
Hoaeae, Ewa, Oahu**

Thank you very much for the copy of your memorandum of March 14, 1989 (DOC. No.: 5277E, FILE NO.: 89-413) to Mr. Marvin T. Miura, Director of the Office of Environmental Quality Control regarding the DEIS for the referenced project. We appreciate your efforts in reviewing the DEIS.

With reference to site preparation and construction, we will take all necessary steps to reduce erosion and silt-laden runoff of exposed areas and to prevent release of petroleum products, building materials (including concrete) and other pollutants into Waialeale Gulch/Stream and Village Park drainage system. Some of mitigating measures that will be used include:

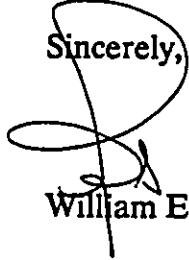
- limiting the extent of exposed area at any one time;
- structural measures, including dikes, berms, interceptor ditches, sediment basins;
- temporary and permanent vegetative cover or mulching;

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- spraying chemicals or liquid asphalt;
- temporary wind barriers;
- other measures that may be recommended by your office and others.

Again, thank you for your comments. Your letter, together with this response, will be published in the Final EIS.

Sincerely,



William E. Wanket

cc: Donald A. Clegg, Chief Planning Officer



COPY

March 9, 1989

TO: DONALD A. CLEGG, CHIEF PLANNING OFFICER
DEPARTMENT OF GENERAL PLANNING

FROM: KAZU HAYASHIDA, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

SUBJECT: YOUR LETTER RECEIVED ON FEBRUARY 8, 1989 ON THE
ENVIRONMENTAL IMPACT STATEMENT FOR ROYAL KUNIA,
PHASE II

We have the following comments on the proposed project:

1. The Kunia Wells I is currently utilized at maximum capacity. Since additional well sources are required, we asked the developer to request permission from the State Water Commission to develop new sources in the Village Park area. Approval of the water master plan is being held in abeyance until the source development issue is resolved.
2. Water service for Royal Kunia, Phase I was approved for 450 units rather than 1,000 units, as stated in the EIS, Appendix E, Section 3.3, "New Facilities".

If you have any questions, please contact Lawrence Whang at 527-6138.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: William E. Wanket, Inc.

WILLIAM
E.
WANKET
INC.

Land Use Consultant

April 5, 1989

Mr. Kazu Hayashida
Manager and Chief Engineer
Board of Water Supply
630 South Beretania Street
Honolulu, Hawaii 96843

Dear Mr. Hayashida:

**Draft Environmental Impact Statement (DEIS)
Royal Kunia Phase II
Hoaeae, Ewa, Oahu**


Thank you very much for the copy of your memorandum of March 9, 1989 to Mr. Donald A. Clegg, Chief Planning Officer of the Department of General Planning regarding the DEIS for the referenced project. We appreciate your efforts in reviewing the DEIS.

Regarding the additional well sources, the developer has filed a well drilling permit with the Department of Land and Natural Resources. Approval from the State Water Commission is required to drill the well.

We will make the correction noted in your comments referring to 450 units, rather than the 1,000 units.

Again, thank you for your comments. Your letter, together with this response, will be published in the Final EIS.

Sincerely,



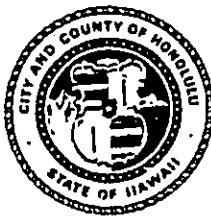
William E. Wanket

cc: Donald A. Clegg, Chief Planning Officer

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1001 Bishop Street
Honolulu, HI 96813
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FAX 521-5410

DEPARTMENT OF GENERAL PLANNING
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813



FRANK F. FASI
MAYOR

DONALD A. CLEGG
CHIEF PLANNING OFFICER

GENE CONNELL
DEPUTY CHIEF PLANNING OFFICER

WM/DGP 2/89-501

March 3, 1989

Mr. William E. Wanket
William E. Wanket, Inc.
Pacific Tower, Suite 1010
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Wanket:

Draft Environmental Impact Statement for the Proposed
Royal Kunia (Phase II) Residential Development,
Tax Map Keys 9-4-2: Por. 1 and 9-4-03: Por. 1 and 9

The Department of General Planning has reviewed the above
referenced Draft Environmental Impact Statement (DEIS) and
offers the following comments:

General Plan Conformance

As noted in the DEIS, an amendment to the population
distribution guidelines of the General Plan was before the City
Council. Subsequent to the adoption of the new population
projections, the City Council also approved several amendments
to the Development Plan (DP) for Central Oahu. As a result,
the Central Oahu DP area is again at its population ceiling in
spite of the recent General Plan amendment. For this reason,
the Royal Kunia Phase II development or any other significant
population generating project would be required to first obtain
an amendment to the General Plan guidelines for population
distribution prior to any DP or zoning approvals.

Development Plan Conformance

As noted above, any change from the project's present
Agricultural designation to the uses proposed in the DEIS would
require a prior amendment to the General Plan population
distribution guidelines.

Mr. William E. Wanket
William E. Wanket, Inc.
Page 2
March 3, 1989

Wastewater System Capacities

The Royal Kunia Phase II development would require expansion and commitment of sewage system capacity at the Waipahu Sewage Pump Station and the Honouliuli Wastewater Treatment Plant.

Kunia Interchange

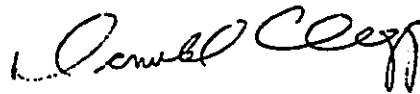
The DEIS recognizes the present need for improvements at the H-1 Freeway/Kunia Road Interchange. Until such time as these improvements are made, future development within the facilities overall service area would be restricted. The implementation of these improvements are presently dependent upon the State Department of Transportation. An option would be an equitable assessment impact fee on developers and developments which contribute traffic volumes to the H-1 Freeway/Kunia Road Interchange. Until a solution is reached to improve the subject interchange, this matter would become an "unresolved issue" which may defer any future major land use change which would impact on this interchange.

Conclusion

The Final EIS (FEIS) should address the issue of General Plan population guidelines in light of recent City Council decisions. Further, the FEIS should expand on its assessment of public facility capacities and the development's impact on existing levels of use.

Thank you for the opportunity to review this Draft EIS. Should you have any questions, please contact Bill Medeiros at 527-6089.

Sincerely,



DONALD A. CLEGG
Chief Planning Officer

DAC:lh

cc: OEQC

WILLIAM
E.
WANKET
INC.

Land Use Consultant

April 3, 1989

Mr. Donald A. Clegg
Chief Planning Officer
Department of General Planning
Municipal Office Building, 8th Floor
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Clegg:

**Draft Environmental Impact Statement (DEIS)
Royal Kunia Phase II
Hoaeae, Ewa, Oahu**

Thank you very much for your letter of March 3, 1989 regarding the DEIS for the referenced project (WM/DGP 2/89-501). We appreciate your efforts in reviewing the DEIS.

Regarding the General Plan and Development Plan conformance, we will revise the Final EIS in light of City Council actions taken in the first part of this year.

With reference to your comments on the Wastewater System, the Final EIS will include DPW's proposed Capital Improvement program for the construction of the expansion for the Honouliuli Wastewater Treatment Plant and the modifications to the Waipahu Wastewater Pump Station. In terms of commitment, we will follow DPW's policy in that regards.

We agree with the comments concerning H-1 Freeway/Kunia Road Interchange and will reflect these comments in the preparation of the Final EIS.

Thank you very much for your comments. Your letter, together with this response, will be published in the Final EIS.

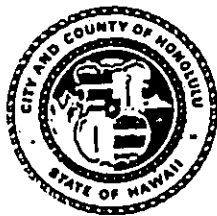
Sincerely,


William E. Wanket

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Phone
(808) 533-4937
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DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 5TH FLOOR
HONOLULU, HAWAII 96813
PHONE: 523-4427



FRANK F. FASI
MAYOR

MIKE N. SCARFONE
DIRECTOR

HIRAM K. KAMAKA
DEPUTY DIRECTOR

March 6, 1989

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

Dear Dr. Miura:

Subject: Draft Environmental Impact Statement
Royal Kunia Phase II

We have reviewed the subject Draft Environmental Impact Statement.

The developer's proposal to set aside 50 percent of the units in the proposed project for "affordable" housing (affordable to households earning 80 to 140 percent of the median income) is consistent with the Department's goal of providing housing opportunities for a wide range of income groups. However, by this definition of "affordable," the housing needs of low- and moderate-income households (households earning less than 80 percent of median income) are not addressed.

This Department's current policy is to recommend that 10 percent of the units in new residential projects requiring zone changes be set aside for low- and moderate-income households as a condition to receiving the zone changes necessary to implement the proposed project. We intend to make this request when the zone change application is circulated to our Department for our review and comment.

Thank you for the opportunity to provide these comments.

Sincerely,

A handwritten signature in cursive script that reads "Michael N. Scarfone".

MICHAEL N. SCARFONE
Director

✓ cc: Mr. William E. Wanket

WILLIAM
E.
WANKET
INC.

Land Use Consultant

April 3, 1989

Mr. Michael N. Scarfone
Director
Department of Housing and Community Development
Municipal Office Building, 5th Floor
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Scarfone:

**Draft Environmental Impact Statement (DEIS)
Royal Kunia Phase II
Hoeaie, Ewa, Oahu**

Thank you very much for the copy of your letter of March 6, 1989 to Mr. Donald A. Clegg, Chief Planning Officer of the Department of General Planning regarding the DEIS for the referenced project. We appreciate your efforts in reviewing the DEIS.

With reference to your comments on provisions for low- and moderate-income housing, the project, at this time, is in its early preliminary stages requiring a development plan amendment as well as a State land use boundary change, before a zone change can be considered for the property. We have tried in this early stage to recognize the need for providing affordable housing units, including low-income rental units (DEIS, page 24). As the project progresses through the pre-zoning stages, we expect the affordable housing requirements, including the amount, type, distribution, and pricing of units to be refined.

Again, thank you for your comments. Your letter, together with this response will be published in the Final EIS.

Sincerely,



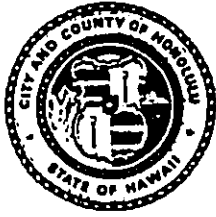
William E. Wanket

cc: Donald A. Clegg, Chief Planning Officer

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410

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

BENJAMIN B. LEE
DEPUTY DIRECTOR

March 16, 1989

MEMORANDUM

TO: DONALD A. CLEGG, CHIEF PLANNING OFFICER
DEPARTMENT OF GENERAL PLANNING

FROM: JOHN P. WHALEN, DIRECTOR

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)
FOR ROYAL KUNIA PHASE II, HOAEAE, EWA
TAX MAP KEYS; 9-4-02: PORTION OF 1;
9-4-03: PORTIONS OF 1 AND 9

Thank you for the opportunity to review the DEIS. Issues and concerns raised in our review of the Environmental Impact Statement Preparation Notice (aside from traffic concerns) have been answered satisfactorily.

The traffic concern continues to be an unresolved issue. Mitigation efforts through the legislative process are encouraged.

Thank you for the opportunity to comment. If you have any questions, please contact Maureen St. Michel of our staff at 527-5349.

A handwritten signature in dark ink, appearing to read "John P. Whalen".

JOHN P. WHALEN
Director of Land Utilization

JPW:sl
0246N

cc: William E. Wanket ✓

WILLIAM
E.
WANKET
INC.

Land Use Consultant

April 3, 1989

Mr. John P. Whalen
Director
Department of Land Utilization
Municipal Office Building, 7th Floor
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Whalen:

**Draft Environmental Impact Statement (DEIS)
Royal Kunia Phase II
Hoaeae, Ewa, Oahu**

Thank you very much for the copy of your memorandum of March 16, 1989 to Mr. Donald A. Clegg, Chief Planning Officer of the Department of General Planning regarding the DEIS for the referenced project. We appreciate your efforts in reviewing the DEIS.

Regional traffic concerns remain an unresolved issue in light of the various developments being proposed in the Ewa and Central Oahu areas. We agree that the legislative process will play a major role in mitigating these concerns.

Again, thank you for your comments. Your letter, together with this response, will be published in the Final EIS.

Sincerely,


William E. Wanket

cc: Donald A. Clegg, Chief Planning Officer

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410

DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813



FRANK F. FASI
MAYOR

WALTER M. OZAWA
DIRECTOR

March 9, 1989

Dr. Marvin Miura, Director
Office of Environmental Quality Control
State of Hawaii
Kekuanaoa Building, Room 104
465 South King Street
Honolulu, Hawaii 96813

Dear Dr. Miura:

Subject: Environmental Impact Statement (EIS)
Royal Kunia Phase II - Hoaeae
Tax Map Key 9-4-02: Por. 1 and 9-4-03: Por. 1 & 9


We have reviewed the Environmental Impact Statement (EIS) for the Royal Kunia Phase II and offer the following comments:

The establishment of the 16-acre park for the Royal Kunia Phase II is acceptable conceptually for now.

We request that the applicant contact our department to discuss the park needs for the project and its impact on the adjacent Royal Kunia Phase I and Village Park developments. The location, size and configuration of the park site must be established to meet City standards and requirements. This matter must be resolved prior to submittals of applications to amend the General Plan and Development Plan to the City.

Thank you for the opportunity to review the EIS.

Sincerely,


WALTER M. OZAWA, Director

WMO:ei

cc: Department of General Planning
✓ William E. Wanket, Inc.
Halekua Development Corporation

WILLIAM
E.
WANKET
INC.

Land Use Consultant

April 3, 1989

Mr. Walter M. Ozawa
Director
Department of Parks and Recreation
Municipal Office Building, 10th Floor
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Ozawa:

**Draft Environmental Impact Statement (DEIS)
Royal Kunia Phase II
Hoaeae, Ewa, Oahu**

Thank you very much for the copy of your letter of March 9, 1989 to Dr. Marvin Miura, Director of the Office of Environmental Quality Control regarding the DEIS for the referenced project. We appreciate your efforts in reviewing the DEIS.

In reference to the request for contact with your department, we have met with your staff (March 9, 1989) to discuss the park needs for the project. We agreed to work closely with your department to ensure that the location, size and configuration of the park site meet City standards and requirements.

Again, thank you for your comments. Your letter, together with this response, will be published in the Final EIS.

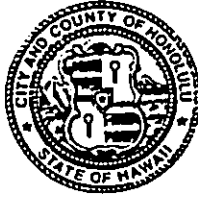
Sincerely,


William E. Wanket

cc: Donald A. Clegg, Chief Planning Officer

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410

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



FRANK F. FAGI
MAYOR

SAM CALLEJO
DIRECTOR AND CHIEF ENGINEER

In reply refer to:
ENV 89-26(448)

February 22, 1989

MEMORANDUM


TO: DONALD A. CLEGG, CHIEF PLANNING OFFICER
DEPARTMENT OF GENERAL PLANNING

FROM: SAM CALLEJO, DIRECTOR AND CHIEF ENGINEER

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)
ROYAL KUNIA, PHASE II
TMK:: 9-4-02: POR. 1; 9-4-03: POR. 1 AND 9

We have reviewed the subject DEIS and have the following comments:

1. The construction funds for the Honouliuli Wastewater Treatment Plant (WWTP) expansion and planning and engineering funds for the Waipahu Wastewater Pump Station (WWPS) modification are being programmed in our FY 89-90 Capital Improvement Budget proposals. If the funds are appropriated, the expanded WWTP and WWPS will be in operation by 1993.
2. We wish to point out that future effluent discharge requirements by EPA for the Honouliuli WWTP may require us to disallow connection of any new developments.
3. We do not have comments on drainage at this time.


SAM CALLEJO
Director and Chief Engineer

cc: William E. Wanket, Inc.

WILLIAM
E.
WANKET
INC.

Land Use Consultant

April 4, 1989

Mr. Sam Callejo
Director and Chief Engineer
Department of Public Works
City and County of Honolulu
Municipal Office Building, 11th Floor
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Callejo:

**Draft Environmental Impact Statement (DEIS)
Royal Kunia Phase II
Hoaeae, Ewa, Oahu**

Thank you very much for the copy of your memorandum of February 22, 1989 to Mr. Donald A. Clegg, Chief Planning Officer of the Department of General Planning regarding the DEIS for the referenced project (ENV 89-26[448]). We appreciate your efforts in reviewing the DEIS.

The information provided in your memorandum will be incorporated in the Final EIS. Your comments are most appreciated. Your memorandum, together with this response, will be published in the Final EIS.

Sincerely,



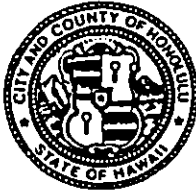
William E. Wanket

cc: Donald A. Clegg, Chief Planning Officer

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR



JOSEPH M. MAGALDI, JR.
Acting Director
TE-791
PL1.1460

March 20, 1989

MEMORANDUM

TO: DONALD A. CLEGG, CHIEF PLANNING OFFICER
DEPARTMENT OF GENERAL PLANNING

FROM: JOSEPH M. MAGALDI, JR., ACTING DIRECTOR

SUBJECT: ROYAL KUNIA PHASE II
DRAFT ENVIRONMENTAL IMPACT STATEMENT
TMK: 9-4-02: POR. 1
9-4-03: POR. 1 & 9

We have reviewed the subject document and have the following comments to offer:

1. Access to major roadways should be limited to cross-streets and driveways fronting these major streets should be avoided.
2. Access to the proposed golf course should be shown.
3. All interior roadways should be designed in accordance with all applicable City standards.
4. The construction drawings should be submitted for review as soon as they become available.

Questions may be referred to Mark Kikuchi of my staff at Local 4199.


JOSEPH M. MAGALDI, JR.

cc: Office of Environmental
Quality Control
William E. Wanket, Inc.

WILLIAM
E.
WANKET
INC.

Land Use Consultant

April 5, 1989

Mr. Joseph M. Magaldi, Jr.
Acting Director
Department of Transportation Services
Municipal Office Building, 3rd Floor
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Magaldi:

**Draft Environmental Impact Statement (DEIS)
Royal Kunia Phase II
Hoaeae, Ewa, Oahu**

Thank you very much for a copy of your memorandum of March 20, 1989 (TE-791 - PL1.1460) to Mr. Donald A. Clegg, Chief Planning Officer of the Department of General Planning regarding the DEIS for the referenced project. We appreciate your efforts in reviewing the DEIS.

Access to major roadways will be limited to cross streets. Access to house lots will be from interior roads. There will be no driveways fronting the major streets.

Access to the proposed golf course has not been finalized. Access will be from a cross street intersection with the major roadway.

All interior roadways will be designed in accordance with all applicable City standards. Construction drawings will be submitted to your office for review as soon as they become available.

Again, thank you for your comments. Your memorandum, together with this response, will be published in the Final EIS.

Sincerely,


William E. Wanket

cc: Donald A. Clegg, Chief Planning Officer

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410

PB 89-151

February 23, 1989

MEMO TO: MR. DONALD CLEGG, CHIEF PLANNING OFFICER
DEPARTMENT OF GENERAL PLANNING

FROM: HERBERT K. MURAOKA
DIRECTOR AND BUILDING SUPERINTENDENT

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT
ROYAL KUNIA, PHASE II
TMK: 9-4-02:1 (POR.); 9-4-03:1 (POR.) & 9 (POR.)

Thank you for the opportunity to review the subject document.

We have no comments.

HERBERT K. MURAOKA
Director and Building Superintendent

TH:ly
cc: J. Harada
William E. Wanket, Inc.

WILLIAM
E.
WANKET
INC.

Land Use Consultant

April 3, 1989

Mr. Herbert K. Muraoka
Director and Building Superintendent
Building Department
Municipal Office Building, 2nd Floor
650 South King Street
Honolulu, Hawaii 96813

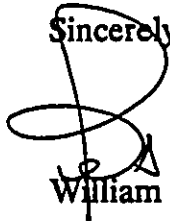
Dear Mr. Muraoka:

**Draft Environmental Impact Statement (DEIS)
Royal Kunia Phase II
Hoeaee, Ewa, Oahu**

Thank you very much for the copy of your memorandum of February 23, 1989 to Mr. Donald A. Clegg, Chief Planning Officer of the Department of General Planning regarding the DEIS for the referenced project (PB 89-151). We appreciate your efforts in reviewing the DEIS.

For your information, your memorandum, together with this response, will be published in the Final EIS.

Sincerely,



William E. Wanket

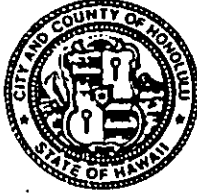
cc: Donald A. Clegg, Chief Planning Officer

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410

FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU

1455 S. BERETANIA STREET, ROOM 303
HONOLULU, HAWAII 96814

FRANK F. FASI
MAYOR



FRANK K. KAHOOHANOHANO
FIRE CHIEF

LIONEL E. CAMARA
DEPUTY FIRE CHIEF

February 10, 1989

TO: DONALD A. CLEGG, CHIEF PLANNING OFFICER
DEPARTMENT OF GENERAL PLANNING

FROM: FRANK K. KAHOOHANOHANO, FIRE CHIEF

SUBJECT: ROYAL KUNIA PHASE II
OAHU, HOAEAE, EWA - TMK: 9-4-02:por 1; 9-4-03:por 1 & 9

We have reviewed the subject material provided and foresee no adverse impact in Fire Department facilities or services, planned or now provided. We have no additional comments at this time.

Should you have any questions, please contact Battalion Chief Kenneth Word of our Administrative Services Bureau at local 3838.

A handwritten signature in cursive script, appearing to read "Frank K. Kahooahano".
FRANK K. KAHOOHANOHANO
Fire Chief

AKL:ny

Return draft to OEQC.

Copy to: William E. Wanket, Inc.
Pacific Tower 1010
1001 Bishop Street
Honolulu, Hawaii 96813

WILLIAM
E.
WANKET
INC.

Land Use Consultant

April 3, 1989

Mr. Frank K. Kahooohanoho
Fire Chief
Fire Department
1455 S. Beretania Street
Room 305
Honolulu, Hawaii 96814

Dear Mr. Kahooohanoho:

**Draft Environmental Impact Statement (DEIS)
Royal Kunia Phase II
Hoaeae, Ewa, Oahu**

Thank you very much for the copy of your memorandum of February 10, 1989 to Mr. Donald A. Clegg, Chief Planning Officer of the Department of General Planning regarding the DEIS for the referenced project. We appreciate your efforts in reviewing the DEIS.

For your information, your memorandum, together with this response, will be published in the Final EIS.

Sincerely,



William E. Wanket

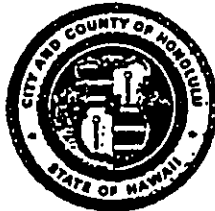
cc: Donald A. Clegg, Chief Planning Officer

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410

OFFICE OF THE MANAGING DIRECTOR
CITY AND COUNTY OF HONOLULU

HONOLULU, HAWAII 96813 • AREA CODE 808 • 527-5796

FRANK F. FASI
MAYOR



JEREMY HARRIS
MANAGING DIRECTOR

DUKE T. KAWASAKI
DEPUTY MANAGING DIRECTOR

SS-LK

March 1, 1989

TO: DONALD A. CLEGG, CHIEF PLANNING OFFICER
DEPARTMENT OF GENERAL PLANNING

FROM: DOUGLAS G. GIBB, CHIEF OF POLICE
HONOLULU POLICE DEPARTMENT

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR THE
ROYAL KUNIA PHASE II, HOAEAE, EWA, OAHU
TMK: 9-4-02: Por. 1; 9-4-03: Por. 1 & 9

After reviewing the above-referenced EIS, we find that our comments in our letter to Mr. William E. Wanket dated November 16, 1988 remain unchanged.

We have no additional comments to offer.

Thank you for allowing us to participate in the review process.

DOUGLAS G. GIBB
Chief of Police

By 

JOSEPH AVEIRO
Acting Assistant Chief of Police
Support Services Bureau

cc: Office of Environmental Quality Control
William E. Wanket, Inc. ✓

WILLIAM
E.
WANKET
INC.

Land Use Consultant

April 3, 1989

Mr. Douglas G. Gibb
Chief of Police
Honolulu Police Department
1455 S. Beretania Street
Honolulu, Hawaii 96814


Dear Mr. Gibb:

**Draft Environmental Impact Statement (DEIS)
Royal Kunia Phase II
Hoaeae, Ewa, Oahu**

Thank you very much for the copy of your memorandum of March 3, 1989 to Mr. Donald A. Clegg, Chief Planning Officer of the Department of General Planning regarding the DEIS for the referenced project (SS-LK). We appreciate your efforts in reviewing the DEIS.

For your information, your memorandum, together with this response, will be published in the Final EIS.

Sincerely,



William E. Wanket

cc: Donald A. Clegg, Chief Planning Officer

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410



February 10, 1989

We greatly appreciate receiving a copy of the environmental impact statements. They are frequently used to answer or supplement other reference sources in response to reference questions about the area. Patrons interested in the future developments in the Ewa area also find the reports interesting and informative. Once again, thank you very much for sending the Library a copy.

Sincerely,

Wanda Enomoto
Emergency-hire Adult
Services Librarian

WHE: whe
2/10/89
cc: D. Eddy

91-950 NORTH ROAD, EWA BEACH, HAWAII 96706 TEL. 689-8391

WILLIAM
E.
WANKET
INC.

Land Use Consultant

April 3, 1989

Ms. Wanda Enomoto
Ewa Beach Public and School Library
91-950 North Road
Ewa Beach, Hawaii 96706

Dear Ms. Enomoto:

**Draft Environmental Impact Statement (DEIS)
Royal Kunia Phase II
Hoaeae, Ewa, Oahu**

Thank you very much for your letter of February 10, 1989. We appreciate your kind remarks.

For your information, your letter, together with this response, will be published in the Final EIS.

Sincerely,


William E. Wanket

cc: Donald A. Clegg, Chief Planning Officer

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410



William A. Bonnet
Manager
Environmental Department

ENV 2-1
JA/G

March 1, 1989

Mr. Donald Clegg
Dept. of General Planning
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Clegg:

Subject: Project Location Review for Environmental Impact
Statement (EIS) for Royal Kunia, Phase II

We have reviewed the project location for subject EIS and have the following comments:

1. There are existing HECO 138 KV transmission lines traversing the northern section of the project site (transmission line is depicted in red on Attachment 1).
2. Since the proposed development proposes to impact these transmission lines, the HECO requirements denoted on pages 79 and 80 for construction in proximity to these lines will be sufficient.
3. The phone number given for HECO's Trouble Dispatch should be changed to 543-7838.

Sincerely,

Attachment

cc: William E. Wanket, Inc.
Marvin T. Miura, OEQC

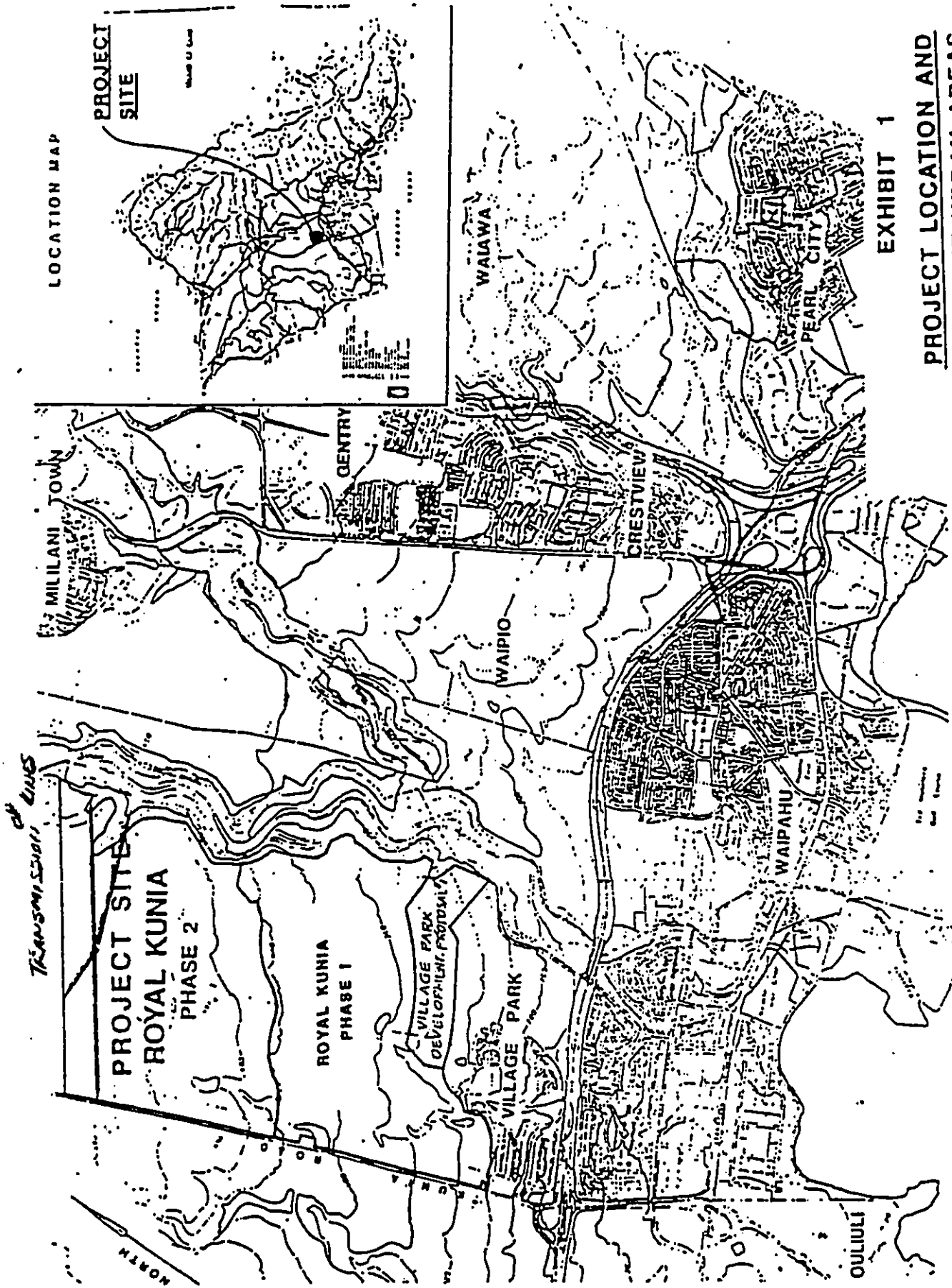


EXHIBIT 1
PROJECT LOCATION AND
ADJACENT URBAN AREAS

WILLIAM
E.
WANKET
INC.

Land Use Consultant

April 3, 1989

Mr. William A. Bonnet
Manager, Environmental Department
Hawaiian Electric Company
P. O. Box 2750
Honolulu, Hawaii 96840-0001

Dear Mr. Bonnet:

**Draft Environmental Impact Statement (DEIS)
Royal Kunia Phase II
Hoaeae, Ewa, Oahu**

Thank you very much for the copy of your letter of March 1, 1989 to Mr. Donald A. Clegg, Chief Planning Officer of the Department of General Planning regarding the DEIS for the referenced project (ENV 2-1). We appreciate your efforts in reviewing the DEIS.

We will incorporate your comments in the preparation of the Final EIS. Your letter, together with this response will be published in the Final EIS.

Sincerely,



William E. Wanket

cc: Donald A. Clegg, Chief Planning Officer

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 533-4937
FAX 521-5410



University of Hawaii at Manoa

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

March 23, 1989
RE:0523

Mr. Donald Clegg
Department of General Planning
City and County of Honolulu
Municipal Office Building, 8th Floor
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Clegg:

Draft Environmental Impact Statement
Royal Kunia Phase II
Hoaeae, Ewa, Oahu

Royal Kunia Phase II is a proposed 670-acre development which will contain 2400 residential units, half of which are classified as affordable, 130 acres for industrial development, a golf course, a park, and a site for an elementary school.

The Environmental Center has reviewed the Draft Environmental Impact Statement (EIS) with the assistance of Peter Flachsbart, Urban and Regional Planning; George Taoka, Civil Engineering; Paul Ekern and Henry Gee, Water Resources Research Center; Jim Hollyer, Agricultural and Resource Economics; and Randall Rush, Environmental Center.

Traffic

In discussing traffic impacts, the Draft EIS acknowledges that the capacity at the Kunia Road/H-1 interchange of the on and off ramps will be exceeded. However, it fails to specify adequate mitigating measures or to address the question of who is responsible for the improvements made necessary by the proposed project.

AN EQUAL OPPORTUNITY EMPLOYER

Golf Course

The City and County of Honolulu has enacted a moratorium on the construction of new private golf courses. With 25% of the proposed development devoted to a golf course, alternative use of the 171.7 acres of the golf course needs to be discussed.

Drainage

Page 11 states that approximately 40% of storm runoff (1500 cfs) generated by the new development will discharge through the existing Village Park Subdivision where drainage system improvements have been installed to accommodate this additional runoff. However, the Draft EIS fails to describe these improvements, thus the adequacy of the drainage system as a whole cannot be assessed. The other 60% of runoff is to be diverted into ponding areas on the golf course and used for irrigation. What is the holding capacity of the ponding areas, and what provisions are there to manage overflow? In addition, drainage alternatives to golf course ponding areas would seem appropriate since the golf course may not be constructed immediately.

What is the derivation of the drainage volume of 2000 cfs to the golf course? Peak flood flow from paved urban areas will significantly exceed flows from sugarcane fields under furrow culture.

Chemical Impacts on Groundwater

The Draft EIS discusses the impact of chemicals leaching to the groundwater and carried by storm runoff from the golf course to the shoreline. However, no consideration has been given to impacts of fertilizers or household and garden pesticides used on the 16-acre park and numerous lawns and gardens in the residential areas which may leach down to the groundwater.

Water Use

We note discrepancies in discussion of water use. On page 47, the water deficit specified in Appendix F is mentioned, but no discussion of its implications is presented. Furthermore, the term, "unit per day" (p. 10) is vague; we assume that in the case of golf courses and parks, a "unit" is one acre. Page 10 states that the golf course and park will each use 4000 gallons "per unit per day" of water. This does not match the peak use for Oahu Sugar Co. of 9000 GPD (Appendix G, page 5). This 4000 GPD equals about .15"/day which roughly corresponds with the 53" per year cited from Giambelluca, Appendix F, page 2. However, some weight should be given to peak summer needs, such as cosmetic golf course irrigation. Ekern and Chang (R74) report pan evaporation for July of .26" per day, which is equivalent to 7,020 GPD. Given a sprinkler uniformity of 0.6, a peak demand of 11,700 GPD would result, almost tripling the demands given in the report.

Mr. Donald Clegg

- 3 -

March 23, 1989

Soils

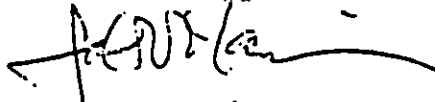
A discrepancy exists between reported soil types. The main report (page 32) cites Molokai and Lahaina soils as being dominant, but Appendix F denotes Wahaiwa and Lahaina silty clays as being predominant.

Winds

According to page 34, wind speed and direction are based on data from Wheeler Air Force Base. Data from the Honolulu International Airport or the Kunia substation would be more relevant.

We thank you for the opportunity to comment on this Draft Environmental Impact Statement.

Yours truly,



John Harrison
Environmental Coordinator

cc: OEQC
William Wanket, Inc.
L. Stephen Lau
Peter Flachsbart
George Taoka
Paul Ekern
Jim Hollyer
Randall A. Rush

WILLIAM
E.
WANKET
INC.

Land Use Consultant

April 6, 1989

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

Dear Mr. Harrison:

**Draft Environmental Impact Statement (DEIS)
Royal Kunia Phase II
Hoeaie, Ewa, Oahu**

Thank you very much for the copy of your letter of March 23, 1989 (RE:0523) to Mr. Donald A. Clegg, Chief Planning Officer of the Department of General Planning regarding the DEIS for the referenced project. We appreciate your efforts in reviewing the DEIS.

Traffic

According to communications from the State Department of Transportation (DOT), Campbell Estate will be coordinating the preparation of a Traffic Master Plan with the DOT and the City Department of Transportation Services that will identify needed roadway improvements, timing of the improvements, who should pay for the improvements and what their fair share should be. One of the improvements that will be identified in the master plan is the improvement to Kunia Interchange. As a developer in the area that will impact Kunia Interchange, we will be expected to pay our fair share. This master plan is expected to be completed by the end of this year.

Golf Course

The City's moratorium on golf course development does not have as its focus the abolishment of golf courses as a use. The moratorium is

Pacific Tower
Suite 1010
1001 Bishop Street
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Phone
(808) 533-4937
FAX 521-5410

for an interim period, and for the purpose of studying the accumulative effects on agricultural uses. Furthermore, the moratorium is limited to lands zoned AG-2 Agriculture. It does not prevent the processing of development plan amendments for golf course use. At this time, it would be premature and unnecessary to study alternative uses for the land.

Drainage

The drainage system in the Village Park Subdivision was designed according to the standards of the City and County of Honolulu and has been dedicated to the City and County of Honolulu. The system consists of various sizes of Reinforced Concrete Pipes, Metal Pipe Arches, and Lined Drainage Ways.

The Preliminary plans for the golf course ponding areas are calculated to be approximately five million gallons. Emergency overflow will follow the existing drainage patterns and flow into Waikele Stream. The golf course is planned to be constructed at the beginning of the project.

A preliminary drainage master plan has been approved by the City and County of Honolulu. The city's standard for 2000 cfs is based on peak discharge of urbanized areas.

Chemical Impacts on Groundwater

Regarding the 16-acre park, it will be dedicated to the City and County of Honolulu. According to staff from the Department of Parks and Recreation (Jason Yuen), all federal and state requirements will be followed to ensure that the groundwater will not be affected by the development and maintenance of the park.

At the present time there is inadequate information available to do a meaningful assessment for the residential and other urban areas. It would set an undesirable precedent to do an assessment of chemical impacts for a whole host of different land uses when the basic information on areal extent, nature of chemicals used, and recharge estimates are not known. A major research project being conducted by the Water Resources Research Center at U.H. is addressing the potential of chemical use associated with urban development of Waiawa ridge and valley; perhaps when the study is completed in October of 1989 some of these questions will be answered.

Water Use

Average annual precipitation for the area is 39.6 inches. Runoff was calculated to be 2.7 inches for the same area, while ET (evapotranspiration) for irrigated sugarcane is about 53 inches. Without irrigation, there is a net deficit of about 16 inches. The data indicated that unirrigated cropped or grassed areas providing a full canopy for ET would not contribute recharge to the Pearl Harbor Aquifer. Because of the water deficit, sugarcane culture in this area would not be economically productive without irrigation.

The average flow requirements (shown on page 10) for commercial, business, park, golf course, parks and schools should read "acre per day" instead of "units per day". The 4,000 GPD is the Board of Water Supply's annual average for golf courses. However, potable water will not be used to irrigate the golf course. Golf course irrigation water will be obtained from Waikele Stream. Permit for such use has been filed with the Department of Land and Natural Resources.

Soils

The soils map (Exhibit 4 of the DEIS) shows Molokai and Lahaina Soils, with the latter being dominant in the area.

Winds

According to discussion with the National Weather Services (April 3, 1989), the tradewinds (70% of the time) at the airport are from the north northeast, northeast, east northeast and east. The predominant tradewinds are from the east northeast. The average wind speed is 11.5 miles/hour. It is interesting to note, that the American Lung Association felt that data from Wheeler Air Force Base was more appropriate given the location of the project site. Data from both sources will be included in the Final EIS.

Again, thank you for your comments. Your letter, together with this response, will be published in the Final EIS.

Sincerely,



William E. Wanket

cc: Donald A. Clegg, Chief Planning Officer

HAWAII INSTITUTE FOR BIOSOCIAL RESEARCH

A NON-PROFIT SCIENTIFIC RESEARCH CORPORATION

SEVEN WATERFRONT PLAZA, SUITE 7-400

500 ALA MOANA BOULEVARD

HONOLULU, HAWAII 96813

MAIL TO: PO. BOX 4124

HONOLULU, HAWAII 96812-4124

(808) 545-3800 OR CELLULAR 226-0631

FAX: (808) 531-4052

COMMENTS RE: ROYAL KUNIA PHASE II, HOAEAE, EWA, OAHU, HALEKUA DEVELOPMENT CORPORATION, TMK: 9-4-02: POR 1;9-4-03: POR 1 & 9 FEBRUARY, 1989 DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS) BY ROBERT W. HALL, PRESIDENT & DIRECTOR.

The Hawaii Institute for Biosocial Research (HIBR) is a non-profit, privately funded environmental think tank concentrating on the biosocial issues of public health and public policy. Our work with regard to environmental impact statements deals primarily with past and current reviews of the scientific literature in order to estimate the impact of the project being assessed with regard to environmental and biosocial issues.

It is our opinion that the planned housing units should not be constructed in the area selected for the following reasons.

1. The close proximity of the project to sugarcane agriculture makes it impossible to protect Royal Kunia residents from pesticide, herbicide, fertilizer air contamination, drift or run-off leading to bioaccumulations of toxic chemicals in the residents. The draft report admits this problem (p. 38).

2. It is not prudent public policy to construct homes next to an area where sugarcane is being burned both from the fire hazard and the air contamination point of view.

3. Building a housing project in a Naval Magazine blast or buffer zone is not wise, prudent, conservative public policy 18 hole golf course or no 18 hole golf course (Id., p. 38). The draft report is deficient in failing to estimate the impact of a Naval Magazine blast on either residents or golfers.

4. The establishment of a golf course anywhere on Oahu means the introduction of a long list of toxic chemicals compiled in the draft report to the surrounding environment. Past experience teaches us that it is not possible to use these chemicals without contaminating the water table, the workers who apply the chemicals, and nearby residents.

5. Not only are many of these chemicals toxic to fish and wildlife, they are both toxic and immunotoxic to humans. All of the chemicals proposed will leach into the soil with potential to contaminate the underlying water table. All of the chemicals proposed will be present in run-off water and have the potential to contaminate aquatic life. The draft EIS admits as much with

the statement that the underlying water table will be used as a source of potable water (Id., p. 47). Many of the toxic chemicals listed in the draft EIS have a half-life or half strength potential of from one to three months or more (Id., p. 41).

6. The draft report fails to address the immunotoxic properties and the biosocial impact of the chemicals listed in the draft report.

7. The draft reports assertion that the organic matter in the area's soils will tend to retard movement of most pesticides and fertilizers below the aquifer horizon is unsubstantiated. Recent experience has taught us that virtually any chemical spread on soil in Hawaii will sooner or later contaminate the underlying aquifers. All past assertions with regard to similar prior unsubstantiated statements "expert" testimony in connection with the federal application for a Heptachlor exemption have proven to be tragically wrong. Statements such as "leaching of the pesticides is unlikely" have no basis in fact and no proof in support of the draft EIS conclusions was offered in the draft report.

8. The statement on p. 42 that the herbicides and pesticides used on golf courses are of relatively low mammalian toxicity comes close to being fraud. There are several reasons for this statement. First, toxicity references in reports such as the instant draft EIS refer to toxicological studies. Any toxicological study that is not very recent is scientifically worthless for any number of reasons including but not limited to economic conflicts of interest on the part of the researchers, the fact that in real life we are all walking cocktails of chemical toxins while research studies concentrate on only one toxin at a time, and the fact that immunotoxicological considerations were almost always ignored in toxicological studies. Toxic chemicals have both additive and synergistic effects which are not mentioned in the draft EIS. We now know that doses of toxins that will not result in any toxicological effect may result in profound immune system reactions. We also know that these reactions vary from individual to individual, or animal to animal.

9. An example of this effect was the death of millions of birds at Carson Sink Nevada a few years ago. The immune systems of the birds were compromised by the toxin selenium. Without immune defenses, the birds died of avian cholera. A similar chain of events is occurring with whales in the St. Lawrence Seaway. The same thing is probably happening to people in Hawaii, albeit more slowly.

10. The report's assumption that the toxins listed "pose little or no hazard to birds" (Id., p. 45) is unproven, scientifically meaningless, and just plain wrong for the reasons

given herein. The statement that "Golf courses are excellent habitats for birds" is an incredible statement. If Love Canal was an excellent habitat for birds, then in that context, golf courses could be considered to be excellent habitats for birds. When a bird's immune system is compromised, the bird does not drop dead immediately. No one knows the extent of the problem and no one knows just how these chemicals impact birds. One cannot assume that there is or there is not an effect. We simply do not know. The information that is available in the literature suggests that the statements in the draft EIS cannot be supported from the scientific literature.

11. The only statistic tracked by the Health Department that gives us a clue to immune system health, acute conditions, are reported to have increased 100% over 7 years in Hawaii. Other clues involve birth defects in agricultural areas, and the Kunia and Pohomoho sterility studies.

12. Not only is chlorpyrifos (Dursban) toxic to birds, there are references in the literature and the Hawaii Department of Health is aware of instances of psychotic behavior in humans as a result of a single contact with humans.

13. The draft EIS is deficient and worthless except for the purposes of disinformation to the extent that current adverse scientific literature is not listed and dealt with in the discussion. There are no references in the discussion to the adverse environmental impact of the toxic chemicals listed which could lead the uninformed to believe that there are none. To the extent that the draft EIS leaves that impression, the draft EIS could fairly be construed to be disinformation or outright fraud without addressing intent. (One of the definitions of fraud is to mislead and we use the word in that context and in the context of our opinion and impressions of the draft EIS).

14. The air quality discussion (Id., p. 42) is deficient since drift does occur from golf courses. Those affected may react according to the state of their individual immune systems. The chance of any connection being made between immune system distress which mimics psychological stress, is virtually nil as a result of the lack of environmental health education among our health professionals. Most would not know an environmental illness if they saw one. The Hawaii Medical Association has admitted as much in recent correspondence to the author.

15. The air quality section admits (Id., p. 45) the impact of drift on those applying the toxic chemicals. The report's observation that spray operators are in "particularly vulnerable positions" is another way of writing off throw away people by those who have absolutely no social conscience. The draft EIS also fails to deal with the public health impact of these workers years down the road when they are no longer eligible for private health insurance.

16. The writers of the air quality section of the draft EIS do not seem to realize that many of the toxic chemicals listed are so persistently volatile that chemicals sprayed over Africa are detected a few days later in the air over Miami. This is precisely how Eskimos living above the Arctic Circle become contaminated. Air contamination with pesticides is not simply a question of droplets and the draft EIS is deficient for failing to recognize that fact.

17. There is some black humor in the omission of the effect of toxins on golfers (Id., p. 45). The assumption of the report that golfers may walk around in miniature "Love Canals" without biosocial penalty is an unproven assumption absurd on its face. The report's own half-life statistics suggest otherwise. Golfers are second only to applicators with regard to the risk of toxic chemical contamination and bioaccumulation. It does not take a great sage of scientific wisdom to make the simple observation that humans have no business being in an area where there isn't any insect life.

18. The draft EIS concludes that none of the anticipated problems will ever happen. The draft EIS is deficient to the extent that it fails to outline a plan or discuss the impact of the likely event the writers of the draft EIS are wrong.

19. The Murdoch-Green report implies that application of the toxic chemicals listed may be used safely to the extent that they are applied according to label instructions. The federal government has repeatedly cautioned that no such analogy can be made for the obvious reason that the studies necessary to support such a conclusion have never been done.

20. Our organization has repeatedly, year after year, provided virtually every state agency concerned with biosocial health with copies of the scientific literature supporting the statements we make herein. Year after year the state agencies involved prove that they uniformly incapable by economic and political interests or by educational bias, of dealing with the immunotoxicological issues of toxins.

21. The instant draft EIS cannot be considered to meet the statutory requirements of Chapter 343, Hawaii Revised Statutes, Chapter 11-200, Administrative Rules, EIS Rules, or any other applicable law or rule. The draft report is so deficient with regard the environmental impact of this project that the report degenerates into nothing more than a self-serving public disinformation, propaganda report. The report writers may have intended to fairly meet the requirements of the law and for the sake of argument, we shall give them the benefit of the doubt on the point. The net effect of the draft EIS, regardless of intent, is to hoodwink both decision makers and the public.

WILLIAM
E.
WANKET
INC.

Land Use Consultant

April 6, 1989

Mr. Robert W. Hall
Hawaii Institute for Biosocial Research
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500 Ala Moana Blvd.
Honolulu, Hawaii 96813

Dear Mr. Hall:

**Draft Environmental Impact Statement (DEIS)
Royal Kunia Phase II
Hoaeae, Ewa, Oahu**

Thank you very much for the copy of your (unsigned and undated) paper offering comments on the DEIS for the referenced project. We respond to your comments numbered 1 through 21 as follows:

1. Additional discussion will be included in the Final EIS to address the issue of sugarcane agriculture in close proximity of the project.
2. See response above.
3. No housing is proposed in the Naval Magazine blast or buffer zone. The golf course that is proposed is also not in the blast zone. According to the Department of the Navy, the blast zone was reduced based on recent evaluations of the explosive safety criteria associated with the tunnel magazines at Waikele. The Navy further recommended that the golf course be retained in its present configuration and location. The NAVMAG Luaualei Waikele Branch station facilities are not expected to have any adverse impact on the project as proposed. We will continue to coordinate our efforts with the Department of the Navy to ensure the development's compatibility with these facilities.

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Because of the extreme technical nature of your comments 4 through 21, we have asked our consultants, Dr. Charles Murdoch and Dr. Richard Green of the University of Hawaii to address your concerns. Their response follows.

4. The pesticides listed in the appendix table represent a partial list of those registered for use on golf courses in Hawaii. There are others. This doesn't imply that all are going to be used. In practice there are perhaps no more than one-half dozen individual pesticides used on a given golf course over a period of several years. There has been no substantiated reports of any of these chemicals entering the water table, contaminating the workers who apply chemicals or nearby residents. The chemicals which have been found in minute quantities in the groundwater of certain locations on Oahu are either soil fumigants applied in pineapple culture (this chemical is not used on turf) or from non-agricultural sources.
5. The dermal and oral LD₅₀ values are the guides available in discussing the toxic effects of pesticides. As stated in our report, the LD₅₀ of most of the pesticides used on golf courses places them in the low to moderately toxic classification. The immunotoxic characteristics of pesticides used on golf courses is not known. A professional toxicologist might be able to provide some insight into the effects on the immune system.

Reasons why the chemicals listed in the appendix table have little potential for reaching groundwater, contaminating surface waters by runoff or becoming a hazard to aquatic life were discussed in the report. We believe that these conclusions are valid. Additional information is provided under comment #7.

6. See our response to point 5 above. We know of no published immunotoxic or biosocial properties of these pesticides.
7. Our report states that organic matter in surface soils "will tend to retard movement of most pesticides...". This statement does not include fertilizers as suggested by the comment.

Contrary to the HIBR comment, most pesticides used in major economic crops on Oahu have not been found in the groundwater. A 1988 report compiled by the Hawaii State Department of Health (Appendix B: Groundwater/Drinking Water Summary of Reported Positive Results, in "Proposed Groundwater Quality Protection Strategy") lists the pesticides which have been found as of 1987. Other than chlorinated/brominated hydrocarbons such as DBCP, EDB, dieldrin and lindane (the latter two generally unconfirmed and with concentrations less than 0.01 ppb), all of which are no longer used, only atrazine has been detected and confirmed in Oahu groundwater. Considering the large number of pesticides (including herbicides) used in sugarcane and pineapple, the effect of pesticide

sorption of soil colloids and degradation of pesticides in the soil profile in retarding movement to groundwater is certainly more the rule than the exception.

Consider the list of chemicals in Table 2 of our report. All of these chemicals have been registered for use on turf with consideration of possible environmental impact. Several of these chemicals were included in a study by Jury et al. (1987) in which pesticides were ranked according to the likelihood of leaching beyond 3 meters deep. Chlorpyrifos, chlorothalonil, 2, 4-D (an ingredient in 33-Plus) and diazinon were all predicted to be less likely than atrazine to leach below 3 meters. Only metribuzin was indicated to be more likely to reach that depth than atrazine. Metribuzin is used in sugarcane in Hawaii and has not, to our knowledge, been detected in groundwater. The greatly expanded well-water monitoring program recently implemented in Hawaii will provide a more complete data base in the future. In summary, the current scientific information supports the conclusion that the chemicals included in Table 2 are not likely to move to groundwater at the site of the development in question.

Note: Diazinon is no longer used for insect control on golf course turf and will be removed from Table 2.

Reference: Jury, W.A., D.D. Focht, and W.J. Farmer. 1987. Evaluation of pesticide groundwater pollution potential from standard indices of soil-chemical absorption and biodegradation. *J. Environ. Qual.* 16:422-428.


8. Our statement that the herbicides and pesticides used on golf courses are of relatively low mammalian toxicity is based on EPA's classification. Pesticides classified as moderately toxic have an acute LD_{50} of 51 to 500, those classified as having low toxicity have an acute LD_{50} of 501 to 5,000. Examination of the LD_{50} of the chemicals listed in Appendix Table 1 show that ficam (which is not used extensively in Hawaii) with an LD_{50} of 40 to 156 is the most toxic chemical. Over 40% of the chemicals listed have an LD_{50} of greater than 5,000, which places them in the classification of very low toxicity. These toxicity classifications are current.
9. The effects of selenium on birds at Carson Sink Nevada and unnamed toxins on whales in the St. Lawrence Seaway has no relevance to use of approved chemicals on golf courses in Hawaii.
10. A comparison of labeled pesticides use to control pests on golf courses with an illegal toxic waste dump is inappropriate.
11. This comment can be addressed only by experts in public health with training and expertise in immune system epidemiology.
12. We are unaware of substantiated reports of these effects.

13. We have discussed in the report conditions which might lead to leaching or runoff of nitrate fertilizers, the chemical with greatest potential to cause adverse environmental impacts. We have also pointed out that these adverse effects can be mitigated in this relatively low rainfall area by proper irrigation management. The literature with which we are familiar indicates that there is little likelihood of the pesticides used in golf course management creating negative environmental impact.
14. See our response to 5 above.
15. The sentence in our report about spray operators being "in particularly vulnerable positions" in regard to contact with pesticide sprays is followed by a sentence stating that because of this they must wear special protective clothing and breathing apparatuses.
16. Of the chemicals listed in Table 2 of our report, none are highly volatile. A measure of the volatility is the vapor pressure (VP). The compounds used in highest quantity, for which vapor pressure values are readily available, are chlorothalonil (VP = 1.3×10^{-5} atm at 25° C) and chlorpyrifos (VP = 2.4×10^{-8} atm at 25° C). For comparison, DBPC, which is known to be volatile, has a vapor pressure of 1.2×10^{-3} atm at 21° C, i.e. at least 100 times the vapor pressure of chlorothalonil and 100,000 times the vapor pressure of chlorpyrifos. All organic chemicals have some measurable vapor pressure, but this does not suggest that these chemicals constitute an environmental hazard. Highly volatile chemicals are not effective against soil pathogens or insect unless injected into the soil. None of the chemicals listed in Table 2 require injection into the soil.
17. The classification of golf courses as "miniature Love Canals:" is again inappropriate. The dermal LD₅₀ of pesticides used on golf course range from 1,000 to greater than 5,000, with most in the latter category. The safety of golfers is a major consideration in the registration of pesticides for golf courses. The relatively low volatility of golf-course pesticides (comment #16) is relevant to this comment also. There are no golf courses where there isn't any insect life.
18. The Recommendations section of our report states mitigating measures to minimize possible negative impact of chemicals applied in golf course management. Proper management of chemicals and irrigation would, in our opinion, preclude negative environmental impacts. We also recommend the establishment of sufficient buffer space with tall vegetation between the golf course and housing sites and other facilities which will be used by people.
19. We know of no such cautions. We do know that EPA cautions that they must be used in strict compliance with labelled instructions.
20. No comment.

21. Out report was an attempt to deal realistically with potential negative impacts of chemical use on the golf course and recommend mitigating measures to minimize these impacts.

Again, thank you for your comments. Your letter, together with this response, will be published in the Final EIS.

Sincerely,



William E. Wanket

cc: Donald A. Clegg, Chief Planning Officer

March 27, 1989

Mr. Donald Clegg
Director
Department of General Planning
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Clegg:

Subject: Draft Environmental Impact Statement for the
Proposed Royal Kunia Phase II

We have reviewed the subject EIS with particular attention to the
sections addressing air quality and offer the following comments:

EIS Main Text

1. Page 54, paragraph 4: The text states "Present agricultural activities on the property may have greater direct impacts to air quality," but no attempt was made to compare the air quality impacts of existing activities with those of the proposed development.
2. Page 54: Although the Air Quality Assessment (Appendix B) indicates violations of the State's 8-hour CO standard, no mention is made of it in the main EIS.

Appendix B, Air Quality Assessment

3. Page 2, paragraph 7: Since the text points out that the historical trend in CO levels in Honolulu has been downward due to vehicular emissions control programs, it would also be important to point out that the effect of these programs will eventually cease because no new, more stringent standards have been promulgated. With all vehicles meeting the same emission standards an increase in numbers of vehicles will result in a concomitant increase in vehicle emissions. At what point in time the downward trend will begin reversing itself is location dependent but some projections show it occurring in the late 1990's in Honolulu. Some discussion of this eventuality should have been included in this assessment and EIS.

Mr. Donald Clegg
March 27, 1989
Page 2

4. Page 3, paragraph 2: "Average" wind speed (6 m/sec) was obtained from the National Weather Service in Honolulu, apparently representative of data collected at the Honolulu International Airport. Given the project's location it would appear that data from the much nearer Wheeler Air Force Base would have been more appropriate. Historical data from that site also indicate more calms and low wind speed conditions during the morning peak hours which would result in higher pollutant concentrations.
5. Page 3, paragraph 4: An old version of the CALINE-series computer model was used (CALINE-3). CALINE-4 has been available for several years.
6. Page 3, paragraph 5: The effort to identify the worst case conditions by modeling with wind direction increments was good except that the choice of a 45-degree increment does not provide nearly enough resolution to find the maximum CO level. The CALINE-4 model has a built-in option which can be used to identify conditions which produce maximum CO concentrations.
7. Page 4, paragraph 2: The text states: "The model indicates that eight hour CO levels at the property line would exceed Hawaii Standards at several locations. However, the extended eight hour exposure is not expected at the property line...." The intent of these statements is not clear. If there are exceedances of the State's 8-hour standard, then why were they not shown in the summary table on page 9?
8. Page 6, Table 1: Incorrect national ambient air quality standards for particulate matter are listed.

Given the aforementioned shortcomings, especially those related to the model used, the weather data used, and the 45-degree wind increments, this assessment may well have significantly underestimated the cumulative air quality impact of the proposed project. We urge that you not accept this EIS until the most complete and accurate information has been provided for your consideration.

Yours truly,

James W. Morrow
Director
Environmental Health

cd 3-29-89
FIRST MARKED 3-28-89

JWM:ct
L8909

WILLIAM
E.
WANKET
INC.

Land Use Consultant

April 4, 1989

Mr. James W. Morrow
Director
Environmental Health
American Lung Association
245 North Kukui Street
Honolulu, Hawaii 96817

Dear Mr. Morrow:

**Draft Environmental Impact Statement (DEIS)
Royal Kunia Phase II
Hoaeae, Ewa, Oahu**

Thank you very much for the copy of your letter of March 27, 1989 to Mr. Donald A. Clegg, Chief Planning Officer of the Department of General Planning regarding the DEIS for the referenced project. Please be advised, however, that your letter was received postmarked March 28, 1989 and, according to Chapter 200, Environmental Impact Statement Rules, you failed to meet the established deadline for comments, which was March 25, 1989 as published in the OEQC's bulletin. Your late comments, however, are addressed below.

Comment 1

Additional studies will be done to compare existing conditions with that resulting from the proposed project. Obviously, the impacts associated with the proposed development should be the focus of the EIS.

Comment 2

The Air Quality Assessment indicated that the State's eight-hour carbon monoxide standard may be exceeded at the property line; however, the property line was not considered to be a sensitive receptor for eight-hour exposure. No violations were identified for receptors located five feet inside the property line.

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APPENDIX A

ARCHAEOLOGICAL WALK-THROUGH SURVEY

ARCHAEOLOGICAL CONSULTANTS OF HAWAII

A



ARCHAEOLOGICAL CONSULTANTS
of
HAWAII

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JOSEPH KENNEDY
Archaeologist

November 10, 1988

Mr William Wanket
Pacific Tower Suite 1010
1001 Bishop
Honolulu, Hawaii 96813

Dear Mr Wanket:

RE: Archaeological Walk-Through Survey of the Proposed Royal
Kunia, Phase II, (TMK: 9-4-02: portion 1 & 9), Ahupua'a
of Hoaeae, Ewa, Island of Oahu.

INTRODUCTION

At the request of your office, Archaeological Consultants of Hawaii, Inc. has conducted a walk-through reconnaissance of 670 acres at the location described above.

At the time of this survey, the entire property was covered in sugarcane and because of this, the prospect of any remaining archaeological sites was judged to be remote. This proved to be the case as no above ground representatives of past use were indicated on the subject property.

PHYSICAL SETTING AND METHODS

As mentioned, the entire property was in sugarcane production. The closest water source was present in the form of a large, man-made reservoir located well makai of the study area. Waikele Stream is close to the eastern, or Diamond Head boundary, but is also not included within the study area.

A two man survey team covered the area by automobile along the network of cane haul roads and by foot in the few areas where this was necessary. Visibility was limited by the dense stands of sugarcane.

W. Wanket
11-10-88
page 2.

PREVIOUS ARCHAEOLOGICAL WORK IN THE AREA
AND
PROJECT AREA HISTORY

To begin, there has been no previous archaeological work conducted on the subject property. An archaeological reconnaissance survey of 200 acres was conducted by the author at nearby TMK: 9-4-04 in September of 1987. No archaeological sites were recorded as a result of that investigation. Recently, Mary Riford of the Bishop Museum has conducted some survey work in Waikele Gulch. The results of that investigation are not available at this time.

Three archival maps were examined; the W.H. Pease Map, prepared in 1850, the 1873 Alexander Map of Honouliuli, prepared in 1873, and the Pearl Lochs Map prepared by the officers of the USS Bennington in 1879. Functional indications for this portion of Hoaeae were nonexistent on these maps. Some scattered pahales belonging to Thompson and Kapili and indications of cultivation appear both mauka and makai of the study area. Mahele (Land Commission Award) data for the ahupua'a is limited to the entire land unit being awarded to Neuku Namaau in 1848. Twenty-two others awardees received land ranging from .244 to 3.966 acres. Lewis Rees received 3,453 acres in this district. Bowser (1880:489) informs us that Mssrs. Robinson operated cattle ranches at Hoaeae.

Surviving remembrance of Hawaiian prehistoric events are limited to the slaughter of men, women and children by the Maui chief Hueu. Both the Kona and Ewa districts were ravaged without mercy. Sterling quotes Fornander:

...the streams of Makaho and Niuhelewai in Kona, and that of Hoaeae in Ewa, are said to have been literally choked with the corpses of the slain. The native Oahu aristocracy were almost entirely extirpated...(Sterling 1978:31)

In addition to this, Handy (1972:472) speaks of a stone named Pohaku-pili which was placed by two gods and marks the boundary between Hoaeae and Waikele.

W. Wanket
11-10-88
page 3

CONCLUSIONS AND RECOMMENDATIONS

While map and archival data provide small indication of human use of this section of Hoaeae, there can be little doubt that some residential units were present and it would seem that these were seasonal occupations related to gathering and dryland cultivation. Later, in the 1800's, cattle ranching was introduced here.

All available information indicates that the more important parts of Hoaeae were located along the coast near the great fishponds and the rich agricultural lands immediately behind them.

In sum then, it may be said that the subject property contains no remaining, above ground archaeological features and offers little opportunity for subsurface recovery. The supportive data are survey results, lack of indicator data from the literature and map sources and an environmental setting that does not lend itself to permanent habitation. Gathering, limited dryland cultivation, and later, ranching, have clearly taken place here, however, these activities do not easily lend themselves to archaeological investigations.

Based on the data presented above, I can see no need for additional archaeological work on the subject property. If there are any questions regarding this report, please feel free to contact me,

Aloha,


Joseph Kennedy

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*Royal Kunia, Phase II
Environmental Impact Statement*

APPENDIX B

AIR QUALITY STUDY

BARRY D. ROOT & BARRY D. NEAL

B

**AIR QUALITY STUDY
FOR THE PROPOSED
ROYAL KUNIA PHASE II PROJECT**

HOAEAE, EWA, OAHU

Prepared for:

William E. Wankett Inc.

Prepared by:

Barry D. Root & Barry D. Neal

June 1989

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1.0 INTRODUCTION AND PROJECT DESCRIPTION

Halekua Development Corporation is proposing for development a mixed use project, referred to as Royal Kunia Phase II, in the Ewa District of leeward Oahu. As indicated in Figure 1, the proposed project site is located north of the H-1 Freeway near the Kunia Interchange and adjacent to the Royal Kunia Phase I project and the existing Village Park subdivision. The proposed project would consist of 2400 housing units, an elementary school site, a 16-acre public park, a 130-acre industrial area, and an 18-hole golf course. Development is expected to be completed by 1999.

The purpose of this study is to describe existing air quality in the project area and to assess the potential short- and long-term direct and indirect air quality impacts that could result from construction and use of the proposed facilities as planned. Measures to mitigate these impacts are suggested where possible and appropriate.

2.0 AMBIENT AIR QUALITY STANDARDS

National Ambient Air Quality Standards (AAQS) are specified in Section 40, Part 50 of the Code of Federal Regulations (CFR), while State of Hawaii AAQS are defined in Chapter 11-59 of the Hawaii Administrative Rules. Table 1 summarizes both the national and the state AAQS that are specified in the cited documents. As indicated in the table, AAQS have been established for six pollutants. The pollutants for which AAQS have been established include particulate matter, sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone and lead. National AAQS are stated in terms of primary and secondary standards. National primary standards are designed to

protect the public health with an "adequate margin of safety". National secondary standards, on the other hand, define levels of air quality necessary to protect the public welfare from "any known or anticipated adverse effects of a pollutant". Secondary public welfare impacts may include such effects as decreased visibility, diminished comfort levels, or other potential injury to the natural or man-made environment, e.g., soiling of materials, damage to vegetation or other economic damage. In contrast to the national AAQS, Hawaii State AAQS are given in terms of a single standard that is designed "to protect public health and welfare and to prevent the significant deterioration of air quality".

Each of the regulated pollutants has the potential to create or exacerbate some form of adverse health effect or to produce environmental degradation when present in sufficiently high concentration for prolonged periods of time. The AAQS specify a maximum allowable concentration for a given pollutant for one or more averaging times to prevent harmful effects. Averaging times vary from one hour to one year depending on the pollutant and type of exposure necessary to cause adverse effects. In the case of the short-term (i.e., 1- to 24-hour) AAQS, both national and state standards allow one exceedance per year.

State of Hawaii AAQS are in some cases considerably more stringent than comparable national AAQS. In particular, the State of Hawaii 1-hour AAQS for carbon monoxide is four times more stringent than the comparable national limit.

Under the provisions of the Federal Clean Air Act [1], the U.S. Environmental Protection Agency (EPA) is required to periodically review and re-evaluate national AAQS in light of research findings

more recent than those which were available at the time the standards were originally set. Occasionally new standards are created as well. Most recently, the national standard for particulate matter has been revised to include specific limits for particulates 10 microns or less in diameter (PM-10) [2]. The State of Hawaii has not explicitly addressed the question of whether to set limits for this category of air pollutant, but national AAQS prevail where states have not set their own more stringent levels.

Hawaii AAQS for sulfur dioxide were relaxed in 1986 to make them essentially the same as national limits. It has been proposed in various forums that the state also relax its carbon monoxide standards to the national levels, but at present there are no indications that such a change is being considered.

3.0 PRESENT AIR QUALITY

Present air quality in the project area could potentially be affected by air pollutants from natural, industrial, agricultural and/or vehicular sources. With respect to the latter two source categories, the present air quality of the project site is affected by occasional dust and smoke from nearby agricultural operations and probably to some extent by carbon monoxide fumes from vehicles traversing the H-1 Freeway and Kunia Road.

Less obvious, more distant sources of air pollution may also affect the project area. Table 2 presents an air pollutant emission summary for the City and County of Honolulu which was compiled in 1980. These are the latest data that are available. The mineral products industry was the most significant source category for emissions of particulate matter. Sulfur dioxide emissions

originated mainly from power plants, while motor vehicles accounted for much of the emissions of nitrogen oxides, carbon monoxide and hydrocarbons.

Natural sources of air pollution emissions which could also affect the project area but cannot be quantified very accurately include the ocean (sea spray), plants (aero-allergens), wind-blown dust, and perhaps distant volcanoes on the Island of Hawaii.

An annual summary of air quality measurements for monitoring stations nearest the project site is presented in Table 3 for the years 1985, 1986 and 1987. These data were all collected by the State Department of Health. Twenty-four hour average sulfur dioxide measurements were made at Barbers Point, about 8 miles southwest of the project site. There were no exceedances of the state/national 24-hour AAQS for sulfur dioxide during the 3-year period. Concentrations monitored during the last 2 years reported were consistently low with daily mean values at or below 5 ug/m³.

Both total particulate and PM-10 concentrations were monitored at Pearl City, approximately 4 miles east of the Village Park/Royal Kunia area. During the 1985-87 reporting period, the highest 24-hour average total particulate concentration measured was 65 ug/m³, while the corresponding value for PM-10 was 32 ug/m³. Average daily concentrations for total particulate and for PM-10 were about 30 to 35 ug/m³ and 15 to 16 ug/m³, respectively. Neither the state nor the national AAQS were exceeded.

The nearest carbon monoxide measurements were made at the Department of Health building in downtown Honolulu (about 12 miles to the east). The average daily maximum 1-hour concentration measured at this location was about 2 mg/m³. During the most recent year reported, 1987, the daily maximum 1-hour concentration ranged from 0.3 to 11.1 mg/m³; one exceedance of the state AAQS was recorded. During the previous year (1986), three exceedances of the state AAQS were reported. Carbon monoxide concentrations in the vicinity of the proposed project are likely much lower than those reported for traffic-congested downtown Honolulu. Present concentrations are estimated later in this study based on air quality modeling of vehicular emissions in the project area.

The nearest available ozone measurements were taken at Sand Island (about 12 miles southeast of the project site). During 1987 the Sand Island daily maximum 1-hour concentration averaged 38 ug/m³ and ranged from 4 to 84 ug/m³, and there were no exceedances of the state AAQS. Concentrations during 1986 were similar to those recorded for 1987, while in 1985 maximum 1-hour concentrations were significantly higher. Three exceedances of the state AAQS were measured during the 1985 period. Ozone concentrations in the vicinity of the proposed project are probably lower than they are at Sand Island.

The closest measurements for ambient lead concentrations are made at the Liliha monitoring station near downtown Honolulu. During the 1985-87 reporting period, lead concentrations at this location had a downward trend, most probably reflecting the increased use of unleaded gasoline. Average quarterly concentrations were near or below the detection limit. No exceedances of the state AAQS have ever been recorded.

Nitrogen dioxide is no longer monitored by the Department of Health anywhere in the state. Concentrations of this pollutant were measured from 1971 through 1976 at Barbers Point, and annual mean values were found to vary from 11 to 29 ug/m³, safely inside the state and national AAQS.

From the data presented in Table 3, it appears that State of Hawaii AAQS for particulates, sulfur dioxide, nitrogen dioxide and lead are currently being met at monitoring stations nearest to the project site. The ozone AAQS has not been exceeded during the past two years at the Sand Island monitoring station. Carbon monoxide readings from urban Honolulu indicate that the state AAQS for carbon monoxide may be exceeded at a rate of one to three times per year in traffic-congested areas. Present concentrations of carbon monoxide and ozone in the vicinity of the proposed project are probably lower than at the locations where the state monitors these pollutants.

4.0 SHORT-TERM DIRECT AND INDIRECT IMPACTS OF PROJECT

Short-term direct and indirect impacts on air quality could potentially occur due to project construction. For a project of this nature, there are two potential sources of air pollution emissions which could directly result in short-term air quality impacts during project construction: (1) fugitive dust from vehicle movement and soil excavation and (2) exhaust emissions from on-site construction equipment. Indirectly, there could also be short-term impacts from slow-moving construction equipment traveling to and from the project site and from a temporary increase in local traffic caused by commuting construction workers.

Fugitive dust emissions may arise from grading and dirt-moving activities within the project site. The emission rate for fugitive dust is nearly impossible to estimate accurately because of its elusive nature and because the potential for its generation varies greatly depending upon the type of soil at the construction site, the amount and type of dirt-disturbing activity taking place, the moisture content of exposed soil in work areas, and the wind speed. The EPA [3] has provided a rough estimate for uncontrolled fugitive dust emissions from construction activity of 1.2 tons per acre per month under conditions of "medium" activity, moderate soil silt content (30%), and precipitation/evaporation (P/E) index of 50. Uncontrolled fugitive dust emissions in the project area would probably be somewhere near this level. In any case, State of Hawaii Air Pollution Control Regulations [4] require that visible emissions of fugitive dust from construction activity be essentially nil.

Adequate fugitive dust control can usually be accomplished by establishment of a frequent watering program to keep bare-dirt surfaces in work areas from becoming significant dust generators. Control regulations also require that open-bodied trucks be covered at all times when in motion if they are transporting materials likely to give rise to airborne dust. Paving of parking areas and establishment of landscaping as early in the construction process as possible can also lower the potential for fugitive dust emissions.

On-site mobile and stationary construction equipment will also emit some air pollutants in the form of engine exhausts. The largest of this equipment is usually diesel-powered. Nitrogen oxides

emissions from diesel engines can be relatively high compared to gasoline-powered equipment, but the standard for nitrogen dioxide is set on an annual basis and is not likely to be violated by short-term construction equipment emissions. Carbon monoxide emissions from diesel engines, on the other hand, are very low and should be relatively insignificant compared to vehicular emissions on nearby roadways.

Indirectly, slow-moving construction vehicles on roadways leading to and from the project site could obstruct the normal flow of traffic to such an extent that overall vehicular emissions are increased, but this impact can be mitigated by moving heavy construction equipment during periods of low traffic volume. Likewise, the schedules of commuting construction workers can be adjusted to avoid peak hours in the project vicinity. Thus, most potential short-term air quality impacts from project construction are relatively easy to mitigate.

5.0 LONG-TERM DIRECT AND INDIRECT IMPACTS OF PROJECT

5.1 Industry Emissions

Air pollution emissions from industries locating at the proposed industrial park could potentially result in direct impacts on air quality. While the specific industrial residents of the proposed project have not yet been identified, the developer is requesting a zoning of type I-2. Permitted industries in this type of zoning include such facilities as automobile service stations, fabricating establishments, manufacturing, processing and packaging establishments, storage yards, warehousing, and wholesaling and distributing businesses. Most of the industries in areas zoned I-2 do not have

the potential to emit significant amounts of air pollution except perhaps for manufacturing.

Without specific information concerning stack heights and stack gas temperatures, exit velocities and emission rates, air quality impacts from the potential manufacturing facilities cannot be quantitatively estimated. At the present time, such detailed information is not available. However, Hawaii air pollution control rules [4] require that any activity that causes air pollution must obtain written approval from the director of the Hawaii Department of Health. This written approval generally involves applying for both a permit to construct and a permit to operate. At the time of application, detailed information must be provided by the applicant concerning the type and nature of any air pollution emissions and the emission control technology that would be utilized. Depending on the magnitudes of the project emissions and other factors, air quality impact analyses and/or air quality monitoring may be required before the application to construct/operate is approved. Thus, even though an assessment of potential direct impacts from project air pollution emissions cannot be done at this time, state rules may require that such analyses be performed at a later date when specific businesses apply to locate at the proposed industrial park.

5.2 Roadway Traffic

By serving as an attraction for increased motor vehicle traffic on nearby roadways, the proposed project must be considered to be a potential indirect air pollution source. Motor vehicles with gasoline-powered engines are significant sources of carbon monoxide. They also emit nitrogen oxides and those burning leaded gasoline can contribute lead to the atmosphere as well. The use

of leaded gasoline in new automobiles is now prohibited. As older vehicles continue to disappear from the numbers of those currently operating on the state's roadways, lead emissions are approaching zero. Nationally, so few vehicles now require leaded gasoline that the EPA is proposing a total ban on leaded gasoline to take effect immediately. Even without such a ban, reported quarterly averages of lead in air samples collected in urban Honolulu have been near zero since early 1986. Thus, lead in the atmosphere is not considered to be a problem anywhere in the state.

Federal air pollution control regulations also call for increased efficiency in removing carbon monoxide and nitrogen oxides from vehicle exhausts. By the year 1995 carbon monoxide emissions are expected to be about one fourth less than the amounts now emitted. At present, however, no further reductions in vehicular emissions have been mandated and increases in traffic levels after 1995 will result in nearly proportional increases in vehicle-related pollutant emissions.

To evaluate the potential long-term indirect air quality impact of increased roadway traffic associated with a project such as this, computerized atmospheric dispersion models are utilized to estimate ambient carbon monoxide concentrations along roadways leading to and from the project. Carbon monoxide is selected for modeling because it is both the most stable and the most abundant of the motor vehicle generated pollutants. Furthermore, carbon monoxide air pollution is generally considered to be a microscale problem, whereas nitrogen oxides air pollution most often is a regional issue. This is reflected in the fact that the AAQS for carbon monoxide are specified on a short-term basis (1-hour and 8-hour averaging times) while the AAQS for nitrogen oxides is set on an annual basis.

Four scenarios were selected for study. The first scenario examined was for the year 1989 with present conditions. The other three scenarios studied were for the year 1999. Case 1 for 1999 assumed no project traffic. Case 2 assumed project traffic with only minimal bus service and car pooling, while Case 3 assumed a 20 percent reduction in town-bound traffic from the three adjacent subdivisions due to increased bus service and car pooling.

To begin the carbon monoxide modeling study, critical receptor areas in the vicinity of the project were identified for analysis. Generally speaking, roadway intersections are the primary concern because of traffic congestion and because of the increase in vehicular emissions associated with traffic cycling: decelerating, stopping, queueing and accelerating. For this study, two existing plus three future intersections along Kunia Road were identified for analysis. At the present time, Kunia Road in the immediate vicinity of the project is a two-lane roadway with left turn lanes for southbound traffic turning into the Village Park subdivision. For the year 1999 without project scenario, it was assumed that Kunia Road would be widened to provide two to three lanes each for north and southbound traffic where it passes through the project area and that a Phase I collector road intersecting with Kunia Road would be built. For the year 1999 with project scenarios, north and south project collector roads intersecting with Kunia Road were assumed to be constructed and Kunia Road was assumed to have one additional lane for northbound traffic and one to two additional lanes for southbound traffic. All intersections were assumed to have demand actuated traffic signals with left turn protection. The traffic impact assessment report for the project [5, 6] describes the present and future configuration of the intersections and roadways in more detail.

The main objectives of the modeling study were to estimate both current and projected levels of maximum 1-hour average carbon monoxide concentration which could be directly compared to the national and state AAQS. The traffic analysis report cited above indicates that current traffic volumes along Kunia Road in the project area peak both in the morning and in the afternoon. Morning and afternoon peak-hour traffic volumes are or would be roughly equal in magnitude. Worst-case meteorological dispersion conditions usually occur during the early morning hours. Also, vehicular emissions are higher in the morning when ambient temperatures are cooler. Hence, even though afternoon traffic counts may be higher, the morning peak traffic hour usually can be expected to cause the highest air pollution concentrations along roadways. Thus, the air quality study focused on the morning peak traffic hour which was assumed to occur between about 6:30 and 7:30 am.

The EPA computer model MOBILE3 [7] was used to calculate vehicular carbon monoxide emission estimates for each of the years studied. Based on recent vehicle registration figures, the present and projected vehicle mix in the project area is estimated to be 91.9% light-duty gasoline-powered vehicles, 4.2% light-duty gasoline-powered trucks and vans, 0.5% heavy-duty gasoline-powered vehicles, 1% diesel-powered trucks and buses, and 1% motorcycles. It was assumed that about 21 percent of all vehicles would be operating in the cold-start mode and that about 27 percent would be operating in the hot-start mode. These are standard, default values that are used in calculating cold/hot start emissions. National averages for "mis-fueling" were assumed. An ambient temperature of 59 degrees F was used for morning peak-hour emission computations. This is a conservative assumption since morning ambient tempera-

tures will generally be warmer than this, and emission estimates given by MOBILE3 are inversely proportional to the ambient temperature.

After computing vehicular carbon monoxide emissions through the use of MOBILE3, these data were then input to the computer model CALINE4 [8]. CALINE4 was developed by the California Transportation Department to simulate vehicular movement and atmospheric dispersion of vehicular emissions. It is designed to predict 1-hour average pollutant concentrations along roadways based on input traffic and emission data, roadway/receptor geometry and meteorological conditions.

Input peak-hour traffic data for CALINE4 were obtained from the traffic study cited previously. The traffic volumes given in the traffic study for the future scenarios include project traffic as well as traffic from other growth that is expected to occur in the area by the year 1999. In all modeling assessments, vehicles were assumed not to accelerate above 25 mph either due to posted speed limits or because congested traffic during peak traffic periods would preclude faster speeds.

Model roadways were set up to reflect actual roadway geometry, physical dimensions and operating characteristics. Model receptor sites were located approximately 10 meters from the edge of the roadways near the intersections studied at a height of 1.5 meters above grade to simulate levels within the normal human breathing zone.

Input meteorological conditions for this study were defined to provide "worst-case" results. One of the key meteorological inputs is atmospheric stability category. For these analyses, atmospheric stability category 6 was assumed. This is the most conservative stability category that can be used for estimating morning pollutant dispersion in model calculations. A surface roughness length of 100 cm was assumed with a mixing height of 300 meters. Worst-case wind conditions were defined as a wind speed of 1 meter per second with a wind direction resulting in the highest predicted concentration.

Existing background concentrations of air pollution in the project vicinity are believed to be relatively low. Hence, background contributions of carbon monoxide from sources or distant roadways not directly considered in the analysis were assumed to be low. A small concentration of 0.5 ppm was added to all predicted 1-hour concentrations for the 1989 scenario to make allowance for background. For the year 1999 scenarios, a 1-hour background concentration of 1.0 ppm was assumed.

Table 4 summarizes the final results of the modeling study in the form of the predicted maximum 1-hour carbon monoxide concentrations for the four year/scenarios studied. These results can be compared directly to the state and the national AAQS. The locations of the predicted maximum concentrations all occurred at or near the intersections in question.

Insofar as present conditions are concerned, the worst-case predicted 1-hour carbon monoxide concentration at the Kunia Road/South Kupuna Loop intersection was 11.1 mg/m³, while the corresponding value at the Kunia Road/North Kupuna Loop intersection was

6.1 mg/m³. Estimated worst-case 1-hour concentrations along Kunia Road north of Kupuna Loop where roadway intersections would be constructed in the future for Phases I and II collector roads were 1.6 mg/m³. Except for concentrations near the Kunia Road/South Kupuna Loop intersection, all estimated present concentrations are within the state and national 1-hour AAQS. The estimated worst-case 1-hour concentration for the 1989 scenario at Kunia Road/South Kupuna Loop exceeds the state standard but is well within the national standard.

In the year 1999 without the proposed project, the worst-case 1-hour concentration along Kunia Road at South Kupuna Loop would increase slightly compared to the 1989 level to a value of 11.3 mg/m³, whereas substantial increases would occur at North Kupuna Loop and at the Phase I collector road intersections due to traffic from Phase I of the project. Estimated worst-case concentrations at the latter two intersections increase to 16.1 and 15.4 mg/m³, respectively. Concentrations north of the Phase I collector road near the locations where Phase II north and south collector roads would be constructed would increase only slightly to 2.2 mg/m³. Based on these estimates, it appears that the state 1-hour AAQS for carbon monoxide would be exceeded at three of the locations studied for the 1999 without project scenario, while the corresponding national AAQS would be met at all locations.

For the 1999 Case 2 scenario (which assumes with project traffic and only minimal bus service), worst-case 1-hour concentrations ranged from 15.3 mg/m³ at the Phase II north project collector road intersection to 18.1 mg/m³ at both the Phase I collector road intersection and the North Kupuna Loop intersection. Estimated

worst-case 1-hour concentrations at all locations analyzed for the 1999 Case 2 scenario exceed the state AAQS but are within the national AAQS.

Predicted worst-case 1-hour concentrations for the 1999 Case 3 scenario (which assumes with project traffic and increased bus service and car pooling) were about 10 percent lower than the 1999 Case 2 scenario with concentrations ranging from 12.8 mg/m³ at the north project collector road intersection to 16.6 mg/m³ at the North Kupuna Loop intersection. All predicted values exceed the state AAQS but are within the national standard.

Worst-case 8-hour carbon monoxide concentrations were estimated by multiplying the worst-case 1-hour values by a persistence factor of 0.5. This accounts for two factors: (1) traffic volumes averaged over eight hours are lower than the peak 1-hour value, and (2) meteorological dispersion conditions are more variable (and hence more favorable) over an 8-hour period than they are for a single hour. Based on monitoring data, 1-hour to 8-hour persistence factors for most locations generally vary from 0.4 to 0.8 with 0.6 being the most typical. One recent study based on modeling [9] concluded that 1-hour to 8-hour persistence factors could typically be expected to range from 0.4 to 0.5. EPA guidelines [10] recommend using a value of 0.6 to 0.7 unless a locally derived persistence factor is available. Recent monitoring data for Honolulu reported by the Department of Health [11] suggests that this factor ranges between about 0.35 and 0.55 depending on location and traffic variability. Considering the location of the project and the traffic pattern for the area, a 1-hour to 8-hour persistence factor of 0.5 is probably most appropriate for this application.

The resulting estimated maximum 8-hour concentrations are indicated in Table 5. The highest estimated worst-case 8-hour carbon monoxide concentration for 1989 was 5.6 mg/m³. This occurred near the intersection of Kunia Road and South Kupuna Loop. At North Kupuna Loop, the estimated worst-case 8-hour value for 1989 was 3.0 mg/m³; estimated concentrations northward of North Kupuna Loop fall to 0.8 mg/m³. In the year 1999 without project case, the predicted maximum 8-hour value was 8.0 mg/m³ at North Kupuna Loop. Estimated concentrations for other locations ranged from 1.1 mg/m³ along Kunia Road where the Phase II roads would be built to 7.7 mg/m³ at the Phase I collector road intersection. In the with project with minimal bus service case, the year 1999 concentrations were highest at the North Kupuna Loop and Phase I collector road (9.0 mg/m³). Concentrations at the other locations studied varied from 6.8 to 7.8 mg/m³. With increased bus service and the promotion of car pooling, the predicted 1999 with project concentrations drop by about 10 percent.

Thus, for the current situation, estimated worst-case 8-hour concentrations along Kunia Road are within the national AAQS (10 mg/m³) but exceed the state AAQS (5 mg/m³) at South Kupuna Loop. In the 1999 without project scenario, the state 8-hour AAQS is predicted to be exceeded at both North and South Kupuna Loop intersections as well as at the Phase I collector road, while the national AAQS is estimated to be met at all locations. In either case for the year 1999 with project scenarios, estimated worst-case 8-hour concentrations at all five intersections in the project area are higher than the state AAQS but within the national standard.

It should be mentioned here that the above predicted concentrations generally are "hot spot" values. That is, concentrations are not widespread but diminish rapidly with distance from the roadway. It should also be noted that the results of this study reflect several assumptions that must be made concerning worst-case meteorological conditions. As mentioned above, a worst-case wind speed of 1 meter per second with a steady direction was assumed. A steady wind of 1 meter per second blowing from a single direction for an hour is not very likely, and may occur only once a year or less. With wind speeds of 2 meters per second, for example, computed carbon monoxide concentrations would be only about half the values given above.

5.3 Electrical Generation

The proposed project would also cause indirect emissions from power generating facilities. The annual electrical demand of the project when fully developed is not expected to exceed 163 million kilowatt-hours. This power demand would most probably be provided mainly by oil-fired generating facilities located on Oahu. However, with H-Power currently under construction and plans for a coal-fired power plant at Campbell Industrial Park in the near future, some of the project power could well come from sources burning other fuels. In order to meet the electrical power needs of the proposed project, power generating facilities would be required to burn more fuel and hence more air pollution would be emitted at these facilities. Given in Table 6 are estimates of the indirect air pollution emissions that would result from the project electrical demand assuming all power is provided by burning more fuel oil at Oahu's power plants. If power is supplied instead or in part by coal or solid waste burning facilities, emissions would likely be higher than the values given in the table.

5.4 Solid Waste Disposal

Solid waste generated by the project when fully occupied is expected to amount to about 32 tons of refuse per day. Most if not all of this refuse will likely be trucked away and either landfilled or burned at another location. If all refuse is landfilled, the only air pollution emissions associated with solid waste disposal would be due to exhaust fumes from the trucks and heavy equipment used to place the refuse in the landfill. If, on the other hand, all or part of the refuse is burned at a municipal incinerator or other facility (such as H-Power), disposal of solid waste from the project would also result in the emissions of particulate, carbon monoxide and other contaminants from the incineration facility. Table 7 gives emission factors for municipal refuse incinerators (without controls) in terms of pounds of air pollution per ton of refuse material charged. Thus, uncontrolled air pollutant emission rates in terms of pounds per day, for example, can be estimated by multiplying the emission factors given in the table by the number of tons per day of refuse that is burned. Particulate emissions from the H-Power facility will be much lower because emissions will be treated by a high-efficiency particulate control system. It should also be noted that if the project electrical demand derives all or in part from H-Power, this will help to offset emissions from burning oil or coal to produce power that might otherwise result.

6.0 IMPACTS OF SUGARCANE OPERATIONS ON PROJECT

In addition to assessing the impact of the project on the surrounding areas, the reverse problem of impacts of air pollution sources located in the surrounding area on the residents of the project is also of concern. For the Royal Kunia Phase II Project, the issue of primary concern is the ongoing sugarcane operations in the

fields adjacent to the project. Insofar as air quality is concerned, sugarcane burning and cane haul road usage present the two greatest problems.

6.1 Sugarcane Burning

The site of the proposed project as well as much of the surrounding area is currently in use for sugar cane cultivation. Sugarcane fields are generally harvested every two years. Prior to harvesting, sugar cane is burned in the field to remove unwanted foliage as well as to control rodents and insects. The major emission by-products of sugarcane burning include particulate, carbon monoxide and volatile organic compounds.

Construction of the proposed project would remove 670 acres of land from sugarcane cultivation and thus provide a side benefit to other nearby residents in that this would eliminate some sugarcane burning emissions that would otherwise occur in the area. Table 8 shows the estimated emissions in tons per year that would be eliminated by the proposed development. Values given in the table represent 335 acres per year harvested (reflecting the biennial harvesting procedure for sugar cane) and are mid-range estimates.

In regard to the question of impacts on residents of the new community from nearby sugarcane burning, the nearest remaining cane fields would be located to the north and to the west of the project where the usual prevailing northeast trade winds would tend to move the smoke away from the development. In accordance with state air pollution control regulations, an agricultural burning permit must be obtained by a field operator before burning can be performed.

Burning cannot be done on "no burn" days when stagnant air conditions are expected to occur.

The land immediately to the north and to the west of the proposed project is used for sugarcane cultivation. Within about one mile of the proposed project there are 12 cane fields of roughly 200 acres each. These fields would have the greatest potential impact on the development. If it is assumed that the fields are harvested every other year and that about 60 acres are burned on a burn day, there would be about 20 days per year when burning would take place on the nearby fields. Depending on field and meteorological conditions, smoke from the fires may impact the project area.

Estimates of worst-case emissions from a burn event are given in Table 9. Based on these emission estimates, a worst-case assessment of ground-level concentrations of carbon monoxide and particulate matter were made using the Gaussian dispersion equation as described by Turner [12]. The virtual point source technique described in this reference was used, and a plume height of 10 meters was assumed with a wind speed of 5 meters per second (11 mph). Horizontal diffusion was assumed to occur under class D, while vertical diffusion corresponding to class C was supposed. The basis for using a more unstable stability class for the vertical diffusion coefficient due to the relatively large dimensions of a sugarcane fire is suggested in a study conducted several years ago [13]. Due to some of the relatively large particle sizes involved in a cane fire, 50 percent fallout of particulate matter was assumed.

Based on dispersion calculations and on measurements that have been made immediately downwind of a cane fire [13, 14], it is estimated

that worst-case ground-level concentrations of particulate matter of up to 20 mg/m³ could occur within 100 meters (330 feet) of the fire and that concentrations of up to 2 mg/m³ could occur as far away as 1600 meters (1 mile). Assuming a background concentration of 40 ug/m³, which is typical for the state, and that elevated particulate concentrations from the cane fire would persist for about 1 hour, it is likely that the state 24-hour ambient air quality standard for particulate matter (150 mg/m³) could be exceeded for a distance of about 1 mile from the fire during worst-case conditions.

Estimates of worst-case ground-level concentrations of carbon monoxide show that values of up to 400 mg/m³ for a 1-hour period could occur within 100 meters (330 feet) of the burning fields. Estimated concentrations drop off to about 40 mg/m³ at a distance of about 1600 meters (1 mile). Thus, it is possible that the 1-hour national AAQS for carbon monoxide (40 mg/m³) could be exceeded within 1 mile of the fire, while the more stringent state AAQS (10 mg/m³) could be exceeded at a greater distance yet.

6.2 Cane Haul Road Usage

Several cane haul roads exist in the vicinity of the project, and cane hauling trucks cross Kunia Road nearby. The cane haul road nearest the proposed project is an infrequently-used semi-paved road running east-west about 1000 feet (300 meters) north of the proposed development. Prevailing winds in the area will tend to carry any fugitive dust emissions emanating from haul road traffic over the project.

Fugitive dust emissions from paved haul roads are primarily a function of road silt loading, vehicle speed, weight and number of wheels, and local climate. Much of the dust generated will be in the form of larger particles that will settle to the surface within a short distance of the roadway. Larger dust particles do not generally constitute a health hazard but mainly are a nuisance. However, dust particles smaller than 10 microns in diameter can remain suspended indefinitely and inhaled rather readily. Thus, it is the smaller particles that are of most concern. The recently revised national AAQS pertain to particulate matter less than 10 microns in diameter, while the state standards pertain to total suspended particulate (generally taken to be particles less than 30 microns in diameter).

Based on the U.S. EPA emission factor for paved haul roads [3], it is estimated that cane haul road traffic would generate about 2 pounds of dust smaller than 10 microns in diameter (or about 4 pounds of dust smaller than 30 microns diameter) per vehicle mile of travel during relatively dry periods and assuming the road has a relatively moderate silt loading. In a 24-hour period, assuming 10 truck passes per hour and 1 mile of travel in the vicinity of the project, it is estimated that about 450 pounds of the smaller particle dust (or about 900 pounds of the larger 30 micron particles) could be generated in the worst case. Most of this dust will be carried over and through the development by the prevailing winds. Dispersion calculations indicate that both the national and the state 24-hour air quality standards for particulate matter would likely be maintained within the residential areas of the project as long as haul roads are paved and are not closer than about 1000 feet (300 meters) and truck traffic does not amount to more than about 10 passes per hour. If haul roads are kept

relatively clean, a smaller separation distance could be possible while still maintaining the AAQS.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Based on air quality data for nearby monitoring stations, modeling of carbon monoxide emissions from vehicles traversing Kunia Road, and considering the location and character of the proposed project site, it appears likely that all state and national air quality standards are currently being met in the project vicinity except for the state AAQS for carbon monoxide. Based on air quality modeling, it is concluded that a small "hot spot" area in the vicinity of Kunia Road and South Kupuna Loop may currently exceed the state AAQS for carbon monoxide during worst-case conditions. Without the proposed project, air quality in the area will likely remain about the same for the next several years except for carbon monoxide emissions from automobile traffic associated with Royal Kunia Phase I development. Worst-case carbon monoxide concentrations after Phase I development will likely exceed state AAQS near Kunia Road intersections but should remain within the national standards.

Assuming the project is built, short-term direct and indirect air quality impacts would result from project construction. Fugitive dust emissions will occur due to site grading and other construction activities, and fumes from gasoline- and diesel-powered construction equipment will also be emitted. The movement of construction equipment and the commuting of construction workers to the site will also cause more air pollution in the area, albeit temporary. Fugitive dust emissions can and should be controlled by watering of work areas and by covering open-bodied trucks. Paving of parking areas and roads and establishing landscaping

early in the construction schedule will also reduce fugitive dust emissions. Exhaust emissions from construction equipment should be relatively inconsequential. If construction-related traffic to and from the site causes a problem with traffic movement in the area, work schedules could be adjusted to avoid peak traffic hours.

Depending on the types of industries that locate at the proposed industrial park, long-term impacts on air quality could potentially occur as a direct result of industry emissions. A quantitative analysis of the potential impacts cannot be done at the present time because the specific industries have not yet been identified. However, any of the prospective occupants emitting air pollution will be required to apply for state permits to construct and to operate. Before granting a permit to construct or a permit to operate, the state may require the applicant to prepare an air quality impact assessment. Although definite buyers for the lots have not been identified, based on the types of industries permitted for an I-2 zoning, it appears likely that they will not be excessive emitters of air pollution.

Emissions from vehicular traffic associated with the proposed project when at full occupancy will result in long-term, indirect impacts on the local air quality. Air quality model projections predict that the state air quality standards for carbon monoxide could occasionally be exceeded in small hot spot areas near Kunia Road intersections but that the national standards would be met. This is based on the projected peak-hour traffic and roadway configuration and laneage given in the traffic impact report for the project. Increasing bus service and promoting car pooling could reduce predicted worst-case concentrations by about 10 percent but concentrations would still be higher than the state limits.

Some long-term impacts could also potentially occur due to indirect emissions from power generating facilities supplying the project with electricity and from the burning of waste materials discarded by occupants of the project. Quantitative estimates of these impacts were not made, but it appears likely that any impacts would be relatively small since emissions from supplying the project with electrical power and solid waste disposal service would be less than 1 percent of current Oahu emissions.

Assessments of the potential worst-case impacts on the proposed project from sugarcane burning indicate that state and/or national AAQS for both particulate matter and carbon monoxide could be exceeded for a distance of about one mile or more downwind of the fire. Thus, it would not be advisable to burn the adjacent fields during periods when the wind could carry the smoke over the proposed development. Residents of the development should be forewarned of this potential problem.

Fugitive dust concentrations within the project residential area emanating from cane haul road traffic near the north boundary should remain within state and national AAQS provided the haul road is paved and kept reasonably clean. Maintaining a separation distance of about 1000 feet (300 meters) between the project residential areas and the haul road is recommended, although a smaller separation distance may be acceptable if haul roads are kept clean.

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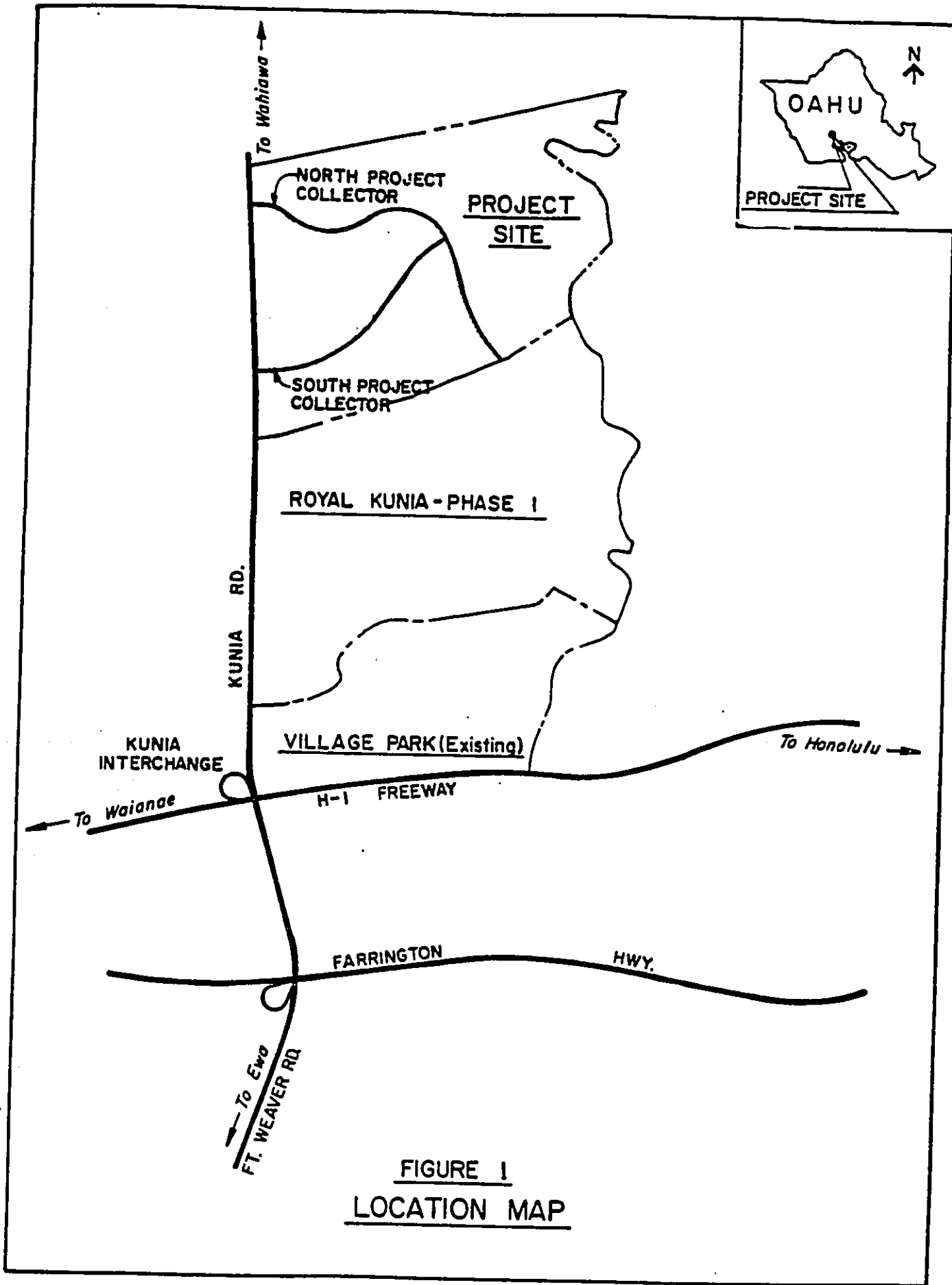


FIGURE 1
LOCATION MAP

Table 1

SUMMARY OF STATE OF HAWAII AND NATIONAL
AMBIENT AIR QUALITY STANDARDS (AAQS)

Pollutant (units)	Averaging Time	Maximum Allowable Concentration		
		National Primary	National Secondary	State of Hawaii
Suspended Particulate Matter (ug/m ³)	Annual	-	-	60 ^a
	24 Hours	-	-	150 ^b
Particulate Matter ^c (ug/m ³)	Annual	50	50	-
	24 Hours	150 ^b	150 ^b	-
Sulfur Dioxide (ug/m ³)	Annual	80	-	80
	24 Hours	365 ^b	-	365 ^b
	3 Hours	-	1300 ^b	1300 ^b
Nitrogen Dioxide (ug/m ³)	Annual	100	100	70
Carbon Monoxide (mg/m ³)	8 Hours	10 ^b	-	5 ^b
	1 Hour	40 ^b	-	10 ^b
Ozone (ug/m ³)	1 Hour	235 ^b	235 ^b	100 ^b
Lead (ug/m ³)	Calendar Quarter	1.5	1.5	1.5

^aGeometric mean^bNot to be exceeded more than once per year^cParticles less than or equal to 10 microns aerodynamic diameter

Table 2
 AIR POLLUTION EMISSIONS INVENTORY FOR
 CITY AND COUNTY OF HONOLULU, 1980

Source Category	Emissions (tons/year)				
	Particulate	Sulfur Oxides	Nitrogen Oxides	Carbon Monoxide	Hydrocarbons
Steam Electric Power Plants	2,092	36,736	12,455	1,065	184
Gas Utilities	14	0	199	0	0
Fuel Combustion in Agricultural Industry	1,088	579	358	0	31
Refinery Industry	622	7,096	2,149	266	2,584
Petroleum Storage	0	0	0	0	1,261
Metallurgical Industries	28	96	40	0	0
Mineral Products Industry	6,884	1,883	597	0	31
Municipal Incineration	42	145	2,029	0	184
Motor Vehicles	1,413	1,014	17,270	239,198	22,853
Construction, Farm and Industrial Vehicles	184	193	2,507	3,729	338
Aircraft	382	145	1,751	5,594	1,476
Vessels	42	386	438	533	123
Agricultural Field Burning	1,399	0	0	15,982	1,692
Total:	14,190	48,273	39,793	266,367	30,757

Source: State of Hawaii, Department of Health

Table 3

ANNUAL SUMMARY OF AIR QUALITY MEASUREMENTS FOR
MONITORING STATIONS NEAREST ROYAL KUNIA PHASE II PROJECT

Parameter/Location	1985	1986	1987
Sulfur Dioxide			
Barbers Point			
No. of 24-Hr Samples	59	57	53
Range of 24-Hr Values (ug/m3)	10-48	<5-10	<5-13
Average Daily Value (ug/m3)	24	<5	5
No. of State AAQS Exceedances	0	0	0
Particulate			
Pearl City			
No. of 24-Hr Samples	47	60	51
Range of 24-Hr Values (ug/m3)	16-62	17-65	20-61
Average Daily Value (ug/m3)	35	29	34
No. of State AAQS Exceedances	0	0	0
PM-10			
Pearl City			
No. of 24-Hr Samples	-	61	63
Range of 24-Hr Values (ug/m3)	-	9-30	8-32
Average Daily Value (ug/m3)	-	16	15
No. of State AAQS Exceedances	-	NA	NA
Carbon Monoxide			
Honolulu			
No. of Daily Samples	342	348	345
Range of Daily Max. 1-Hr Values (mg/m3)	0.0-10.4	0.2-13.5	0.3-11.1
Avg. Daily Maximum 1-hr Value (mg/m3)	1.5	2.2	1.7
No. of State AAQS Exceedances	1	3	1
Ozone			
Sand Island			
No. of Daily Samples	341	346	342
Range of Daily Max. 1-Hr Values (ug/m3)	8-198	10-88	4-84
Avg. Daily Maximum 1-hr Value (ug/m3)	43	39	38
No. of State AAQS Exceedances	3	0	0
Lead			
Liliha			
No. of 24-Hr Samples	58	61	59
Range of 24-Hr Values (ug/m3)	0.0-0.5	0.0-0.3	0.0-0.1
Average Quarterly Value (ug/m3)	0.2	0.0	0.0
No. of State AAQS Exceedances	0	0	0

Source: "Hawaii Air Quality Data for the Period of January 1985 to December 1987", State of Hawaii Department of Health

Table 4

ESTIMATED WORST-CASE 1-HOUR CARBON MONOXIDE CONCENTRATIONS
ALONG ROADWAYS NEAR ROYAL KUNIA PHASE II PROJECT
(milligrams per cubic meter)

Roadway Intersection	Year/Scenario			
	1989/ Present	1999/ Case 1 ^a	1999/ Case 2 ^b	1999/ Case 3 ^c
Kunia Road and South Kupuna Loop	11.1	11.3	13.5	12.5
Kunia Road and North Kupuna Loop	6.1	16.1	18.1	16.6
Kunia Road and Phase I Collector	1.6 ^d	15.4	18.1	16.3
Kunia Road and South Project Collector	1.6 ^d	2.2 ^d	15.5	13.8
Kunia Road and North Project Collector	1.6 ^d	2.2 ^d	15.3	12.8

Hawaii State AAQS: 10
National AAQS: 40

^aCase 1 - without project

^bCase 2 - with project

^cCase 3 - with project plus bus service and car pooling

^dConcentration along Kunia Road near location of proposed intersection

Table 5

ESTIMATED WORST-CASE 9-HOUR CARBON MONOXIDE CONCENTRATIONS
ALONG ROADWAYS NEAR ROYAL KUNIA PHASE II PROJECT
(milligrams per cubic meter)

Roadway Intersection	Year/Scenario			
	1999/ Present	1999/ Case 1 ^a	1999/ Case 2 ^b	1999/ Case 3 ^c
Kunia Road and South Kupuna Loop	5.6	5.6	6.8	6.2
Kunia Road and North Kupuna Loop	3.0	8.0	9.0	8.3
Kunia Road and Phase I Collector	0.8 ^d	7.7	9.0	8.1
Kunia Road and South Project Collector	0.8 ^d	1.1 ^d	7.8	6.9
Kunia Road and North Project Collector	0.8 ^d	1.1 ^d	7.6	6.4

Hawaii State AAQS: 5
National AAQS: 10

^aCase 1 - without project

^bCase 2 - with project

^cCase 3 - with project plus bus service and car pooling

^dConcentration along Kunia Road near location of proposed intersection

Table 6

ESTIMATED INDIRECT AIR POLLUTION EMISSIONS FROM
ROYAL KUNIA PHASE II PROJECT ELECTRICAL DEMAND^a

Air Pollutant	Emission Rate (tons/year)
Particulate	13
Sulfur Dioxide	410
Carbon Monoxide	29
Volatile Organics	2
Nitrogen Oxides	117

^aBased on U.S. EPA emission factors for industrial boilers [15].
Assumes electrical demand of 163 million kw-hrs per year and low
sulfur oil used to generate power.

Table 7
UNCONTROLLED AIR POLLUTION EMISSION FACTORS FOR
MUNICIPAL REFUSE INCINERATORS (lb/ton)^a

Air Pollutant	Emission Factor
Particulate	14
Sulfur Oxides	2.5
Carbon Monoxide	35
Organics	1.5
Nitrogen Oxides	3

^aEmission factors are given in terms of weight of material emitted per unit weight of refuse material charged.

^bAssumes incinerator equipped with settling chamber and water spray.

Source: U.S. Environmental Protection Agency [3]

Table 8

ESTIMATED AIR POLLUTION EMISSIONS ELIMINATED
BY WITHDRAWING FIELDS FROM SUGAR CANE AT
ROYAL KUNIA PHASE II^a

Air Pollutant	Emission Rate (tons/year)
Particulate	17
Carbon Monoxide	164
Volatile Organics	25

^aBased on mid-range of U.S. EPA emission factors [3]. Assumes
335 acres per year harvested.

Table 9

ESTIMATED WORST-CASE AIR POLLUTION EMISSIONS FROM
SUGARCANE BURNING EVENT NEAR ROYAL KUNIA PHASE II^a

Air Pollutant	Emissions (tons)
Particulate	4
Carbon Monoxide	41
Volatile Organics	8

^aBased on upper range of U.S. EPA emission factors [3]. Assumes
60 acres burned.

APPENDIX C

AVIFAUNAL AND FERAL MAMMAL SURVEY

PHILLIP L. BRUNER

C

AVIFAUNAL AND FERAL MAMMAL SURVEY OF ROYAL KUNIA- PHASE II
PROPERTY LOCATED AT KUNIA, CENTRAL OAHU

Prepared for

William E. Wanket Inc.

By

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15 November 1988

AVIFAUNAL AND FERAL MAMMAL SURVEY OF ROYAL KUNIA- PHASE II
PROPERTY LOCATED AT KUNIA, CENTRAL OAHU

INTRODUCTION

The purpose of this report is to summarize the findings of a two day (3,8 November 1988) bird and mammal field survey conducted at Royal Kunia-Phase II property in Kunia, central Oahu. Also included are references to pertinent literature. Finally, the report provides some suggestions as to the possible changes in the faunal community that may occur following the proposed development.

The objectives of the field survey were to:

- 1- Document what bird and mammal species occur on the property or may likely occur given the type of habitats available.
- 2- Provide some baseline data on the relative density of each species.
- 3- Compare these findings with published and unpublished data.
- 4- Assess the possible changes in the bird and mammal communities that might occur as a result of habitat alteration due to the proposed development.

GENERAL SITE DESCRIPTION

The project site is comprised of approximately 670 acres. Sugar cane cultivation covers virtually all of the property. Waikele Stream drainage marks the eastern boundary and Kunia Road the western boundary. Sugar cane fields adjoin the other two sides of the property. At the time of the survey none of the property was in a cleared or plowed state, all of the land was planted in sugar cane. Numerous roads through the sugar cane fields provide access to all sections of the property. No wetlands or forested habitat occur on the site.

Weather during the field survey was clear with occasional cloudy periods. Heavy rains occurred on days between the two survey dates. Winds were from the east.

STUDY METHODS

Field observations were made with the aid of binoculars and by listening for vocalizations. Attention was also paid to the presence of tracks and scats as indicators of bird and mammal activity. Existing roads around and through the property were followed and at various points (see Fig. 1) four minute counts were made of all birds seen or heard. Between these count stations tallies of birds seen and heard were also kept. These counts provide the basis for the population estimates given in this report. Data on habitat associations come from these observations plus information provided in Berger (1972), Hawaii Audubon Society (1984) and Pratt et al. (1987). Annual counts of birds in central Oahu by Hawaii Audubon Society as published in their journal 'Elepaio were also consulted in order to acquire a more complete picture of the birdlife activity in the area.

Observations of feral mammals were limited to visual sightings and evidence in the form of scats and tracks. No attempts were made to trap mammals in order to obtain data on their relative density and distribution.

Scientific names used herein follow those given in the recent American Ornithologist's Union Checklist (A.O.U. 1983), Hawaii's Birds (Hawaii Audubon Society 1984), A Field Guide to the Birds of Hawaii and the Tropical Pacific (Pratt et al. 1987), and Mammal Species of the World (Honacki et al. 1982).

RESULTS AND DISCUSSION

Resident Endemic (Native) Birds:

No endemic birds were recorded during the survey. Given the present habitats available on the property the only likely endemic species that might occasionally occur would be the Short-eared Owl (Asio flammeus sandwichensis). Bremer (1987) reports this species on only three of the last ten annual surveys of the Waipio and Central Oahu area. The absence of any wetland and forest habitat precludes use of the property by native (endemic) birds.

Migratory Indigenous (Native) Birds:

Pacific Golden Plover (Pluvialis fulva) -

A total of 45 plover were recorded during the field survey. Most were seen along the roads which run in all directions through the property and in a recently cleared sugar cane field just outside the west boundary. Johnson et al. (1981) and Bruner (1983) have shown plover are extremely site-faithful (returning each year to the same site) on their wintering grounds and many establish foraging territories which they defend vigorously. Such behavior makes it possible to acquire a good estimate of the actual abundance of plover in any one area. These populations likewise remain relatively stable over many years.

No other migratory birds were recorded during the survey. Ruddy Turnstone (Arenaria interpres) and perhaps Sanderling (Calidris alba) might occasionally forage at this site following a recent harvest of the sugar cane when open bare fields are available. Site-faithfulness of these species has been investigated by Myers et al. (1981). Their results revealed that environmental changes dramatically alter territorial and site-faithfulness responses.

Resident Indigenous (Native) Birds:

No indigenous resident species were recorded. The absence of wetlands eliminates the Black-crowned Night Heron (Nycticorax nycticorax) as a possibility. The property as it is presently constituted does not provide any suitable habitat for indigenous resident birds.

Exotic (Introduced) Birds:

A total of 15 species of exotic birds were recorded during the field survey. Table One shows the relative abundance and habitat associations of these species. Bremer (1987) provides a more comprehensive list of exotic birds which occur in the Waipio and Central Oahu area. A faunal survey of property located just west of the Royal Kunia-Phase II property revealed a similar assemblage of exotic species (Bruner 1987). In fact the only species found on the 1987 survey and not recorded on the Royal Kunia-Phase II site was the Red Avadavat (Amandava amandava). Three additional exotic species were found on this Royal Kunia-Phase II faunal survey: White-rumped Shama (Copsychus malabaricus), Common (Ring-necked) Pheasant (Phasianus colchicus) and Japanese Bush-warbler (Cettia diphone). The most abundant species during the field survey was the Zebra Dove (Geopelia striata) followed closely by Japanese White-eye (Zosterops japonicus). The combined lists of exotic birds from the Royal Kunia-Phase II property and lands to the west (Bruner 1987) provides a good view of the species composition and relative density of exotic species in this sector and in this type of habitat on Oahu. The only likely exotic species so far not accounted for by either faunal survey was the Common Barn Owl (Tyto alba).

Feral Mammals:

Mongoose (Herpestes auropunctatus) were commonly observed during the field survey. Feral cats were also recorded. No rats or mice were observed but a trapping program would likely show

that their numbers are similar to what one would find elsewhere in sugar cane fields on Oahu.

Records of the endemic and endangered Hawaiian Hoary Bat (Lasiurus cinereus semotus) are sketchy but the species has been recorded from central Oahu (Tomich 1986). None were found on this faunal survey.

CONCLUSIONS

A brief field survey can at best provide a limited perspective of the wildlife present in the area. Not all species will likely be observed and information on their use of the site must be sketched together from brief observations and the available literature on the species. The number of species and the relative density of each species may vary throughout the year due to available resources and reproductive success. Species which are migratory will quite obviously be a part of the ecological picture only at certain times during the year. Exotic species sometimes prosper for a time only to later disappear or become a less significant part of the ecosystem (Williams 1987). Thus only long term studies can provide the insights necessary to acquire a definitive perspective of the bird and mammal populations in a particular area. However, when brief field studies are coupled with data gathered from other similar habitats the value of the conclusions drawn are significantly increased.

In terms of broad conclusions related to bird and mammal activity on this property the following are offered:

- 1- The present monoculture of sugar cane limits use of this site by birds. Most bird activity was found along the roadsides and adjacent to Waikele Stream drainage.
- 2- Mammal activity was not unusual based on personal observations in similar habitat elsewhere on Oahu. More detailed data would involve a long term trapping program.

- 3- A change of land use of the type proposed will significantly alter the present habitat by creating a much larger diversity of habitats than are available in the present monoculture of sugar cane. The planting of trees and the creation of grassy open areas will provide new habitats which will likely result in an increase of species like plover and Common Myna (Acridotheres tristis). House Sparrow (Passer domesticus) should also become more common following urban development. Mammals populations may also be effected following development. The loss of the dense cover provided by sugar cane may reduce mongoose and rat/mice populations. Game birds such as Common (Ring-necked) Pheasant (Phasianus colchicus) will also be negatively impacted by a change of habitat due to development. This species is, however, widespread and relatively common in sugar cane and second growth habitats on Oahu.
- 4- Overall the conversion of the property from a sugar cane monoculture to a more diversified habitat of trees and grass should have positive effect on the populations of most bird species present on the property.

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15 November 1988

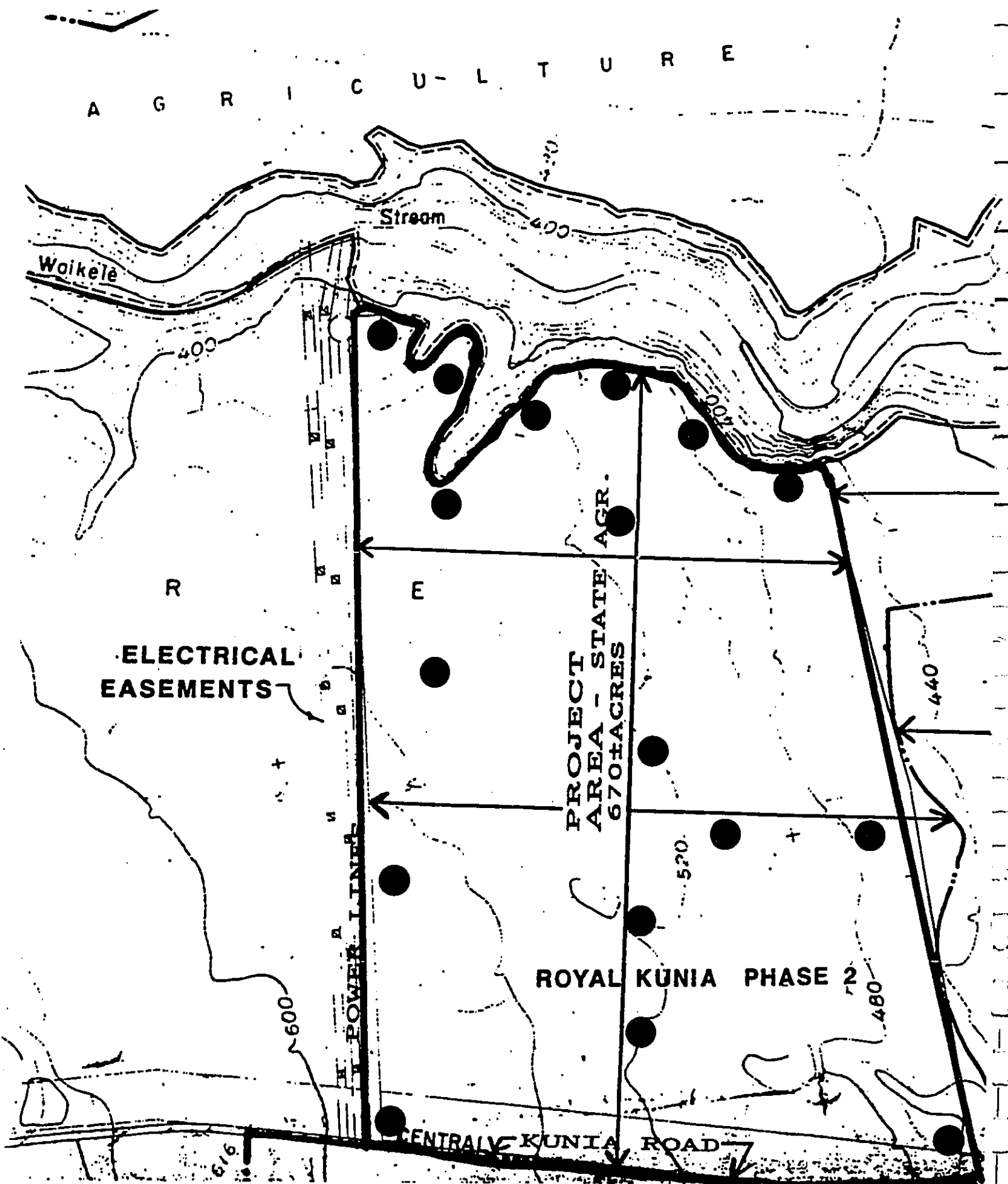


Fig. 1 Project site outlined by broad black line. Four minute count stations indicated by black dots.

TABLE 1

Relative abundance and general habitat preferences of exotic birds on property proposed for development at Royal Kunia-Phase II, Central Oahu.

COMMON NAME	SCIENTIFIC NAME	RELATIVE ABUNDANCE*	HABITAT ASSOCIATIONS*
Cattle Egret	<u>Bulbucus ibis</u>	R = 4	G
Common (Ring-necked) Pheasant	<u>Phasianus colchicus</u>	R = 2	Ag, G
Spotted Dove	<u>Streptopelia chinensis</u>	U = 2.2	S, G
Zebra Dove	<u>Geopelia striata</u>	A = 12.3	S, G
Common Myna	<u>Acridotheres tristis</u>	U = 4.8	S, G
Northern Cardinal	<u>Cardinalis cardinalis</u>	U = 3.0	S, Ag, G
Red-crested Cardinal	<u>Paroaria coronata</u>	U = 4.4	S, Ag, G
Red-vented Bulbul	<u>Pycnonotus cafer</u>	C = 6.1	S, Ag
Japanese White-eye	<u>Zosterops japonicus</u>	A = 11.4	S, Ag
White-rumped Shama	<u>Copsychus malabaricus</u>	R = 7	S
House Sparrow	<u>Passer domesticus</u>	R = 6	G
House Finch	<u>Carpodacus mexicanus</u>	C = 6.3	S, G
Nutmeg Mannikin	<u>Lonchura punctulata</u>	C = 5.5	G, Ag
Chesnut Mannikin	<u>Lonchura malacca</u>	C = 5.3	G, Ag
Common Waxbill	<u>Estrilda astrild</u>	U = 4.0	G, Ag

* (see page 9 for key to symbols)

KEY TO TABLE 1

Relative Abundance = Average of frequency on four minute counts in appropriate habitat and tallys between count stations.

A = Abundant (ave. 10+) on 4 min. counts

C = Common (ave. 5-10) on 4 min. counts

U = Uncommon (ave. less than 5) on 4 min. counts

R = Rare (recorded number which follows is total)

Habitat Association = habitat most likely to occur in.

G = Grassland (roadsides)

Ag = Agricultural fields (sugar cane)

S = Second growth forest (adjacent to Waikele Stream drainage)

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APPENDIX D

BOTANICAL SURVEY

CHAR AND ASSOCIATES

D

BOTANICAL SURVEY
ROYAL KUNIA PHASE II
'EWA DISTRICT, O'AHU

by

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SUMMARY

In early November 1988, a botanical survey was carried out on the site of the proposed Royal Kunia Phase II development project. The site consisted entirely of well-maintained cane fields in active production, with almost weed-free perimeters. A total of 59 species of vascular plants were found on the site. Of these, 57 (97%) were exotic weeds or deliberately introduced plants, and 2 (3%) were native or presumed-native plants. None of the species found on the site were officially listed as endangered or threatened; nor were any species proposed or candidate for such status.

INTRODUCTION

The study site consists of approximately 670 acres of sugar cane land located just north of Waipahu. It is bounded on the southwest by Kunia Road, on the northwest by a high-tension powerline, on the east by Waikele Gulch, and on the southeast by an indefinite boundary at an elevation of about 450 feet. All of the site is in active sugar production and devoid of noteworthy features except for two earth-and-stone dams, which formerly impounded water, and an abandoned landing-strip, which has been incorporated into the system of cane-haul roads. Rock piles are small and widely scattered.

PREVIOUS SURVEYS

At least two botanical surveys have been done in the vicinity of the present project site. The first was in the cane fields just north of the present site and south of the Hawaii Country Club golf course (Linney and Char, 1987). A much more extensive list of weedy species was found in that survey, due to the more lax maintenance of those fields, but there were no other significant differences in the vegetation of the two. The second was done in Waikele Gulch immediately adjacent to the present site (Char, 1988). Because of the entirely different environmental conditions (streams, flood-

plains, dry and rocky hillsides, cliffs, etc.), there was a much greater diversity of vegetation types and component species. There is no correspondence between the gulch and adjacent cane fields, and so comparisons are of limited value in the present survey.

SURVEY METHODS

A walk-through method was used for this survey. All parts of the site were easily accessible by the system of interior and peripheral cane roads. Plants were identified on sight. Taxonomy and nomenclature of ferns follows Wagner and Wagner (1987), while the flowering plants generally follow Wagner, et al. (in press).

DESCRIPTION OF THE VEGETATION

Almost the entirety of the site was covered with sugar cane (Saccharum officinarum). Along roads and ditches a very small number of wayside weeds commonly associated with agricultural lands were in evidence. Though a minor component of the vegetation, they constituted a vast majority of the species listed at the end of this report. Among the most characteristic of these were nut sedge (Cyperus rotundus), finger grass (Chloris barbata), sour grass, (Digitaria insularis), Guinea grass (Panicum maximum), Amaranthus spinosus and viridis, Ageratum conyzoides, horseweed (Conyza canadensis), emilia (Emilia sonchifolia and fosbergii), Pluchea symphytifolia and indica, bindweeds (Ipomoea triloba and obscura), spurge (Chamaesyce and Euphorbia species), rattlepod (Crotalaria incana), Desmanthus virgatus, koa-haole (Leucaena leucocephala), wood-sorrel (Oxalis corniculata and corymbosa), popolo (Solanum americanum), 'uhaloa (Waltheria indica), and apium (Ciclospermum leptophyllum). The number of plants is disproportionately small for a cane field habitat of such size, and reflects the care with which the fields are being maintained.

A few ornamental or edible plants that have escaped from cultivation were also found established around the cane fields. These included coral vine (Antigonon leptopus), horseradish tree (Moringa oleifera), four-o'clock (Mirabilis jalapa), avocado (Persea americana), and Catalpa longissima. Bittermelon (Momordica charantia) and pumpkin (cucurbita maxima), probably cultivated in the past, are now established as naturalized plants in the fields.

Normally where the field abuts a gulch, additional species would be expected to encroach on the field from the gulch. There was only an insignificant contribution of species from Waikele Gulch, and these were all restricted to the perimeter, including passion fruits (Passiflora edulis and suberosa), silkoak (Grevillea robusta), 'opiuma (Pithecellobium dulce), castorbean (Ricinus communis), Lantana camara, and mimosa (Paraserianthes falcataria).

THREATENED AND ENDANGERED SPECIES

No listed, proposed, or candidate threatened and endangered species, as designated by the Federal and/or State governments (U.S. Fish and Wildlife Service, 1985; Herbst, 1987) were found on the site. There was no intact native plant community in or adjacent to the study site that might be adversely affected by development.

RECOMMENDATIONS

There is little of botanical interest on the project site, as most of the area has been extensively cultivated for many years. The proposed development is not expected to have a significant impact on the total island populations of the species involved. The few, questionably native species found on the site are common weedy plants of similar habitats throughout the islands. Where feasible, it might be desirable to landscape with native plants that are adapted to the local climatic conditions.

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SPECIES LIST

A list of all the vascular plants found on the site follows. Plants are organized in three groups -- ferns and fern allies, monocots, and dicots. Within each group, they are further arranged in alphabetical order by family and genus. For each species, an accepted common name is given. The Hawaiian name is given for all native plants if known, and for those exotic plants that are generally known by a Hawaiian name. Biogeographic status is indicated by a letter code. An explanation of abbreviations used (other than author citations) is given below.

STATUS

- I - indigenous, considered native to the Hawaiian Islands, but also found elsewhere
- P - Polynesian, not considered native, but thought to have been introduced by the Polynesians prior to 1778
- X - exotic, not native, introduced after 1778

SPECIES LIST

BIOGEOGRAPHIC

STATUS

COMMON NAME

SCIENTIFIC NAME

FERNS AND FERN ALLIES

Adiantaceae

Pityrogramma calomelanos (L.) Link

silver fern

X

Aspleniaceae

Nephrolepis multiflora (Roxb.) Jarret ex Morton

sword fern

X

FLOWERING PLANTS

MONOCOTS

6

Cyperaceae

Cyperus rotundus L.

nut sedge

X

Gramineae

Cenchrus ciliaris L.

buffel grass

X

Chloris barbata (L.) Sw.

finger grass

X

Digitaria insularis (L.) Mez ex Ekman

sour grass

X

Panicum maximum Jacq.

Guinea grass

X

Panicum maximum Jacq. var. trichoglume Eyles ex Robyns

green panic grass

X

Panicum repens L.

quack grass

X

Pennisetum purpureum Schumach.

elephant grass

X

Rhynchelytrum repens (Willd.) C. E. Hubb.

Natal redtop

X

Saccharum officinarum L.

sugarcane

P

Sorghum halepense (L.) Pers.

Johnson grass

X

<u>SCIENTIFIC NAME</u>	<u>COMMON NAME</u>	<u>STATUS</u>
DICOTS		
Amaranthaceae		
<u>Amaranthus spinosus</u> L.	spiny pigweed	X
<u>Amaranthus viridis</u> L.	amaranthus	X
Anacardiaceae		
<u>Schinus terebinthifolius</u> Raddi	Christmasberry	X
Bignoniaceae		
<u>Catalpa longissima</u> (Jacq.) Sims	yoke-wood, catalpa	X
Buddlejaceae		
<u>Buddleia asiatica</u> Lour.	buddleia	X
Compositae		
<u>Ageratina riparia</u> (Rege.) King & Robinson	Hamakua pamakani	X
<u>Ageratum conyzoides</u> L.	ageratum	X
<u>Conyza canadensis</u> (L.) Cronquist	horseweed	X
<u>Crassocephalum crepidioides</u> (Benth.) S. Moore	crassocephalum	X
<u>Emilia fosbergii</u> D. H. Nicolson	red-flowered emilia	X
<u>Emilia sonchifolia</u> (L.) DC.	purple-flowered emilia	X
<u>Pluchea indica</u> (L.) Less.	pluchea	X
<u>Pluchea symphytifolia</u> (Miller) Gillis	pluchea	X
<u>Sonchus oleraceus</u> L.	sowthistle	X

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<u>SCIENTIFIC NAME</u>	<u>COMMON NAME</u>	<u>STATUS</u>
Convolvulaceae		
<u>Ipomoea obscura</u> (L.) Ker-Gawl.	yellow bindweed	X
<u>Ipomoea triloba</u> L.	pink bindweed	X
Cucurbitaceae		
<u>Cucurbita maxima</u> Duch.	pumpkin	X
<u>Momordica charantia</u> L.	bittermelon	X
Euphorbiaceae		
<u>Chamaesyce hirta</u> (L.) Millsp.	hairy spurge	X
<u>Chamaesyce hypericifolia</u> (L.) Millsp.	spurge	X
<u>Euphorbia cyathophora</u> Murr.	summer poinsettia	X
<u>Euphorbia heterophylla</u> L.	spurge	X
<u>Ricinus communis</u> L.	castorbean	X
Labiatae		
<u>Leonotis nepetaefolia</u> (L.) Ait.	lion's ear	X
Lauraceae		
<u>Persea americana</u> Mill.	avocado	X
Leguminosae		
<u>Crotalaria incana</u> L.	rattlepod	X
<u>Desmanthus virgatus</u> (L.) Willd.	desmanthus	X
<u>Leucaena leucocephala</u> (Lam.) deWit	koa-haoie	X
<u>Macroptilium lathyroides</u> (L.) Urb.	wild bush-bean	X



<u>SCIENTIFIC NAME</u>	<u>COMMON NAME</u>	<u>STATUS</u>
Proteaceae <u>Grevillea robusta</u> A. Cunningh. in R. Br.	silkoak	X
Solanaceae <u>Lycopersicon pimpinellifolium</u> Mill. <u>Solanum americanum</u> Mill.	currant tomato popolo	X X
Sterculiaceae <u>Maltheria indica</u> L. var. <u>americana</u> (L.) R. Br. ex Hosaka	'uha'loa, hi'aloa	I?
Umbelliferae <u>Ciclospermum leptophyllum</u> (Pers.) Sprague	apium	X
Verbenaceae <u>Lantana camara</u> L.	lantana	X

APPENDIX E

ENGINEERING ANALYSIS

PARK ENGINEERING



ENGINEERING ANALYSIS
FOR
ROYAL KUNIA PHASE II
HOAEAE, EWA, OAHU, HAWAII

PREPARED FOR:
HALEKUA DEVELOPMENT CORPORATION
2024 NORTH KING STREET
HONOLULU, HAWAII 96819

PREPARED BY:
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Kawaiahao Plaza, Hale Mauka
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JUNE 1989

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FIGURE 1 PROJECT SITE SHOWING ADJACENT URBAN AREAS

SECTION 1. PHYSICAL CHARACTERISTICS OF PROJECT SITE

1.1 SITE LOCATION

The proposed development site is located at Waikele and Hoaeae, Ewa, Oahu, Tax Map Key: 9-4-02: Por. 01 and 9-4-03: Por. of 1 and 9. The parcel is located approximately 1.2 miles north of Kunia Interchange of Interstate Route H-1. The site is bounded on the south by the Royal Kunia Phase I; on the west by Kunia Road; on the east by Waikele Gulch and on the north by Overhead Electrical Transmission Lines on sugar cane crop land, currently leased by Oahu Sugar Co. Limits of the project site are delineated in Figure 1.

1.2 SITE SIZE

The proposed development site is approximately 669.9 acres, of which 56.0 acres will be zoned Apartment, 171.7 acres Golf Course, 130 acres Industrial, 16.0 acres Public Park, 6.0 acres School and 272.8 acres residential.

1.3 CONFIGURATION

The proposed project site is rectangularly shaped, running lengthwise along the northwestern boundary of the existing Royal Kunia Phase I between Kunia Road and Waikele Gulch. The area is approximately 4700 feet wide and 6500 feet long.

1.4 TOPOGRAPHY

Aerial photo contour maps of the area indicate that the site slopes downward from the northwest to the southeast at a gradient of 2 to 6 percent. Two (2) drainageways traverse the middle section of the site. The ground elevations range from approximately 450 to 575 feet mean sea level.

SECTION 2.

TRAFFIC

2.1 EXISTING STREETS AND HIGHWAYS

The proposed development is located adjacent to existing Kunia Road on its eastern boundary approximately 1.2 miles north of Kunia Interchange of Interstate Route H-1, as shown on Figure 1. Between the interchange and the development, there are two intersections on Kunia Road for access to the existing Village Park Subdivision and one proposed intersection on Kunia Road for access to Royal Kunia Phase I project. The internal roads in this subdivision will make two connections to Kunia Road.

Kunia interchange will be improved to increase the capacities of the ramps and Kunia Road which serve the existing project in the two major destinations, namely Honolulu including Pearl Harbor and the airport; and Waianae including Campbell Industrial Park and the proposed West Beach resort development.

Further to the south, Kunia Road intersects Farrington Highway and connects directly to the realigned Fort Weaver Road. It also partially intersects Honowai Street and Waipahu Street. This network serves the project with interconnections with Waipahu and Ewa.

To the north, Kunia Road provides direct access to Schofield Barracks, Wheeler Field, Wahiawa and the North Shore.

While existing Kunia Road is a two-lane road, conditions at the project site make it feasible to widen the roadway to provide access to the abutting land. The proposed development will have 4850 feet of frontage on Kunia Road.

2.2 PROPOSED MAJOR STREETS

The primary access to the development will be via two intersections at Kunia Road, to be located approximately 1.4 miles and 2.0 miles north of the existing Kunia Interchange of Interstate Route H-1.

2.3 TRAFFIC IMPACT REPORT

A detailed Traffic Impact Report for Royal Kunia Phase II is bound separately.

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SECTION 3. WATER SYSTEM

3.1 EXISTING FACILITIES

Water for the existing Harbor View Subdivision, Village Park Subdivision and portion of Royal Kunia Phase I is provided by Kunia Well II. Source and storage facilities at the Kunia Well II site, located about 0.8 miles above Village Park along Kunia Road, includes a 1.5 MG "440" reservoir, a 1.0 MG "440" reservoir and two deep wells. An activated carbon water treatment system at the Kunia Well II site has been installed for contaminant removal by the developers and have been turned over to the Board of Water Supply.

3.2 WATER REQUIREMENTS

The development of the project site will require approximately 1.718 MGD (average flow) of water. The flow requirement was computed according to the Board of Water Supply Standards as follows:

Residential	500 gallons per unit per day
Apartment	400 gallons per unit per day
Industrial	4,000 gallons per acre per day
Parks & School	4,000 gallons per acre per day

The developers has applied to drill one new well at the Kunia Well II site to service the project. As an alternative water source, the Board of Water Supply has indicated that water can be made available by their existing facilities.

3.3 NEW FACILITIES

The following improvements will be installed with the development of Royal Kunia Phase I:

- 1) Install one deep well.

- 2) Construct a booster pump station (with two 1900 gpm pump) at the Kunia Well II site.
- 3) Install approximately 9000 linear feet of 20" transmission main from the existing Kunia "440" Reservoir to the new Kunia "675" Reservoir.
- 4) Construct a 1.0 MG Kunia "675" Concrete Reservoir.

The following improvements will be installed with the development of Royal Kunia Phase II:

- 1) Install one deep well.
- 2) Install one 1900 gpm pump in the pump station.
- 3) Construct 3.0 MG Kunia "675" Concrete Reservoir.

Additional onsite distribution systems will be designed to Board of Water Supply Design Standards.

3.4 NON-POTABLE WATER

Water requirements for golf course irrigation will be either obtained from Oahu Sugar Company irrigation system or from Waikele Stream.

SECTION 4. WASTEWATER SYSTEM

4.1 EXISTING SYSTEM

Wastewater from the development will be collected by a net work of pipes flowing through Royal Kunia Phase I and flowing to the 21" trunk line to be installed from Royal Kunia Phase I to the Waipahu Sewage Pump Station.

4.2 WASTEWATER FLOW REQUIREMENT

Average daily wastewater flow generated by the development of the project site will be approximately 1.8 MGD. The flow requirement was computed according to the City and County Wastewater Standards as follows:

Residential	320 gallons per unit per day
Apartment	224 gallons per unit per day
Commercial/Industrial	8,000 gallons per acre per day
School	50,000 gallons per school per day

4.3 NEW SYSTEM

Royal Kunia implementation schedule is being coordinated with the Division of Wastewater Management who is in the process of expanding the existing Waipahu Sewage Pump Station and Honouliuli Wastewater Treatment Plant.

SECTION 5. SOLID WASTE AND DISPOSAL

5.1 EXISTING CONDITIONS

The City and County of Honolulu is providing refuse collection service for the existing Village Park Subdivision and Royal Kunia Subdivision Phase I. Within the Ewa area, the City and County operate the Waipahu Incinerator.

5.2 SOLID WASTE GENERATION

Fully developed, the proposed project would generate approximately 32 tons of mixed commercial, institutional, and residential solid waste per day. This quantity represents about one percent of the total solid waste generated on Oahu each day at the present time.

The proposed Industrial/Commercial project would not generate any heavy industrial or otherwise hazardous wastes.

5.3 COLLECTION AND DISPOSAL

After the project is fully developed, it is expected that collection will be provided by both government and private work forces. Infrastructure planning will permit City and County of Honolulu refuse collection for single family residences, while commercial and business establishments will be served by private collectors. Apartment units can be served by either the City and County or private collectors.

The Waipahu Incinerator will be kept in service until the Resource Recovery Project becomes operational, private industry is pursuing approvals to establish a sanitary landfill at Waimanalo Gulch.

The implementation of the City and County's resource recovery project at Barbers Point within two years and the landfill at Waimanalo Gulch should be able to accommodate the proposed project and handle the future growth in Leeward Oahu.

SECTION 6. DRAINAGE AND GRADING

6.1 EXISTING CONDITIONS

Approximately 40% of the new development, the westerly portion along Kunia Road, slopes toward the Royal Kunia Phase I and the existing Village Park Subdivision. The remaining 60% of the new development, the easterly portion, slopes toward Waikele Stream.

The flood insurance hazard rating for this area is Zone C, areas of minimal flooding.

6.2 PROPOSED IMPROVEMENTS

A Drainage Master Plan has been submitted to the Department of Public Works for approval.

Approximately 40% of the storm runoff (1500 cfs) generated by the new development will discharge through the existing Village Park Subdivision. The drainage improvements within the existing Village Park Subdivision have been installed to handle this additional storm runoff. The runoff then flows into improved drainage facilities that are maintained by the City and County of Honolulu and discharges into Pearl Harbor.

Approximately 60% of the storm runoff (2000 cfs) generated by the new development will be diverted into the golf course ponding areas and will be used to irrigate the golf course.

Development of the project site is not expected to have any noticeable impact upon the configuration of Waikele Stream. Flow levels and water quality of Waikele Stream are not expected to be altered or changed to any noticeable or measurable degree. This conclusion is based on the relatively small area of that portion of the project site that presently drains directly into Waikele Gulch as compared to the large area of the Waikele Stream hydrological basin (281 acres and 29,000 acres, respectively).

6.3 GRADING

Grading will be performed in accordance with Chapter 23, Grading, Soil Erosion and Sediment Control, of the revised Ordinances of Honolulu, 1978 as amended. Grading is expected to encompass the entire project site. Erosion control measures will be implemented as outlined in the City and County Grading Ordinance. Strict compliance to City ordinances should minimize any potential environmental impact.

Erosion and dust control measures that can be implemented are as follows:

1. Temporary and permanent interceptor ditches, sediment traps and sediment basins.
2. Temporary and permanent vegetative cover.
3. Mulching.
4. Spraying of Chemicals or Liquid Asphalts.
5. Temporary wind barriers.

SECTION 7.

ELECTRIC AND TELEPHONE SYSTEMS

7.1 EXISTING SYSTEMS

Electrical and communication improvements necessary to support the requirements of this project can be served from existing utility systems, with some offsite work required. In general, the offsite improvements required for the development is an ongoing activity for the utility companies and should not create an undue hardship for the respective utilities. Furthermore, this development will require that the electrical and communication utility systems be constructed and maintained according to approved utility standards.

Onsite facilities for the utility systems will have minimal impact on the environment. Noise, aesthetic considerations, safety hazards, and loading impact will be within normally applied guidelines.

7.2 POWER AND TELEPHONE SERVICE REQUIREMENTS

The existing HECO. Hoaeae substation which is servicing the existing Village Park substation will not be able to service the Royal Kunia Phase I and II Subdivision. HECO. facility is also inadequate to service the proposed expansion.

7.3 PROPOSED IMPROVEMENTS

1. Electrical

Existing Hawaiian Electric Company overhead 46 KV line routed along Kunia Road fronting the project site must be relocated to accommodate the Kunia Road widening.

Based on the forecasted loading, Hawaiian Electric Company anticipates that the substation provide for Royal Kunia Phase I can serve the project loads.

12 KV distribution feeders will be extended from the substation and will be connected to service transformers located adjacent to project facilities via switching vaults provided along the 12 KV distribution feeder routes. The switching vaults will protect the distribution feeders, and allows for isolation of damaged cables and redundancy to protect the development against prolonged outages resulting from the failure of any one section of the underground electrical system. Service transformers will step-down the 12 KV distribution voltage to the utilization voltage required by the project facilities.

The electrical system will be an underground facility with the exception of the 46 KV overhead lines and structures, the switching vaults and service transformers. A network of underground ducts and handholes will be provided to facilitate cable installation. Hawaiian Electric Company will cable the underground duct system. Cable and ducts will be suitable for underground applications and therefore, are tolerant of both wet and dry conditions.

2. Communications

Telephone facilities must be extended to the project site from the Hawaiian Telephone Company Remote Office provided for Royal Kunia Phase I. Cross-connect pedestals will be provided by the telephone company at various locations throughout the site to permit access and telephone service to the project facilities. Furthermore, an existing direct buried communication cable for military purposes and existing aerial telephone cables which are routed along Kunia Road must be relocated to accommodate the Kunia Road widening.

The telephone system will be an underground facility with the only exceptions being the cross-connect pedestals. A network of underground ducts and handholes will facilitate the telephone cable installation. Hawaiian Telephone Company will cable the underground duct system and make all the necessary arrangements for serving each facility's telephone requirements. Cables and

ducts will be suitable for underground applications and therefore, are tolerant of both wet and dry conditions.

Similarly, CATV facilities must be extended from Royal Kunia Phase I to the project site.

3. Potential Impacts

Relocated 46 KV overhead lines along Kunia Road will be installed similar to the existing facilities, following standard utility company practices. Furthermore, because Hawaiian Electric Company must maintain the lines and structures for the purposes they were intended and for their best use, the lines will have minimal negative impact on the surrounding communities.

Telephone facilities do not require major offsite work. All offsite work will be constructed and maintained following the utility company's standard practices.

APPENDIX F

**ENVIRONMENTAL IMPACT OF FERTILIZER,
HERBICIDE AND PESTICIDE USE**

CHARLES L. MURDOCH AND RICHARD E. GREEN

F

ENVIRONMENTAL IMPACT
OF
FERTILIZER, HERBICIDE AND PESTICIDE USE
ON THE PROPOSED
ROYAL KUNIA PHASE II
GOLF COURSE

A REPORT TO

William E. Wankett Inc.
Land use Consultant

November 16, 1988

PREPARED BY

Charles L. Murdoch, Ph. D

Richard E. Green, Ph. D.

I. INTRODUCTION

The development of the proposed 172 acre golf course will require application of fertilizers to supply essential nutrients to turfgrasses and ornamental plants and pesticides to control their associated weed, disease, and insect pests. These chemicals may be subject to movement from the site of application, either by runoff during high intensity storms, or by movement toward groundwater when water infiltration exceeds evapotranspiration (ET). Although the Kunia site is a relatively low-rainfall, high-ET area, high-intensity storms occur occasionally, resulting in runoff through drainage ways to the coast. Irrigation in excess of ET could contribute water recharge to groundwater, thus water management is an important determinant in the control of chemical movement.

This report provides an assessment of the anticipated environmental impact of chemicals applied to a golf course at this site based on an analysis of site factors and recommended management practices. In addition, the impact of a golf course with appropriate management is compared with the existing situation (sugarcane culture).

II. APPROACH

Development site maps were provided by William E. Wankett, Land Use Consultant. We visited the site on November 11, 1988. Detailed topographic and soils maps provided information required for an assessment of infiltration and runoff potentials. Published data on water balance in the area provided an estimate of groundwater recharge with both sugarcane and turf cover. Chemical use in sugarcane is estimated from published information while the anticipated use of chemicals in golf course management is based on our own recommendations.

III. ANALYSIS OF RELEVANT FACTORS WHICH MAY IMPACT ON CHEMICAL MOVEMENT

A. Site factors

1. Geology, soils, topography

The geology of this area is dominated by basalt from the Koolau and Waianae volcanic series, with alluvial fans from the mountains and ash deposits complicating the picture. The dominant soils in the project area are Wahiawa silty clay (Tropeptic Haplustox), 0 to 3% slope, and Lahaina silty clay (also Tropeptic Haplustox), 0 to 3% slope at the higher elevations and 3 to 7% slope at the lower elevations. Weathered basalt, alluvium and ash underlie the soils. Both of these soils are relatively deep (more than 36 inches), are well drained and have moderately rapid to moderate permeability. These two soils are among the best cropped soils in Hawaii, and have sustained sugarcane and pineapple production over several decades. Their hydraulic properties have been studied in detail (Green,

et al., 1982). They are relatively non-erosive due to their excellent structural stability, good permeability and gently sloping topography. Organic carbon content in the A horizon is about 2% in both soils, a positive factor with respect to pesticide mobility since sorption of pesticides occurs principally on organic matter. NOTE: Reference to Wahiawa soils are in error, should read Molekai - characteristics are similar.

2. Climate and hydrology

Monthly average rainfall at the site varies from a low of about 20 mm/month in June and July to a high of about 135 mm/month in January, with a mean annual rainfall of about 800 mm (31 inches). A water balance for the non-caprock area of Southern Oahu can be determined from data presented by Giambelluca (1983). Average annual precipitation for the entire area is 1007 mm (39.6 inches). Runoff was calculated to be 68 mm (2.7 inches) for the same region, while ET for irrigated sugarcane is about 1350 mm (53 inches). Thus, without irrigation, there is a net deficit of about 411 mm (16 inches). The data indicate that unirrigated cropped or grassed areas providing a full canopy for ET would not contribute recharge to the Pearl Harbor Aquifer. Actually, because of the water deficit, sugarcane culture in this area would not be economically productive without irrigation.

The seasonal nature of rainfall in the low-elevation, leeward areas of Oahu results in the likelihood of recharge and runoff only during the winter months. With drip irrigation of sugarcane, recharge from irrigation has been greatly reduced in comparison to earlier furrow irrigation. Results of nematicide analyses on deep soil core samples in pineapple fields located between Mililani and Kunia (Wong, 1987; Peterson et al., 1985) suggest no major penetration of pesticides to depths below 20 feet in the low-elevation, low-rainfall areas. However, in higher elevation, high-rainfall areas, substantial recharge apparently resulted in pesticide movement to much greater depths (more than 150 feet). Groundwater samples have confirmed this pattern (Oki and Giambelluca, 1987). Thus, there is little groundwater recharge from rainfall at the proposed project site.

B. Management factors

1. Fertilizers

Fertilizers are applied to golf courses to supply those essential nutrients which are used in large amounts and which are deficient in most soils. In typical soils, the elements which are normally applied in a turfgrass fertilization program are nitrogen (N), phosphorus (P), and potassium (K). Fertilizers are normally applied to only the greens, tees, fairways, and part of the roughs of a golf course. Typical areas in these types of turfgrasses are estimated in the discussion below.

Turfgrasses use much more N than other elements. Based on turfgrass clipping composition, it has been shown that the turfgrasses grown in Hawaii use about twice as much N as K and about 4 times as much N as P.

The primary fertilizer elements of concern for contamination of ground and surface waters are nitrogen and phosphorus. Phosphorus is attached very tightly to iron and aluminum hydroxides which are plentiful in the soil of this location and moves little if any from the site of application. Phosphorus, therefore will not cause any problem with contamination of drainage water. Ammonium nitrogen (NH₄) likewise moves little in soils. Nitrogen applied in the ammonium form, however, is rapidly converted to the nitrate form (NO₃) which is not bound to the soil and moves readily with water. Because of high N uptake by turfgrasses, however, nitrogen will be used rapidly after application. Only under conditions where rainfall occurs soon after application of a soluble nitrogen source would there be loss by surface runoff or by leaching below the root zone. This nitrogen movement could be avoided by applying a slow-release nitrogen fertilizer.

Fertilizer use rates for the different golf course areas are shown in Table 1. Complete fertilizers (ones containing N, P, and K) are usually applied. Because nitrogen is applied in larger quantities and also because it is the only fertilizer element likely to cause contamination of ground or surface waters, only nitrogen application rates are given.

Table 1. Approximate fertilizer use rates for different areas of a typical 18-hole golf course in Hawaii.

Type of turf	Area (acres)	Fertilizer amount (lb. N/1000 sq. ft.)	Application frequency	Total annual application (tons N)
Greens	3	0.5	2 weeks	0.85
Tees	3	1.0	3 weeks	1.15
Fairways	50	1.5	8 weeks	10.00
Roughs	<u>30</u>	1.0	3 months	<u>2.60</u>
Total	86			14.60

2. Pesticides

There are a number of weed, insect and disease pests of turfgrasses in Hawaii which sometimes require application of chemical pesticides. Pesticides are normally applied only in response to outbreaks of pests. There are few instances in which pesticides are applied in a regularly scheduled, preventative program. A typical pesticide program for golf courses in Hawaii is given in Table 2 below. There are several chemicals which may be substituted for certain ones in this suggested program. Properties of the chemicals listed in Table 2 (Hartley and Kidd, 1983), as well as those of most chemicals used in turf in Hawaii, are given in Appendix Table 1.

3. Irrigation

Because rainfall is not uniformly distributed throughout the year, all golf courses are irrigated to supplement rainfall. Golf courses usually have permanent

sprinkler irrigation systems with sophisticated controllers. Many are computer controlled, so that each sprinkler head on the golf course can be adjusted from a computer terminal to apply a selected amount of water on each cycle.

Because golf greens are constructed of sand (or mixes dominated by sand) the water holding capacity is less than for other areas containing soil. For this reason, golf greens must be watered more frequently than other areas.

Table 2. A typical pesticide program for an 18-hole golf course in Hawaii.

Turfgrass area	Area (acres)	Chemical	Frequency	Rate/application	Annual total
I. Herbicides					
A. Greens	3	MSMA	6 times/year	2 lb. ai./acre	36 lb. ai
		bensulide	2 times/year	12 lb ai/acre	72 lb. ai
B. Tees	3	MSMA	6 times/year	2 lb. ai./acre	36 lb. ai
		33 Plus	3 times/year	1 pint/acre	9 pints
		bensulide	2 times/year	12 lb. ai./acre	72 lb. ai
C. Fairways	50	MSMA	6 times/year	2 lb. ai./acre	600 lb. ai
		33 Plus	3 times/year	1 pint/acre	19 gallons
		metribuzin	2 times/year	0.75 lb. ai./acre	75 lb. ai.
D. Perimeter areas	20	glyphosate	3 times/year	1.5 lb. ai./acre	90 lb. ai.
II. Insecticides					
A. Greens	3	chlorpyrifos	As needed	1 lb. ai./acre	Approx. 18 lb. ai.
B. Tees	3	chlorpyrifos	As needed	1 lb. ai. acre	Approx. 18 lb. ai.
C. Fairways	Spot treatments	chlorpyrifos	As needed	1 lb. ai./acre	Approx. 50 lb. ai.
		diazinon	As needed	5 lb. ai./acre	Approx. 250 lb.ai.
III. Fungicides					
A. Greens	3	metalaxyl	As needed	1.3 lb. ai./acre	Approx. 25 lb. ai.
		chlorothalonil	As needed	8 lb. ai./acre	Approx. 72 lb. ai.
B. Tees	3	metalaxyl	As needed	1.3 lb. ai./acre	Approx. 25 lb. ai.
		chlorothalonil	As needed	8 lb. ai./acre	Approx. 72 lb. ai.
C. Fairways	Spot treatments	chlorothalonil	As needed	8 lb. ai./acre	Approx. 250 lb.ai.

Typical evapotranspiration rates for well-watered turf in Hawaii range from 0.1 to 0.3 inches per day, depending on temperature, the amount of sunlight, relative humidity, wind speed and the amount of available water in the soil. Soils store approximately 0.5 to 2.5 inches of available water per foot of depth, depending on soil texture. Sands hold less, clays hold more. Irrigation should be applied when about one-half the available water has been used. The effective rooting depth for mown turf is approximately one foot. Therefore, turfgrasses will need to be watered every day to about once a week depending upon the type of soil and the water use rate. Amounts of water applied at each irrigation are about 20,000 gal. for greens and 500,000 gals. for fairways.

Irrigation practices may have a large influence on the movement of soluble nitrogen fertilizers in soils. If excessive irrigation water is applied soon after application of soluble nitrogen sources, the chance for runoff or leaching of nitrogen below the root zone is increased. Because of the high cost of irrigation water, there is little incentive to over-water golf courses. As was previously mentioned, golf course irrigation systems are sophisticated, allowing precise control of the amount of water applied.

IV. ENVIRONMENTAL IMPACT OF CHEMICALS APPLIED TO THE PROPOSED GOLF COURSE

A. Groundwater and runoff

A principal concern is the potential for movement of applied chemicals to streams and eventually to shoreline waters by runoff or by leaching to groundwater with subsequent lateral transport. Recharge of groundwater from infiltration in the development area will be minimal due to the relatively low rainfall much of the year. Additionally, the organic matter in these soils (approximately 2% organic carbon) will tend to retard movement of most pesticides below the A horizon. Removal of topsoil during development should be limited as much as possible because the topsoil is the zone of high organic matter content, high biological activity and high sorption of applied chemicals; surface soils reduce the movement of chemicals from the site of application. The two principal soils (Wahiawa and Lahaina) have relatively deep profiles (more than 36 inches) which will retard vertical movement of applied chemicals to subsurface waters and provide an opportunity for biological and chemical degradation. While leaching of pesticides is unlikely on these deep soils, over-irrigation combined with over-application of nitrogen fertilizer could result in leaching of nitrate nitrogen. Nitrate leaching can be avoided by careful management of both irrigation and nitrogen fertilization. This fact is recognized by Golf Course Superintendents as it is in the interest of both management economics and environmental quality to use no more water and fertilizer than is required for good growth of turfgrass.

In general, a properly developed and managed golf course should not represent a threat to the quality of either groundwater or surface drainage waters in the project area. The quantities of both fertilizers and herbicides used on a typical 18-hole golf course are less than are used on a comparable area of sugarcane, which has proven to be an environmentally acceptable economic crop for this area.

B. Impact on Migratory Birds and Endangered Hawaiian Waterbirds.

The fertilizers, herbicides, and fungicides used in golf course maintenance pose little or no hazard to birds frequenting the grassed areas or ponds associated with golf courses. Fertilizers are relatively non-toxic unless ingested in large amounts. All herbicides and fungicides used in golf course maintenance in Hawaii are of low to moderate toxicity (Appendix Table 1). The only chemicals used in golf

course maintenance in Hawaii which are highly toxic to birds are the organic phosphate insecticides, especially chlorpyrifos.

Although chlorpyrifos is toxic to birds, it is strongly adsorbed on the thatch layer of turf and moves little from the site of application. One reason for its weakness in controlling soil infesting insects is the inability to get the insecticide through the thatch layer to the depth needed to contact these insects. Recent studies (Sears and Chapman, 1980; Tashiro, 1980) have shown that chlorpyrifos applied to turfgrasses does not penetrate more than 2 to 3 centimeters in the soil. In addition to resistance to movement in the soil, it has been shown that it is rapidly degraded in the soil, both by hydrolysis and microbial action (Miles et al. 1979).

Because of the adsorption of organic phosphate insecticides on organic layers in turf and their rapid break down, there is little chance of their movement from grassed areas into the ponds associated with the proposed golf course. Label instructions for application of these pesticides (which turfgrass managers are required by law to follow) specifically prohibit their direct application to streams and ponds.

The likelihood of bird injury by pesticides used in maintenance of the proposed golf course can be reduced by proper application of pesticides with reduced toxicity to birds. The attached table shows that carbaryl and trichlorfon are less toxic to birds than chlorpyrifos. In most cases these insecticides may be substituted for chlorpyrifos with little loss of effectiveness.

Golf courses are excellent habitats for birds. As far as we are aware, there have been no reported incidents of bird kill in Hawaii from chemicals applied in golf course management. Waterfowl and fish appear to thrive in ponds and water hazards on golf courses in Hawaii. Many golf courses cultivate white amur fish in the ponds to control algae. Mosquito fish are generally stocked to prevent mosquito problems. We are aware of no incidents of fish or waterfowl injury from chemicals applied to golf courses.

The labeling of herbicides and pesticides by EPA for particular uses enforced by the Hawaii Department of Agriculture, is perhaps the best assurance of protection of humans and wildlife from their hazards. All pesticides must be applied in compliance with federal and state laws regulating their use. Hazards to both humans and wildlife are included in the decision to label a pesticide for specific uses, including use on golf courses, and in developing regulations on allowable application procedures of the pesticide for various uses.

C. Impact on Air Quality.

Most herbicides and pesticides used on golf courses are of relatively low mammalian toxicity, ranging from hundreds to several thousand mg/kg body weight (Appendix Table 1). Because they are not highly volatile and are applied in dilute sprays (50 to 100 gallons of spray solution per acre) to open areas, there is little

likelihood of volatility once the pesticides are applied. The greatest danger of significant airborne concentrations of pesticides is from aerial application. Golf course pesticides are applied with ground spray equipment. Boom height of spray equipment is less than one meter. Low spray pressures (20 to 40 psi) and coarse spray droplets further reduce the hazard of airborne fine droplets. Droplets larger than 100 micrometers diameter are not highly subject to drift. Figure 1 below illustrates the effect of spray droplet size on spray drift.

Most of the spray volume from typical flat-fan nozzles used in agricultural spray equipment is from droplets larger than 100 micrometers. Table 3 below shows a typical distribution of droplet sizes for a flat-fan nozzle (the type used in most golf course spray equipment).

Figure 1. Relationship between spray droplet size and spray drift based on droplets falling 10 feet in a 3 MPH wind (from Hofman et al. 1986).

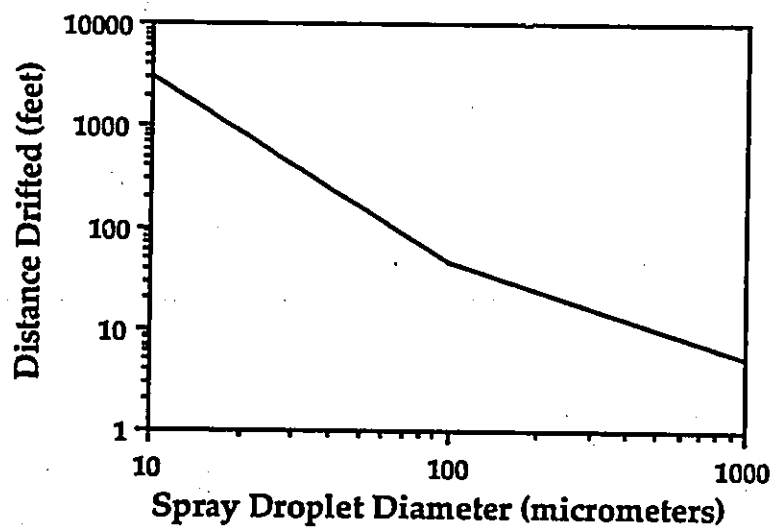


Table 3. Droplet size range for a typical flat-fan nozzle at 20 and 40 psi. (from Hofman et al., 1986)

Droplet size range (microns)	Percent of spray volume	
	20 psi	40 psi
0-21	0.1	0.4
21-63	3.0	10.4
63-105	10.7	20.1
105-147	16.2	25.4
147-210	36.7	35.3
210-294	27.5	7.7
>294	5.8	0.7

At the low concentrations used in pesticide application, this would not result in significant quantities of pesticides being carried downwind. High wind speed would increase the likelihood of drift of fine spray droplets, however, because high wind speed distorts spray patterns and results in poor pesticide coverage; spraying in periods of high wind is not common practice. Table 4 below shows the percent of spray application volume deposited at 4 and 8 feet downwind and the distance downwind for the volume to drop to 1% or below for flat-fan nozzles under different conditions. Even under high wind conditions (almost 10 mph) and spraying at 40 psi, the distance downwind at which 1% or less of the total spray volume was deposited was only 17 feet.

Table 4. Percent of spray volume deposited at 4 and 8 feet downwind and the distance in feet for the volume of spray solution to drop to 1% of the total spray volume (from Hofman et al., 1986).

Nozzle ht. (in.)	Pressure (psi)	Wind speed (mph)	Percent deposited		Distance to drop to 1% of volume
			4 ft.	8 ft.	
14	40	3.5	3.1	0.6	7.0
27	40	3.5	5.9	1.5	13.0
18	30	5.3	9.3	2.2	14.0
18	25	9.9	10.3	3.1	15.5
18	40	9.9	9.1	3.6	17.0

To facilitate spray operations and to comply with label instructions of some pesticides, spray applications are only made in late afternoon or early morning

hours when golfers are not on the golf course. This reduces the risk of exposure of people to airborne spray particles. Sufficient buffer space with tall vegetation between the golf course and housing sites and facilities (such as the clubhouse) which will be used by people will further reduce the chance of exposure to airborne pesticide particles.

The greatest danger of airborne pesticides is to the applicators of pesticides themselves. Mixing of wettable powder formulations and being in close proximity to airborne spray particles, particularly when operating spray equipment in a downwind position, places spray operators in particularly vulnerable positions. EPA and OSHA have strict standards which specify that spray operators wear appropriate protective clothing and breathing apparatuses.

V. ENVIRONMENTAL IMPACT OF CHEMICALS APPLIED TO THE PROPOSED GOLF COURSE COMPARED TO THOSE APPLIED TO EXISTING AGRICULTURAL CROPS.

A. Existing conditions

The proposed golf course site is presently cropped with sugarcane. The cane is drip irrigated, providing efficient use of applied water. The principal fertilizer nutrients applied are N and K ; water soluble forms are applied through the drip system. Typical quantities applied are about 300 pounds of N and 400 pounds of K₂O, with most of the fertilizer being applied during the first year of the crop. As mentioned previously, only nitrate (NO₃) is considered a potential pollutant of groundwater. However, there is no evidence that NO₃ levels in the Pearl Harbor aquifer have been seriously impacted by NO₃ leaching from sugarcane fields (Green and Young, 1970). Use of drip irrigation in recent years has probably reduced irrigation recharge to the aquifer, thus reducing the quantity of leached N.

Pesticide use for insect and disease control in sugarcane culture is minimal, since insects are controlled biologically. Fungicide is used only to treat seed pieces before planting (principally Benlate), thus the quantities applied are small and localized. Only herbicides for weed control are applied to the soil as surface sprays, usually two or three times in the first 6 months after planting. Herbicide practices have not changed substantially in the past 20 years, with the exception of the adoption of the use of glyphosate (Roundup) for in-field post-emergence spot spraying and control of weeds in field boundaries, ditches, and roadsides. The principal pre-emergence herbicides used in the Kunia area are usually atrazine and either ametryn or diuron. Typical quantities applied are 6 pounds active ingredient (ai.) per acre per crop.

Studies on Oahu several years ago (Green et al., 1977) indicated that diuron was transported from sugarcane and/or pineapple fields to the West Loch of Pearl

Harbor via Waikele stream. While the herbicide could not be detected in water, it was found at low levels in sediments from both the stream and the bay. The quantities of diuron in sediments were thought to be too low to be of environmental consequence. Neither atrazine or ametryn was found in either water or sediments.

In the last few years, atrazine has been detected in water from several wells in central Oahu (Hawaii State Department of Health, 1988). The concentrations are all less than 1 ppb, well below levels considered safe for potable waters, but these and other results illustrate that atrazine has leached below the root zone, probably because of the excessive water applied with furrow irrigation in the past. It is likely that drip irrigation, which provides better water control, has reduced chemical leaching in comparison with furrow irrigation.

B. Proposed golf course

Fertilizer, pesticide and irrigation applications to the proposed golf course have been discussed previously. Golf course management is much more intense than sugarcane management. At first glance it would appear that more fertilizers are being applied to the golf course than to sugarcane because of the higher application rates to turfgrasses. After closer examination, however, it is shown that, because only a small portion of the area is fertilized, total fertilizer use will be similar. If sugarcane culture uses 300 pounds of N per acre for one year of the two-year growing cycle, this results in about 30 tons of N for the 2 years. Golf course culture, as shown in Table 1 above, requires approximately 14.6 tons of N each year. For a two year period about 29 tons of N would be applied in golf course fertilization.

Because the area treated with pesticides on a golf course is small, the total amount of pesticide applied is relatively small also. The pesticides used in golf course management are mostly of very low toxicity (Appendix Table 1). Most are either rapidly degraded in soil and/or are sorbed tightly to organic matter or soil colloids and move little from the site of application.

Turfgrasses are relatively permanent. Once an area is established, it is not cultivated with the associated erosion that occurs when sugarcane fields are cultivated for replanting. In fact, the presence of a large turfed area, such as the proposed golf course, would reduce the sediment load entering the drainage way and eventually Pearl Harbor.

While the recent adoption of drip irrigation in most sugarcane production (including that in the area of the proposed golf course) has resulted in more efficient water use, and therefore less recharge of groundwater, sprinkler irrigation of turfgrasses is even more efficient. By proper management of water, there should be minimal recharge because of the evapotranspiration deficit discussed previously.

VI. SUMMARY AND CONCLUSIONS

Mismanagement of chemicals and/or irrigation water applied to the turf on the golf course could conceivably result in their reaching groundwater by leaching or the shoreline by storm runoff. The groundwater aquifer in this area will likely be used as a source of potable water, thus it is especially critical that chemicals applied in the management of the golf course not reach groundwater. Analysis of the site and management factors suggests that, with appropriate golf course development and management practices, there will be no significant adverse environmental or ecological consequences resulting from the use of herbicides, pesticides and fertilizers on the proposed golf course.

The following items support our conclusion:

1. Among the fertilizer elements, only nitrogen in the form of nitrate could possibly diminish water quality, but with proper management of nitrogen fertilizer and water leaching will be minimal, since turfgrass roots are excellent scavengers of nitrate. Phosphorus sorption is high in these soils, so that movement of P from the site of application is not a problem.
2. Runoff amounts will be negligible on the permeable, relatively level Wahiawa and Lahaina soils, especially after establishment of a turfgrass cover. Since runoff from the golf course can be initiated only by sustained, high-intensity rainfall, storms causing runoff from the golf course would result in massive quantities of water in intermittent streams fed from off-site. Thus runoff from the golf course will be highly diluted, so that any negative impact of transported chemicals on local streams or on coastal waters is most unlikely.
3. Leaching of pesticide chemicals to groundwater is not expected to be a concern because of the organic carbon content (approximately 2%) of the surface soils and relatively deep profiles. Natural recharge is negligible in this area of relatively low rainfall and high evapotranspiration, and the pesticides used are highly sorbed and/or rapidly degraded under moist soil conditions.
4. The chemicals applied in golf course management pose little hazard for birds or wildlife. Fertilizers are relatively non-toxic unless ingested in large amounts. With the exception of chlorpyrifos, the pesticides are of low toxicity to birds.
5. There will be no significant adverse effects on air quality from application of herbicides or pesticides in golf course management provided that appropriate application techniques are used. The spray equipment used in golf course maintenance is ground-operated. Nozzle heights are typically less than 2 feet. Low spray pressures and coarse nozzle openings result in relatively large droplet sizes which are not highly subject to drift.

VI. RECOMMENDATIONS

- Irrigation management is critical to the conclusions reached above. For this reason we recommend that a U. S. Weather Bureau class A evaporation pan be used to measure evaporation and schedule irrigation application in the management of the proposed golf course. Excellent discussion of irrigation scheduling can be found in the book Golf Course and Grounds Irrigation and Drainage (Jarret, 1985).
- Where grading is necessary, topsoil should be stockpiled and replaced over the areas to which chemicals will be applied; the high organic matter surface soils will retard pesticide movement.
- Judicious use of fertilizers and pesticides, especially in the early establishment of turf, is essential, since pesticides and nitrogen will be more likely to move before an extensive root system and thatch layer are developed.
- As our conclusions are based on the assumption that sound management practices will be followed with regard to fertilizer and pesticide application and irrigation, we recommend that a qualified Golf Course Superintendent be given the responsibility of managing the golf course.

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APPENDIX

Appendix Table 1. Properties of pesticides used on turf in Hawaii.

Pesticide common name	Trade name (s)	Oral LD-50 (mg/kg body wt.)*	Toxicity to fish and wildlife*	Soil sorption Index (Koc)**	Water solubility (mg/l)**	Half-life in soil (days)**	Surface loss potential**	Leaching potential**
Herbicides:								
MSMA	Weedhoe etc.	1800	Low	10000	1000000	100	Large	Small
glyphosate	Roundup, Kleenup	150	Mod. to birds, none to fish	10000	1000000	30	Large	Small
metribuzin	Sencor	2200	Moderate	41	1220	30	Medium	Large
2,4-D	part of mixtures	370-700	High to fish	109	300000	10	Medium	Medium
meoprop	ditto	700-1500	Low	3	660000	21	Small	Large
dicamba	ditto	1000-2000	Non toxic to fish	800000	800000	14	Small	Large
oryzalin	Surflan	10000	Mod. to birds, toxic to fish	2700	2.5	60	Large	Small
oxadiazon	Ronstar	8000	Toxic to fish		0.7			
propyzamide	Kerb	5620-8350	Low	990	15	30	Large	Small
simazine	Princep	>5000	Low	138	3.5	75	Medium	Large
chlorthal-dimethyl	Dacihal	>3000	Low	5000	0.5	30	Large	Small
bensulfide	Belasan, Belamec	770	Mod. to fish	10000	25	60	Large	Small
paraquat dichloride	Ortho Paraquat CL	150	Mod. to birds, none to fish	100000	1000000	3600	Large	Small
benfluralin	Balan	10000	Low to birds, high to fish	11000	0.1	30	Large	Small
Insecticides								
chlorpyrifos	Dursban	135-163	High	6070	2	30	Large	Small
benfocarb	Ficam	40-156	High					
carbaryl	Sevin	400-850	Moderate	229	40	7	Medium	Small
trichlorfon	Dylox	450-630	Moderate	2	154000	27	Small	Large
Fungicides								
azoxystrobin	Dyreno	<5000	Low	3000	10	1	Small	Small
benomyl	Benlate	9590	Low	2100	2	100	Large	Small
chlorothalonil	Daconil 2787	>10000	Low to birds, mod. to fish	1380	0.6	20	Large	Small
iprodione	Chipco 26019 RP	3500	Low	500	13	20	Medium	Small
mancozeb	Dithane M-45	>8000	Low	1000	0.5	35	Large	Small
quinlozone	PCNB, Terrachlor	12000	Non-toxic	1000	0.44	21	Large	Small
thiram	Tersan	7500	Low	383	30	20	Medium	Medium
triadimefon	Bayleton	568	Low	273	260	21	Medium	Medium
metiylaxyl	Subdue	669	Non-toxic	16	7100	7	Small	Medium
thiophanate-methyl	Cleary 3336	7500	Low	1000	3.5	0	Small	Small

*Data from Hatrley, Douglas and Hamish Kid (Eds.). 1983. The Agrochemicals Handbook. Unwin Bro., Ltd. Old Working, Surry, England

**Data from R. D. Wauchope. 1985. USDA-ARS Interim Pesticide Properties Database, Version 1.0.

*Royal Kunia, Phase II
Environmental Impact Statement*

APPENDIX G
IMPACT ON AGRICULTURE
DECISION ANALYSTS HAWAII, INC.

PROPOSED ROYAL KUNIA, PHASE II
Impact on Agriculture

PROPOSED ROYAL KUNIA, PHASE II
Impact on Agriculture

PREPARED FOR:

Halekua Development Corporation

PREPARED BY:

Decision Analysts Hawaii, Inc.

December 1988

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EXECUTIVE SUMMARY

The development of Royal Kunia, Phase II would result in the urbanization of approximately 670 acres of sugarcane lands which are currently under cultivation by Oahu Sugar Company, Ltd. (OSCo).

Impact on OSCo

Assuming that U.S. sugar prices will continue to be high enough to justify continued sugar operations in Hawaii, an important question is whether Royal Kunia, Phase II—combined with other planned and proposed projects—would eventually cause the closing of OSCo, either by reducing sugarcane acreage sufficiently to reduce economies of scale, and/or by contributing to a scattered and therefore inefficient plantation rather than a more compact and efficient one.

Assuming further that all proposed projects will be approved, and that it would take about 20 years to realize the full development of all projects, OSCo would retain about 11,490 acres under cultivation in the mid-1990s when its major leases expire. This is sufficient land to maintain the historic level of production of 90,000 to 95,000 tons of raw sugar per year, provided that the average yield increases from 14.06 tons of raw sugar per acre in 1987, to a very optimistic 17.9 tons per acre by the end of 1995.

However, if an average yield of 17.9 tons per acre is not achieved (which is likely), or if the resulting form of the plantation proves to be inefficient for OSCo to run a two-mill operation, or if urbanization proceeds much more rapidly than projected, then an efficient sugar operation could be achieved by switching to a one-mill operation. For this case, land requirements would be about 10,350 acres, assuming a more realistic yield of 14.5 tons per acre and production of about 67,500 tons per year. This would provide a buffer of 1,140 acres from which to assemble an efficient plantation; this figure is based on 11,490 acres remaining after projected urbanization (assuming approval of all planned and proposed projects), minus the estimated 10,350 acres required for a one-mill operation. If yields reach higher levels, then the buffer increases accordingly. It is uncertain whether or not attrition would be sufficient to accommodate the reduction in employment associated with a switch to a one-mill operation.

EXECUTIVE SUMMARY

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In summary, Royal Kunia, Phase II, in combination with other approved and proposed projects, is not expected to threaten the economic viability of OSCo before the major leases expire in the mid-1990s; economies of scale and a compact efficient plantation would be possible by (1) switching to a single-mill operation; or (2) retaining a two-mill operation, provided that urbanization proceeds gradually and yields can be increased rapidly to compensate for the loss of acreage.

In the longer term, the future of OSCo is uncertain given the outlook for flat or declining sugar prices, and costs which generally increase with inflation. Furthermore, economic incentives may not favor renewal of the major leases. But assuming continued operations, then at full development of all the planned and proposed projects (assuming approval of all projects), the amount of land under cultivation by OSCo would decline by 5,400 acres, from 13,440 acres to about 8,100 acres. This loss of acreage would likely require a switch to a one-mill operation in order to maintain economic viability. Furthermore, average yields would have to reach an optimistic 18.5 tons per acre or more. Given currently available information, it is uncertain whether the form of the plantation would allow viable operations.

Impact on the Growth of Diversified Agriculture

The development of Royal Kunia, Phase II on sugarcane acreage would eliminate the possibility of using these lands for diversified agriculture. However, it is extremely doubtful that the project would adversely affect the growth of diversified agriculture in Hawaii. There are four reasons for this assessment: (1) an extensive amount of prime-agricultural land and water has been freed from sugar and pineapple production because of past mill closings and reductions in operations, most of which remains available for diversified agriculture activities; (2) a very real possibility exists that additional land and water will be freed from sugar production given the outlook for low sugar prices; (3) some—if not most—of the sugar operations will make their lands available for profitable replacement crops to the extent that such crops are available; and (4) compared to the available supply, a very small amount of land and water is required to grow proven and promising crops to achieve a realistic level of food and animal-feed self-sufficiency, and to increase exports.

The increasing availability of prime agricultural land in Hawaii is part of very long-term and accelerating trends occurring throughout most developed and developing market economies. Productivity and yields have been increasing faster than population growth. This situation requires that labor, land, and other resources be withdrawn from agriculture in order to restore balanced markets and to increase farm income for those who remain.

Consistency with State and County Plans

Since Royal Kunia, Phase II is not expected to adversely affect the economic viability of OSCo before the major leases expire in the mid-1990s, and would not limit the growth of diversified agriculture, the project is consistent with the major thrust of the agricultural portion of the Hawaii State Plan, the State Agriculture Functional Plan, and the General Plan of the City and County of Honolulu. This thrust in all three plans calls for preserving the economic viability of plantation agriculture and promoting the growth of diversified agriculture. Also, the project would provide public benefits of reasonably priced housing, recreation, and employment.

In the longer term, the future of OSCo is uncertain because of a price/cost squeeze, the uncertainty over the renewal of all major leases, and potential impacts of urban pressures on the plantation.

PROPOSED ROYAL KUNIA, PHASE II: IMPACT ON AGRICULTURE

The proposed Royal Kunia, Phase II would result in the urbanization of approximately 670 acres of sugarcane land which is currently under cultivation by Oahu Sugar Company, Ltd. (OSCo). The impact of this conversion on OSCo operations, and on the potential growth of diversified agriculture is summarized in this report.

SOIL QUALITY OF AFFECTED SUGARCANE ACREAGE

The affected acreage consists primarily of seven soil types:

LaA	Lahaina silty clay, 0 to 3 percent slope.
LaB	Lahaina silty clay, 3 to 7 percent slope.
MuD	Molokai silty clay loam, 15 to 25 percent slope.
MuB	Molokai silty clay loam, 3 to 7 percent slope.
LaC3	Lahaina silty clay, 7 to 15 percent slope, severely eroded.
WaB	Wahiawa silty clay, 3 to 8 percent slope.
WaA	Wahiawa silty clay, 0 to 3 percent slope.
LaC	Lahaina silty clay, 7 to 15 percent slope.
MuA	Molokai silty clay loam, 0 to 3 percent slope.

For each soil type, Table 1 shows the approximate acreage, possible agricultural uses, and two soil ratings (explained below). The predominate soil types—LaA and LaB—comprise about 83 percent of the project area. Suitable agricultural activities associated with the affected soil types include sugarcane and pineapple for all nine soil types except MuA and, for some of the soil types, pasture and truck crops.

The soils within the petition area have been rated in terms of four classification systems commonly used in Hawaii: (1) Land Capability Grouping, (2) Agricultural Lands of Importance to the State of Hawaii, (3) Overall Productivity Rating, and (4) Proposed Land Evaluation and Site Assessment. These classification systems are discussed below:

- (1) Land Capability Grouping by the United States Department of Agriculture Soil Conservation Service (SCS).

This classification system rates soils according to eight levels, ranging from the highest classification level, I, to the lowest level, VIII. Assuming irrigation, these ratings are shown in Table 1. Soil types LaA, WaA, and MuA have a land capability rating of I, which indicates that the soils have few limitations that restrict their use. These soils cover about 51 percent of the proposed project. Soils LaB, MuB and WaB, which cover 39 percent of the project, have a land capability rating of IIe, which indicates that the soils have moderate limitations that reduce the choice of plants that can be grown successfully, or moderate conservation practices are required. Subclassification "e" indicates that the limitation is due to the risk of erosion, and therefore soils require protection when cultivated. Soil type LaC covers 1 percent of the project, and has a capability rating of IIIe, which indicates that the soil has severe limitations that reduce the choice of plants, require special conservation practic-

Table 1.— PROPOSED ROYAL KUNIA, PHASE II:
SOIL TYPES, AGRICULTURAL USES, AND LESA AND SCS RATINGS

Soil Type	Acreage	Agricultural Uses	SCS Rating ¹	LESA Rating
LaA	331.4	Sugar, Pineapple	I	92
LaB	226.6	Sugar, Pineapple, Truck Crops,	IIe	90
MuD	43.6	Sugar, Pineapple	IVe	59
MuB	25.9	Sugar, Pineapple, Pasture	IIe	88
LaC3	17.5	Sugar, Pineapple	IVe	66
WaB	11.3	Sugar, Pineapple, Pasture	IIe	94
WaA	7.0	Sugar, Pineapple, Pasture	I	96
LaC	6.3	Sugar, Pineapple, Truck Crops, Pasture	IIIe	82
MuA	0.4	Sugar	I	90

1. Assuming irrigation.

Source: United States Department of Agriculture, Soil Conservation Service, *Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii*, August 1972.

es, or both. Again, the problem is due to the risk of erosion. Soil types MuC and LaC3 cover 9 percent of the project area and have a soil classification of IVe which indicates that the soils have very severe limitations that reduce the choice of plants, require very careful management, or both. Again, risk of erosion is the problem.

- (2) Agricultural Lands of Importance in the State of Hawaii (ALISH), by the SCS, University of Hawaii (UH) College of Tropical Agriculture and Human Resources, and the State of Hawaii Department of Agriculture.

This system classifies lands into three categories: (a) prime agricultural land which is land that is best suited for the production of crops because of its ability to sustain high yields with relatively little input and with the least damage to the environment; (b) unique agricultural land which is non-prime agricultural land that is currently used for the production of specific high-value crops; and (c) other agricultural land which is non-prime and non-unique agricultural land that is of importance to the production of crops. Except for approximately 6.5 percent of the proposed development area, the soils are rated as "prime" agricultural lands.

- (3) Overall Productivity Rating, by the UH Land Study Bureau (LSB).

This classification rates soils according to five levels, with "A" representing the class of highest productivity and "E" the lowest. About 93 percent of the petition lands have soils rated "A," with the remainder rated "B."

- (4) Proposed Land Evaluation and Site Assessment (LESA) System, by the State of Hawaii Land Evaluation and Site Assessment Commission

Based on soil quality, locational attributes, improvements, nearby activities, and land-use plans, this proposed classification system would designate a sufficient amount of the better agricultural lands in order to meet projected agricultural goals. If the LESA classification approach were applied, the designated lands would be termed "important agricultural lands" (IAL), and would include all lands having a rating of 66 or over, out of a possible total of 100. Based on the proposed maps, about 93 percent of the petition area would be designated as IAL. The ratings for each soil type are shown in Table 1. However, the identification would be subject to change based on a change in nearby activities and a change in County land-use plans. Also, the designation could be changed if an overriding public benefit is demonstrated.

IMPACT ON OSCo¹

Background Information

Production

Amfac's Oahu Sugar Company, Inc. (OSCo) first milled sugar in 1899, and is now the fourth largest sugar operation in the State. In 1987, it produced 94,414 tons of raw sugar (nearly 10 percent of the State's total sugar production) and 18,917 tons of molasses. In addition, it sold 17.0 million kWh of electric power to Hawaiian Electric Co.

Land Area

In late 1988, OSCo cultivated 13,487 acres of sugarcane lands which covered portions of Central Oahu on each side of Kunia Road above Pearl Harbor, and portions of the Ewa Plain to the west of Pearl Harbor. The Ewa lands were taken over from Ewa Plantation in 1970. Another 4,910 acres of OSCo lands were in production in 1982, the bulk of which now lie fallow, while a few hundred acres have been urbanized. These lands are primarily mauka lands which incurred high pumping costs; and lands close to the ocean where soils tend to be inferior, yields low, and hauling costs high because of the distance to the mill.

Land Ownership

As mentioned above, nearly all of the land which OSCo cultivates is leased. Until recently, the principal landowners were the Campbell and Robinson Estates, whose leases to OSCo expire in 1995 and 1996, respectively; and the U.S. Navy whose lease to OSCo expires in 1995. The Campbell lands include most of the Ewa Plain and Central Oahu lands above H-1 Freeway and west of Kunia Road. The Robinson Estate lands are in Central Oahu above H-1 Freeway and between Kunia Road and Waikele Stream. Navy lands include Waipio Peninsula, and a portion of the eastern portion of the Ewa Plain.

To a major extent, control of OSCo lands recently has passed or is in the process of being passed from the two major estates to developers. The lands affected include: (1) practically all of the Campbell Estate lands in Ewa, except for lands which Campbell Estate plans for commercial development and expansion of Campbell Industrial Park, and a few fields near Ewa Beach; and (2) over half of the Robinson Estate lands. The only land still under the control of a major estate and leased to OSCo include: (1) some of the Campbell Estate lands in Ewa which it has retained for its own development plus a few fields near Ewa Beach; (2) Campbell Estate lands in Central Oahu; and (3) some of the northern fields on Robinson Estate lands.

1. Unless otherwise noted, the material in this section is from OSCo.

The new landowners include about a half-dozen private companies, plus the State of Hawaii and the City & County of Honolulu. The major new owner of OSCo leased lands, and the one which will play a dominate role in determining the fate of OSCo, is now the State of Hawaii, which is in the process of negotiating the purchase from Campbell Estate of an additional 3,100 acres of land in the central portion of the Ewa Plain, with the intention of "banking" it for eventual housing developments.

Water

OSCo is one of the major water users on Oahu, pumping up to 112 million gallons per day (MGD) of groundwater in 1987, and diverting in normal-rainfall years 25 to 30 MGD from the Windward side via Waiahole Ditch. Per-acre usage by OSCo can exceed 9,000 gallons per day. In comparison, domestic water provided by the Honolulu Board of Water Supply for Oahu averages only 141 MGD, and per-acre usage for single-family homes (at 5 units per acre) averages about 2,130 gallons per day.

Employment

Field, mill, and management employment at OSCo in late 1988 was 460 workers. Indirect employment dependent upon OSCo is estimated to be 520 jobs.²

Yields

Because of favorable growing conditions, good farming practices, and drip irrigation, sugar yields at OSCo are very high: 14.06 tons per acre in 1987, versus a Statewide average of 12.32 tons per acre.³ In fact, OSCo holds the world record sugar yield at 21.63 tons per acre set in April 1985.⁴ The 1987 average yield was about 24 percent higher than the 1979 yield of 11.3 tons per acre.

Profitability

Even with high yields and very efficient operations, OSCo is only marginally profitable—the principal problem being low sugar prices and high lease rents. The marginal profitability is measured before accounting for any new capital investment that may be needed to replace equipment.

2. Multiplier of 1.13, based on the State Economic Model.

3. HSPA, *Hawaiian Sugar Manual*, 1988.

4. HSPA, "Hawaii Sugar News," June 26, 1985.

OSCo Plans

In 1982, Amfac developed a Master Agricultural Plan which included a "Survival Plan" for OSCo. This plan, which has been fully implemented, was developed in reaction to OSCo's operating loss in 1981 of nearly \$10 million, and an outlook for low sugar prices. In recognition of the fact that sugar plantations are already in place with substantial improvements, but suitable replacement crops have yet to be identified, the plan amounted to a holding action to gain time to either restore the profitability of the plantation, or find as many replacement crops as possible before OSCo could be forced by outside economic factors to cease operations. Key components of the plan were:

- continue to improve the economic efficiency of OSCo by increasing sugar yields and reducing production costs (both of which have been improved substantially in the past few years);
- urbanize Waikele (the only OSCo land owned by Amfac) in order to derive revenues to help support and justify continued sugar operations; and
- experiment with a variety of crops (papaya, sweet corn, potatoes, forage and feed crops, coffee, etc.) in order to find profitable replacement crops for sugar.

An important component of OSCo's cost-reduction efforts is its continued decline in the labor force; over the past 3 years, employment decreased by about 140 jobs, or about 23 percent. The employment decrease is accomplished by attrition—that is, employees who retire or leave OSCo for other voluntary reasons generally are not replaced.

Of interest, nearly all sugarcane operators throughout the world are pursuing a similar strategy of trying to improve efficiency by increasing yields and reducing production costs; and are searching for alternative crops.⁵

OSCo has also been considering the option of contracting operations by running a single mill rather than two mills in parallel as is currently the case. With a single mill, OSCo could reduce production from its historic level of from 90,000 to 95,000 tons per year to from 60,000 to 75,000 tons without losing its economies of scale; a corresponding decrease would occur in the OSCo's acreage requirements. The conversion would involve new investment in the plantation, resulting in an average cost of production which would be about the same or slightly higher than for a two-mill operation. Of significance, Amfac's Kekaha Sugar Company, Inc., which experiences climatic conditions similar to those of OSCo lands and a similar yield potential, historically has been one of the most efficient sugar operations in the State. Yet this plantation had only about 8,375 acres under cultivation in 1987, and produced only about 56,620 tons of sugar.

5. Ibid.

Outlook For OSCo

The continued survival of OSCo will depend on a number of factors. One of the most important of which will be continued Federal price supports for sugar that are sufficiently high to justify continued operations, and continued—if not greater—success in reducing production costs to a level that will allow profitability. OSCo's success in increasing its yields and/or downsizing the plantation to compensate for lands lost to urbanization will also be important. The agricultural quality of the lands which remain, and the form of the plantation will also be a concern. In general, the preferred contraction in the plantation is from the periphery inward because this would result in a compact plantation and high-quality lands: a more compact plantation reduces trucking and other costs, while higher-quality lands contribute to higher yields. After the major leases expire in the mid-1990s, continued sugar operations also will depend on OSCo's success in negotiating favorable lease terms. These issues are discussed below for two time periods: 1995 when the major leases become due, and the longer-term of about two decades.

Outlook to 1995

Short-Term Outlook for Sugar Prices

The survival of OSCo will depend greatly on the price of sugar. In the world market, the average price of sugar is expected to remain well below the production costs for all countries, because most sugar is traded in controlled and/or subsidized markets, where surplus sugar is dumped onto the world market for sale at a loss. Dramatic price increases have occurred, however, following a 6- to 9-year cycle, with prices increasing when world production falls short of consumption. However, a number of fundamental developments have taken place in sugar and in related industries in the past two decades which appear to have altered the pattern of sugar prices, thereby reducing peak prices and extending the periods of low prices. These changes include: the decline or stagnation of sugar consumption in some developed countries; market inroads made by the liquid sweetener high-fructose corn syrup (HFCS); the availability of substantial sugar reserves in the form of sugarcane now devoted to ethanol production; major gains in sugarbeet production in several European countries which were traditionally cane sugar importers; and the appearance of the European Economic Community (ECC) as a major exporter of refined sugar.⁶

In the United States, Federal legislation protects sugar from the low world prices by imposing import quotas, tariffs, and import fees. However, U.S. sugar prices are managed so that they remain fairly low in order to prevent an acceleration in the growth of competing sweeteners, and to maintain public support for the program. Under the U.S. Food Security Act,

6. James B. Brown, *The International Sugar Industry, Developments and Prospects*.

which runs to late 1990, the target price for sugar is 18 cents per pound, with no adjustments for inflation.

The competing sweetener of major concern has been HFCS. It is as sweet, or sweeter, than regular sugar, costs less to produce, sells for less, is more profitable, is very similar to liquid sugar, can be substituted readily in many applications, and is easier and cheaper to handle. It has experienced a rapid growth in sales at the expense of regular sugar sales. However, HFCS has captured nearly all of the liquid-sweetener market so that its continued growth will depend on the market acceptance of Crystar, the crystalline version of HFCS. In addition, the new low-calorie sweetener aspartame, sold under the brand name "Equal," is capturing market share and putting additional downward pressure on U.S. sugar prices.

Regarding the short-term outlook for sugar legislation, it should be noted that, because of the advent of HFCS, many corn states (HFCS is produced from corn) have joined the sugar and sweetener coalition, making it larger and stronger than in the past. The considered expectation among sugar experts and lobbyists is that sugar will continue to be included in the U.S. Food Security Act, but that the price-support level may decrease slightly. Even though this is expected, there is a risk that efforts by sugar users and consumer groups to exclude sugar from the U.S. Food Security Act, or to significantly reduce the support price, will be successful.

In order to survive decrease sugar prices and return to profitability, OSCo will have to decreasing its production costs accordingly.

Urbanization Pressures on OSCo

The gradual growth westward of urban Honolulu has consumed a large amount of former sugarcane land, as evidenced by the fact that the eastern boundary of OSCo lands has moved westward by 9 miles from Moanalua Valley to the area beyond Waikele Stream. Since the 1960s, four ridges west of Halawa have been urbanized. Even with this level of urbanization, sufficient acreage was cultivated by OSCo to maintain economies of scale because of new plantings in the foothills of the Waianae mountains and on former pasture lands. The westward urbanization pressures of Honolulu continue, but plantings of new lands to compensate for lost fields are no longer feasible.

The economic forces which create urbanization pressures on OSCo are very strong:

- Financial returns from urban land uses far exceed those from agricultural uses.
- OSCo is near the new or growing employment centers of Ko Olina Resort, Barbers Point Harbor, Campbell Industrial Park, Kapolei Town Center and downtown Honolulu.

- Because of OSCo's proximity to the H-1 Freeway, its lands are within a reasonable travel distance of these new and growing employment centers.
- Water would become available for other uses if it were freed from sugar production.
- OSCo land is near the Honouliuli waste-treatment facility.
- Construction costs would be low in comparison to areas that require extensive grading or removal of existing structures.

In contrast, redevelopment of downtown Honolulu suffers from the high expense and displacement problems required to remove existing structures, the cost and inconvenience of redeveloping inadequate infrastructure, less desirable high-rise housing compared to single-family homes, and occasional strong community opposition. Hawaii Kai suffers from a lack of employment growth centers, relatively little land available for further single-family housing, severe transportation problems, and community opposition to further development. Similarly, the Windward side suffers from a lack of growing employment centers, transportation problems, and community opposition to further development.

In view of these factors, the City & County of Honolulu has designated the Ewa area as a "Secondary Urban Center" which will be developed to accommodate a major portion of Honolulu's future growth. Developments approved and proposed for the Ewa/Central-Oahu area which would affect OSCo acreage are given in Table 2.

In this listing of major developments, the 241 acres shown as "Other" represent acreage to the west of Kapolei; OSCo expects to fallow this acreage due to the expense of farming this relatively small and isolated area. It is likely that this land would be laid fallow as soon as Kapolei Village is developed down to Waimanalo Road, which would occur in the latter stages of its development. Regarding the Kunia Golf Course, the landowner lacks land withdrawal rights before the lease expires in 1996.

Acreage Reduction to 1995

Assuming approval of Royal Kunia, Phase II, along with all of the other planned and proposed developments listed in Table 2, and a 20-year average development period for the housing, commercial, and resort projects, then the loss of sugarcane acreage by the end of 1995 when the major lease with Campbell Estate expires would be less than 2,000 acres. Remaining acreage under cultivation by OSCo would fall from 13,487 acres to about 11,490 acres, assuming no replanting of fallowed land.

Assuming further that U.S. sugar prices will continue to be high enough to justify continued sugar operations in Hawaii, an important question is whether the reduction of the plantation to 11,490 acres would cause the closing of OSCo by reducing sugarcane acreage sufficiently to reduce economies of scale, and/or by contributing to a scattered and therefore inefficient plantation rather than a more compact and efficient one.

Acreage Requirement

As indicated in Table 3, OSCo's land requirement will depend on its success in increasing yields, and on whether or not the plantation is downsized to a one-mill operation. Average sugar yields fluctuate from year to year but, over the long term, yields have increased gradually. For example, yields increased from 11.3 tons per acre in 1979, to 14.06 tons in 1987, or an increase of 24.4 percent over 8 years. The increase resulted from the conversion to drip irrigation, fallowing low-yield fields, the introduction of improved varieties of the sugarcane plant, and other improvements. Under ideal conditions, OSCo achieved the world-record yield of 21.63 tons per acre from one of its Kunia fields. For the future, increasing yields are expected to occur as a result of contracting operations to higher-quality fields, introducing improved varieties of cane, improving farming practices, adding chemical ripeners, introducing more efficient harvesters, etc.

**Table 2. PLANNED AND PROPOSED DEVELOPMENTS
AFFECTING OAHU SUGAR COMPANY ACREAGE: 1988**

Project	Sugarcane Acreage
Royal Kunia, Phases I and II (547.5 acres partially approved by the State)	1,386
Ewa Gentry (partially approved)	891
Kapolei Village, State of Hawaii (approved)	775
Kapolei Town Center, Campbell Estate (partially approved)	693
Ewa Marina (approved)	410
Ko Olina Resort (approved)	281
Golf Course (J. Myers)	270
West Loch Estates, City and County of Honolulu (approved)	195
Kunia Golf Course	190
Kapolei Knolls	55
Other	241
Total	5,387

Source: Applications and discussions with Oahu Sugar Co., Ltd.

Returning to the 11,490 acres of sugarcane lands that is projected to remain after urbanization to 1995 (which assumes that all planned and proposed projects are approved), this is sufficient land to maintain a two-mill operation, provided that the average yield reaches an optimistic 17.9 tons per year (see Table 3). In terms of the form of the plantation, the development sequence for Royal Kunia, Phase II would be from the south to the north, which is the preferred sequence.

If an average yield of 17.9 tons per acre is not achieved by 1995 (which is likely), or if the resulting form of the plantation proves to be inefficient for OSCo to run a two-mill operation, or if urbanization proceeds much more rapidly than projected, then an efficient sugar operation could be achieved by switching to a one-mill operation. This would reduce land re-

Table 3. OSCo ACREAGE REQUIREMENTS FOR ONE AND TWO MILLS, BY YIELD LEVEL¹

Yield (tons of raw sugar per harvested acre)	One Mill ² (67,500 tons of raw sugar per year)	Two Mills ³ (92,500 tons of raw sugar per year)
11.3 ³ (1979 average yield)	13,274 acres	18,191 acres
14.06 (1987 average yield)	10,669	14,620
14.5	10,345	14,176
15.0	10,000	13,704
15.5	9,677	13,262
16.0	9,375	12,847
16.5	9,091	12,458
17.0	8,824	12,092
17.5	8,571	11,746
18.0	8,333	11,420
18.5	8,108	11,111
19.0	7,895	10,819
21.63 (record yield)	6,935	9,503

1. It is assumed that 10 percent of the acreage is set aside for seed cane, and that one-half of the remaining acreage is harvested annually.
2. The estimated output from a one-mill operation would be from 60,000 to 75,000 tons of raw sugar per year.
3. Historic production from the two-mill operation is from 90,000 to 95,000 tons of raw sugar per year.

quirements by about 25 percent or more. For a one-mill operation, about 10,000 to 10,350 acres would be required, assuming a more realistic yield of 14.5 to 15 tons per acre for the remaining acreage (see Table 3). A yield of 14.55 tons per acre would provide a buffer of 1,140 acres from which to assemble an efficient plantation; the figure of 1,140 acres is based on 11,490 acres remaining after projected urbanization (assuming approval of all planned and proposed projects), minus the estimated 10,350 acres needed for a one-mill operation assuming yields of 15 tons per acre. If yields are higher, the buffer increases accordingly.

Summary Outlook to 1995

In summary, by the mid-1990s, when the major leases expire, Royal Kunia, Phase II, in combination with the various other planned and proposed projects, is not expected to threaten the economic viability of OSCo. However, if urbanization of the approved and proposed projects proceeds rapidly, or if the sequence of urbanization results in a scattered plantation that is inefficient for running a two-mill operation, then a switch from a two- to a one-mill operation may be required in order to retain economic viability.

Long-Term Outlook

After the major leases expire in 1995 and 1996, the future of OSCo becomes increasingly uncertain, as discussed below.

Long-Term Outlook for Sugar Prices

Regarding sugar prices, the major long-term concern is the introduction of a number of new sweeteners for which the target market is that portion of the sweetener market still held by regular sugar. Included are such sweeteners as Crystar (crystalline HFCS), high-temperature aspartame, super aspartame, sunette, sucralose, alitame, talin, and stevioside. Some of the sweeteners have recently won approval for human consumption in the United States, and others are in the process of obtaining approvals. If at least one of these new sweeteners achieves significant market success, then the downward pressure on sugar prices will increase.

Lease Renewals

The continued survival of OSCo also will depend upon renewal of its major leases which are scheduled to expire in 1995 and 1996, including leases with Campbell Estate, Robinson Estate, the State of Hawaii, the U.S. Navy, and major developers. Renewal of the major leases with terms acceptable to OSCo is uncertain, particularly since a significant reduction in rents probably will be required in order to allow OSCo to achieve profitable operations. This may allow one or both of the pineapple companies on Oahu to outbid OSCo for a major portion of the Kunia lands now farmed by OSCo. Also, Navy regulations require that their lands be

leased according to competitive bids, which raises the possibility that some of the Navy land may be converted to diversified agriculture. Finally, major developers may be unwilling to commit their lands to continued sugar operations.

The uncertainty regarding renewals of its leases is affecting OSCo's long-term investments in the operation.

Long-Term Urbanization

Assuming U.S. sugar prices that are sufficiently high to justify continued sugar operations, and renewal of all of the major leases, then the loss of sugarcane acreage to urbanization becomes an issue. Assuming further that all planned and proposed projects are approved and fully developed within two decades, then the amount of land under cultivation by OSCo would decline by 5,400 acres, from 13,487 acres to about 8,100 acres. This loss of acreage would likely require a switch to a one-mill operation in order to maintain economic viability. Furthermore, yields would have to reach an optimistic 18.5 tons per acre. Given currently available information, it is uncertain whether the form of the plantation would allow viable operations.

Summary Long-Term Outlook

In summary, the long-term future of OSCo becomes increasingly uncertain because of the potential for declining sugar prices, the possibility that major leases will not be renewed, and potential impacts of urban pressures on the plantation.

Economic Impact of Reducing OSCo Operations

Assuming that a two-mill operation remains economically viable, OSCo would lose little revenues so long as yields increase sufficiently for production to remain near its historic level. Also, the reduction in employment associated with the projected reduction in acreage is not expected to require any layoffs of sugar workers since OSCo makes a practice of reducing employment through attrition.

For a one-mill operation, production would decline by about 25,000 tons of raw sugar per year, or 27 percent of current production. Based on 1987 prices (\$332.47 per ton for sugar, and \$39.56 per ton for molasses, with one-fifth of a ton of molasses produced for each ton of sugar), lost revenues would amount to about \$8.5 million per year. But because less sugar would be grown and milled, production costs would also decline. It is uncertain whether or not attrition would be sufficient to accommodate a reduction in employment associated with a switch to a one-mill operation.

IMPACT ON GROWTH OF DIVERSIFIED AGRICULTURE

The development of Royal Kunia, Phase II is a commitment of prime agricultural land to residential, light industrial, and recreational use. For the purposes of this discussion, prime agricultural land is loosely defined to mean any high-quality agricultural land capable of providing high yields for a variety of crops, and would include over 90 percent of the lands currently cultivated in the petition area. This commitment raises the question of whether Royal Kunia, Phase II would affect adversely the development of diversified agriculture—either immediately or over the long term. Before addressing this question, crops that are agronomically suited for the area are listed, and the demand for and the supply of prime agricultural land for diversified agriculture are clarified below.

Potential Diversified-Agriculture Crops

Given the relatively sunny conditions, good soils, and other agronomical conditions in Kunia, crops and agricultural activities suited for Kunia include: avocados, Chinese bananas, snap beans, bittermelon, sweet corn, cucumbers, daikon, long eggplant, round eggplant, semi-head lettuce, limes, dry onions, green onions, Chinese peas, sweet peppers, potatoes, sweet potatoes, pumpkins, radishes, Italian squash, oriental squash, tomatoes, watermelon, seed crops, forage crops, flowers, potted foliage, and livestock. Given the high land rents which prevail in the area, it is uncertain which of these crops would be profitable, assuming the Hawaii market exceeds that which is already supplied by producers elsewhere in the State.

Demand for Prime Agricultural Land

As part of its analysis to identify IAL (see Table 1), the LESA Commission adopted projections of the amount of agricultural land required to increase food and animal-feed self-sufficiency given projected resident-plus-visitor population growth, and increased crop exports. The projections for the State and Oahu are shown in Tables 4 and 5, respectively. As indicated, LESA projects that an estimated 52,684 additional acres will be required Statewide to accommodate the increase in production for the 1983-to-1995 period. The corresponding figure for Oahu is 7,979 acres. The crops and acreage requirements are categorized according to those which generally do not require prime agricultural land (although some crops may be grown profitably on prime agricultural land), those which generally do require prime agricultural land, plus a contingency of 10 percent of all acreage used for purposes other than beef and cattle production.

Table 4.— LESA AGRICULTURAL ACREAGE REQUIREMENTS,
STATE OF HAWAII: 1983 AND 1995

Crop or Activity	1983	1995	Increase
Crops and Activities which Generally Do Not Require Prime Agricultural Lands			
Beef/cattle ^{1,2}	765,450	365,090	--
Livestock:			
Dairy	1,000	1,182	182
Eggs/Poultry	281	515	234
Swine	<u>600</u>	<u>1,050</u>	<u>450</u>
Subtotal for Livestock	1,881	2,747	866
Unique Crops:			
Aquaculture	500	4,500	4,000
Coffee	2,000	5,700	3,700
Flowers/Nursery	1,786	3,040	1,254
Papaya	2,120	11,850	9,730
Taro/Watercress	400	527	127
Subtotal for Unique Crops	6,806	25,617	18,811
Macadamia Nuts	15,800	27,000	11,200
Crops and Activities which Generally Do Require Prime Agricultural Lands			
Plantation:			
Sugarcane ^{2,3}	194,300	177,700	-16,600
Pineapple	<u>36,000</u>	<u>36,049</u>	<u>49</u>
Subtotal for Plantation	230,300	213,749	-16,551
Other:			
Guava	965	1,400	435
Seed Corn	730	1,060	330
Bananas	1,100	2,200	1,100
Feed/Forage ^{2,4}	8,705	12,495	3,790
Fruits	635	1,156	521
Vegetables/Melons ⁵	4,340	7,022	2,682
Subtotal for Other Crops	16,475	25,333	8,858
Contingency ⁶	<u>--</u>	<u>29,500</u>	<u>29,500</u>
TOTAL	1,036,712	689,036	--
TOTAL, Excluding Beef/Cattle	<u>271,262</u>	<u>323,946</u>	<u>52,684</u>

Table 4.— LESA AGRICULTURAL ACREAGE REQUIREMENTS,
STATE OF HAWAII: 1983 AND 1995
(continued)

1. Includes marginal grazing and pasture lands. The 1983 figure includes arid zones and other areas having low carrying capacity, while the 1995 figure does not.
2. Often includes land in a holding operation awaiting discovery of profitable uses.
3. The decline in acreage primarily reflects the loss of Puna Sugar Co.
4. Includes some pastureland and 8,000 acres of guinea grass on Molokai.
5. Overstated in that the acreage figures are for harvested acres, rather than for the amount of land required (i.e., the acreage requirements for a crop harvested twice a year should be halved).
6. Based on 10% of all acreage other than that for beef/cattle. This contingency amounts to double counting in that the LESA projections are already high. Also, the contingency figure allows for an additional 17,770 acres for expansion of sugarcane, even though the sugar industry is expected to decline, not expand.

Table 5.— LESA AGRICULTURAL ACREAGE REQUIREMENTS,
CITY AND COUNTY OF HONOLULU: 1983 AND 1995

Crop or Activity	1983	1995	Increase
Crops and Activities which Generally Do Not Require Prime Agricultural Lands			
Beef/cattle ^{1,2}	18,200	10,090	--
Livestock:			
Dairy	340	40	62
Eggs/Poultry	250	390	140
Swine	<u>144</u>	<u>200</u>	<u>56</u>
Subtotal for Livestock	734	992	258
Unique Crops:			
Aquaculture	300	2,400	2,100
Flowers/Nursery	495	850	355
Papaya	70	170	100
Taro/Watercress	<u>60</u>	<u>85</u>	<u>25</u>
Subtotal for Unique Crops	925	3,505	2,580
Crops and Activities which Generally Do Require Prime Agricultural Lands			
Plantation:			
Sugarcane ²	27,200	25,300	-1,900
Pineapple	<u>11,829</u>	<u>11,800</u>	<u>-29</u>
Subtotal for Plantation	39,029	37,100	-1,929
Other:			
Guava	--	242	242
Seed Corn	125	180	55
Bananas	540	836	296
Feed/Forage ^{2,3}	1,741	2,912	1,171
Fruits	90	200	110
Vegetables/Melons ⁴	<u>1,155</u>	<u>1,595</u>	<u>440</u>
Subtotal for Other Crops	3,651	5,965	2,314
Contingency ⁵	--	<u>4,756</u>	<u>4,756</u>
TOTAL	62,539	62,408	--
TOTAL, Excluding Beef/Cattle	44,339	52,318	7,979

Table 5.— LESA AGRICULTURAL ACREAGE REQUIREMENTS,
CITY AND COUNTY OF HONOLULU: 1983 AND 1995
(continued)

1. Includes marginal grazing and pasture lands. The 1983 figure includes arid zones and other areas having low carrying capacity, while the 1995 figure does not.
2. Often includes land in a holding operation awaiting discovery of profitable uses.
3. Includes some pasture.
4. Overstated in that the acreage figures are for harvested acres, rather than for the amount of land required (i.e., the acreage requirements for a crop harvested twice a year should be halved).
5. Based on 10% of all acreage other than that for beef/cattle. This contingency amounts to double counting in that the LESA projections are already high. Also, the contingency figure allows for an additional 17,770 acres for expansion of sugarcane, even though the sugar industry is expected to decline, not expand.

It should be noted that the LESA projections and the corresponding Illustrative Generalized IAL Maps contain, or appear to contain, a number of major flaws which have led to a gross overestimation of the amount of agricultural land required:

- Based on a thorough, in-depth, and widely reviewed analysis of the market potential for crops grown on Molokai,⁷ and analysis of previous projections distributed by the State of Hawaii Department of Agriculture, the LESA projection for diversified agriculture appears to be excessively high. Apparently, it is assumed that many unprofitable crops will become profitable, that Hawaii farmers will be able to undersell low-cost summer crops from California, and that each and every activity will experience rapid growth. Verification of the extent of these flaws is hampered by the fact that the assumptions and analysis which underlie the LESA projections have not been made available for public inspection.
- Some of the LESA acreage estimates are for harvested acreage, which leads to an overestimate of the land requirements for those crops which are harvested more than once a year (i.e., the acreage requirements for a crop harvested twice a year should be halved).
- The LESA contingency of 29,500 acres is excessive, particularly since LESA projects a requirement for less than 9,000 additional acres of prime agricultural lands. The contingency is large primarily because the LESA methodology implicitly allows for expansion of sugar operations—a grossly unrealistic possibility. Furthermore, the contingency amounts to double counting since the high projections already contain a built-in contingency.
- The LESA methodology assumes that prime agricultural lands that were freed from sugar and pineapple production and placed in pasture or some other low-profit operation will stay in these uses. This is very unrealistic in that these are holding operations for land until profitable crops can be identified.
- The LESA methodology incorrectly assumes that sugar is a healthy industry and, therefore, that sugar lands would be unavailable for more profitable replacement crops.
- The Illustrative Generalized IAL Maps incorrectly allocate prime agricultural lands to certain activities which do not need such lands (e.g., aquaculture should be allocated the agriculturally low-quality coastal lands at Kahuku).

The relevant figures from Tables 4 and 5 are not the total figures, but the increase in the amount of prime agricultural land required to accommodate diversified agriculture: the increase is 8,858 acres for the State, and 2,314 acres for Oahu. As discussed above, these

7. Plasch, Bruce S., Peter Garrod, et. al., *An Economic Development Strategy and Implementation Program for Molokai*.

figures are excessive; a more realistic estimate for the State is probably closer to 1,500 acres.⁸ Nevertheless, even using the excessive LESA estimate, the amount of additional prime agricultural land that would be required to accommodate diversified agriculture, and provide the hope (but not the realistic expectation) of profitable operations, is surprisingly small.

If diversified agriculture is to require a large amount of prime agricultural land, then additional crops will have to be grown for the export market rather than for the small Hawaii market. However, the extreme difficulty of developing large export markets should be noted. For over a century, numerous and extensive crop searches and experiments have been conducted by many people and organizations, and have led to surprisingly few major long-term successes in Hawaii, thereby indicating the extreme difficulty in identifying new export crops and developing them into new and profitable industries. Furthermore, the difficulty in developing export markets is increasing because of increasing competition from other sugarcane-growing areas. As noted previously, low sugar prices have led nearly all sugarcane operators throughout the world to search for profitable replacement crops, particularly crops which can increase the level of earnings from exports. Thus far, few successes have materialized.

Supply of Prime Agricultural Land

Regarding the supply of land, an enormous and growing supply of prime agricultural land is available for other uses. Since 1968, about 88,800 acres of Hawaii's prime agricultural land has been freed from sugar and pineapple production: about 61,500 acres of land freed from sugar production (about 15,200 acres on Oahu and 46,300 on the Neighbor Islands), and about 27,300 acres freed from pineapple production (about 6,600 acres on Oahu and 20,700 on the Neighbor Islands).⁹⁻¹¹ Some of the land freed from sugar and pineapple production has or will be converted to urban, diversified agriculture, and aquaculture uses. After making allowances for the various conversions, uncommitted acreage which remains available to diversified agriculture and aquaculture amounts to many tens of thousands of acres, with a large portion of this on Oahu. Much of this land is fallow, in pasture, or in some other low-value land-holding operation.

This supply of prime agricultural land probably will increase given the very real possibility of future sugar plantation closings. As discussed above, the outlook for sugar prices is unfavorable, and some unprofitable mills are in operation today only because they have lease

8. Ibid.

9. Hawaiian Sugar Planters' Association, *Hawaiian Sugar Manual 1988*.

10. Hawaii Agricultural Statistics Service, *Statistics of Hawaiian Agriculture 1987*.

11. Robert C. Schmitt, *Historical Statistics of Hawaii*.

and/or energy contracts which make closing too expensive. However, these contracts eventually will end.

Furthermore, a portion of the sugarcane land is in a holding pattern awaiting the discovery of profitable replacement activities; this land forms part of the supply of prime agricultural land available to profitable diversified agriculture crops.

Many of the lands freed, to be freed, or which can be freed from sugar and pineapple production have excellent agricultural qualities and climatic conditions, and are well-suited for a variety of crops. Also, water is available for most of these lands, especially lands freed from sugar production.

Additional lands which have been made available for diversified agriculture are in government-sponsored agricultural parks throughout the State. Lands for agricultural activities which do not require prime agricultural land include pasture land, land for livestock operations, and "unique" lands as classified by ALISH (see page 3). Unique lands are not prime agricultural lands, but are important lands for certain crops, the principal examples are the coffee lands in Kona, and certain lava lands in Puna that are particularly well-suited for growing papaya. The supply of unique lands is quite large and is distinct from the supply of prime agricultural lands.

Availability of Land to Small-Scale Farmers

Even though considerable agricultural land exists, small agricultural parcels are seldom available to small-scale farmers under long-term leases because land-use regulations and the political environment make it unprofitable and too risky to the landowner to lease out small farm parcels. Agricultural use constitutes a low-value use of the land and, correspondingly, farmers pay relatively low lease rents. At the same time, in order to rent to small-scale farmers, landowners are required to subdivide the property. Applicable County subdivision regulations (designed for rural estates) require expensive electrical power, paved rather than gravel roads, and buried rather than surface water lines. The combination of low rents and expensive subdivision requirements makes it unprofitable for the landowner to subdivide land for small farms.

For example, rather than developing the State agricultural park in Kahuku, it would have been—as surprising as it may seem—less expensive for the State to give each farmer in the park \$100,000¹². In addition, there is the risk that when the leases expire, small-scale farmers will turn to the Legislature in an attempt to prevent landowners from raising lease rents, or to

12. This is based on 275 usable acres divided into 24 lots, a land cost to the State of \$50 per acre per year, improvement costs of \$3.5 million for developing the farm plots (electric power, roads, etc.); rents received from farmers of \$300 per acre per year; an 8-percent discount rate based on State bonds; and a 30-year term for the bond and the lease.

prevent landowners from evicting them in favor of a higher and more profitable use of the landowner's land—this often occurs in long-term leases for land on which small-scale farmers have built homes (e.g., Waihole-Waikane, Kona, Waianae, Kalama Valley). Such an economic environment favors leases to large-scale operators (including cooperatives consisting of many small-scale farmers), short-term and illegal leases of unsubdivided land, subdivision of the land into rural estates for sale to buyers who can afford the costs of the subdivision requirements, or leaving the land fallow.

In summary, the shortage of small parcels of land for farmers is a serious problem. Nevertheless, a vast supply of prime agricultural land does exist and is available for those profitable diversified agricultural activities that are large in scale, or for which the subdivision requirements are somehow circumvented.

Outlook for Diversified Agriculture

Based on the above analysis, ample prime agricultural land will be available to easily accommodate the requirements of diversified agriculture. This conclusion derives from the fact that a vast amount of prime agricultural land and water is available, having been freed from sugar and pineapple production in recent years; the very real possibility that additional sugarcane acreage and water will be freed, given the outlook for low sugar prices; the fact that some, if not most, of the sugar operations would make their lands available for profitable replacement crops; and, in contrast, land requirements for diversified agriculture that are surprisingly modest. In other words, the limiting factor will be the market, not the land supply. The proposed Royal Kunia, Phase II involves far too little land to affect this conclusion. Therefore, the Royal Kunia, Phase II would not affect adversely the growth of diversified agriculture.

Consistency with Overseas Long-Term Trends

The increased availability of prime agricultural land in Hawaii compared to that of prior decades results from some very long-term and accelerating trends that are occurring throughout the United States, Europe, and many developed and developing market economies. For example, U.S. farmers are paid by the government not to farm their land. This has resulted in 30 million acres of agricultural land lying fallow in 1984.¹³ In Europe, quotas are used to limit production. The principal agricultural problem has been overproduction, which has occurred as a result of the tremendous success of increasing yields, coupled with a slowing of the population growth rate. Because yields increase faster than population growth, resources must be freed from agriculture in order to restore balanced markets, and to increase income to the farmers who remain. Otherwise agricultural products glut the market; this is followed by low prices.

13. Norman E. Borlaug and Christopher R. Dowsell, "World Revolution in Agriculture."

es, a fall in farmers' income, and bankruptcies.

Furthermore, the export market has not been able to absorb the excess production, partly due to the agricultural successes achieved in many developing countries. For example, India once suffered from severe food problems. With the introduction of modern agriculture, however, its farm industry has been transformed, making India self-sufficient and even an exporter of many foods it once had to import. Similar gains have been achieved throughout Asia and Central and South America.

Sugar is clearly part of this trend which, over the long term, shows supply increasing more quickly than demand. In fact, some of the newer sweeteners have the theoretical potential of causing the release of all the land in the world that is now planted in sugarcane and sugarbeets.

The major agricultural problem facing the United States and many other economies, therefore, is how to make the reduction in production an orderly one so as to minimize social problems. This is a problem that arises from the tremendous successes in agriculture production, and contrasts sharply with, and invalidates, the 200-year old prediction of Thomas Malthus that population will increase faster than the food supply.

CONSISTENCY WITH STATE AND COUNTY PLANS

Since the proposed Royal Kunia, Phase II would not adversely affect the economic viability of OSCo before the leases expire in the mid-1990s, would not adversely affect existing diversified agricultural activities, would not limit the growth of diversified agriculture; but would contribute to the State's housing, industrial, and recreational facilities and to employment, the project is consistent with the major thrust of the Hawaii State Plan, the State Agriculture Functional Plan, and the General Plan of the City and County of Honolulu. This thrust in all three plans calls for preserving the economic viability of plantation agriculture and promoting the growth of diversified agriculture (see Table 6). To accomplish this, an adequate supply of agriculturally suitable lands and water must be assured. The thrust of these plans is not to preserve prime agricultural lands simply for the sake of preserving them—preservation is to occur only if a potential need for these agricultural lands exists.

After the major leases expire in 1995 and 1996, the future of OSCo is uncertain because of a continuing price/cost squeeze, the uncertainty about whether all major landowners will lease their lands to OSCo at acceptable terms, and potential impacts of urban pressures on the plantation.

**Table 6.-- SELECTED STATE AND COUNTY OBJECTIVES,
POLICIES, AND GUIDELINES RELATED
TO AGRICULTURAL LANDS**

HAWAII STATE PLAN (Chapter 226, Hawaii Revised Statutes, as amended):

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

- (a) Planning for the State's economy with regard to agriculture shall be directed towards achievement of the following objectives:
 - (1) Continued viability in Hawaii's sugar and pineapple industries.
 - (2) Continued growth and development of diversified agriculture throughout the State.
- (b) To achieve the agricultural objectives, it shall be the policy of the State to:
 - (6) Assure the availability of agriculturally suitable lands with adequate water to accommodate present and future needs.

Section 226-103 Economic priority guidelines.

- (c) Priority guidelines to promote the continued viability of the sugar and pineapple industries:
 - (1) Provide adequate agricultural lands to support the economic viability of the sugar and pineapple industries.
- (d) Priority guidelines to promote the growth and development of diversified agriculture and aquaculture:
 - (1) Identify, conserve, and protect agricultural and aquacultural lands of importance and initiate affirmative and comprehensive programs to promote economically productive agricultural and aquacultural uses of such lands.

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

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

Table 6.-- SELECTED STATE AND COUNTY OBJECTIVES,
POLICIES, AND GUIDELINES RELATED
TO AGRICULTURAL LANDS
(continued)

STATE AGRICULTURAL FUNCTIONAL PLAN (June 1985)
(Functional plans are guidelines for implementing the State Plan, and are not adopted by the State Legislature.)

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

(5) Policy: Provide greater protection to agricultural lands in accordance with the Hawaii State Constitution.

(c) Implementing Action: Identify important agricultural lands to promote diversified agriculture, increased agricultural self-sufficiency, and assure the availability of agriculturally suitable lands.

(d) Implementing Action: Until standards and criteria to conserve and protect important agricultural lands are enacted by the Legislature, important agricultural lands should be classified in the State Agricultural District and zoned for agricultural use, except where, by the preponderance of the evidence presented, injustice or inequity will result or overriding public interest exists to provide such lands for other objectives of the Hawaii State plan.

CITY AND COUNTY OF HONOLULU
GENERAL PLAN, Objectives and Policies (Resolution No. 82-188)

Economic Activity

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

Policy 4. Provide sufficient agricultural land in Ewa, Central Oahu, and the North Shore to encourage the continuation of sugar and pineapple as viable industries.

Policy 5. Maintain agricultural land along the Windward, North Shore, and Waianae coasts for truck farming, flower growing, aquaculture, livestock production, and other types of diversified agriculture.

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APPENDIX H

IMPACT ON STATE AND COUNTY FINANCES

DECISION ANALYSTS HAWAII, INC.

PROPOSED ROYAL KUNIA, PHASE II
Impact on State and County Finances

PROPOSED ROYAL KUNIA, PHASE II
Impact on State and County Finances

PREPARED FOR:

Halekua Development Corporation

PREPARED BY:

Decision Analysts Hawaii, Inc.

December 1988

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EXECUTIVE SUMMARY

Halekua Development Corporation's proposed Royal Kunia, Phase II would contain a variety of rental apartments, townhouses, and single-family homes; a light-industrial area; a golf course; a public park; and a school. In addition, the developer would provide road, water, drainage, and sewer improvements.

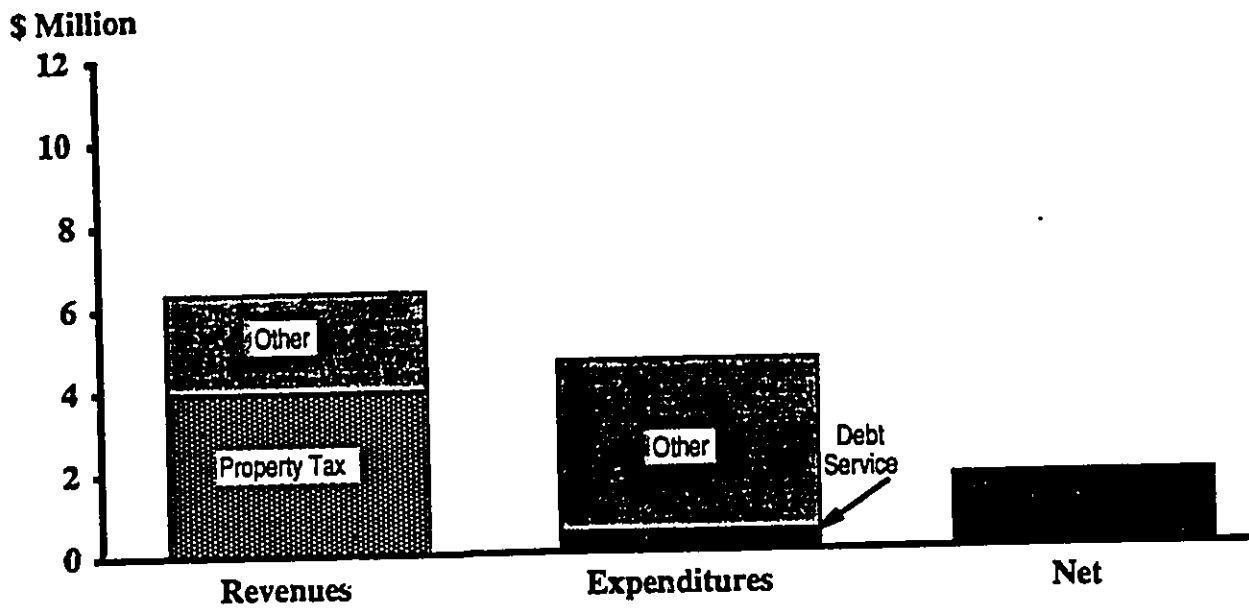
State and County revenues which would be derived from this project are expected to be significant, and sufficient to allow government to easily afford the capital improvements and services required to accommodate the project. The revenues are expected to be sufficient to: (1) finance park, fire station, wastewater treatment, school and roadway improvements; (2) provide the same level of per-unit services as are provided currently to island residents; and (3) serve additional community needs with the remaining net revenues.

At project completion, County revenues derived from the Royal Kunia, Phase II are projected to be \$6.4 million per year, while expenditures to support the project are expected to be \$4.6 million, for a net of \$1.8 million per year (see Figure ES-1). All dollar amounts are in 1987 dollars.

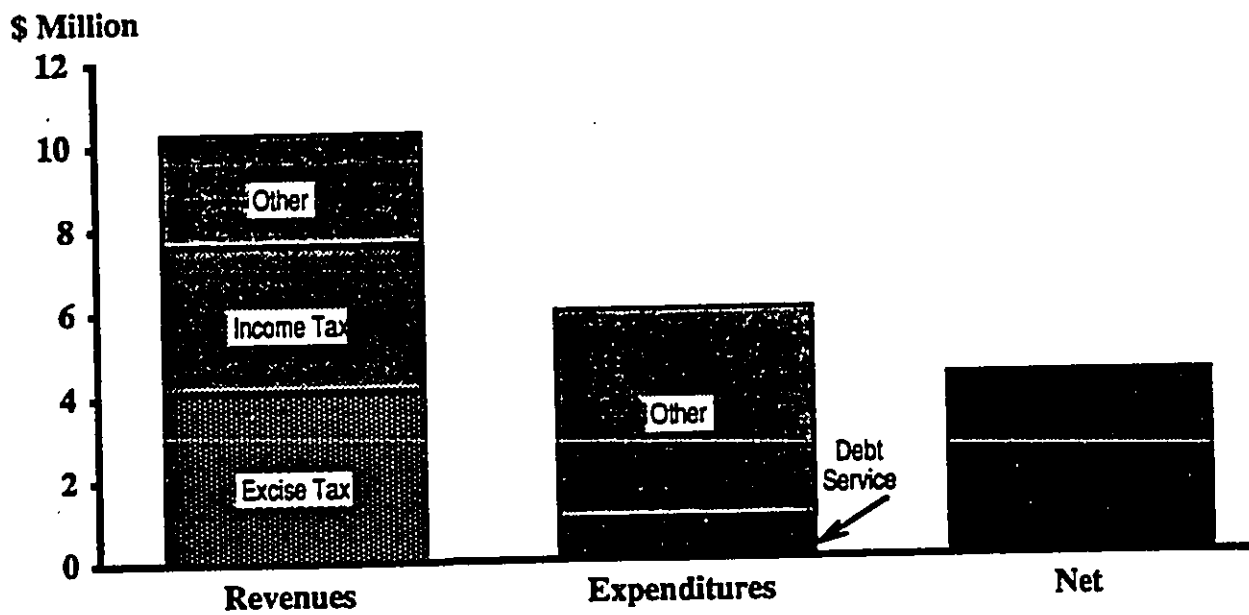
For the State, revenues generated by construction activity are estimated to average \$7.7 million per year over the 5-year construction period, resulting in total construction-generated revenues of \$38.5 million. This sum exceeds the \$10.4 million projected expenditure by the State for required improvements. Upon completion of the project, State revenues derived from the Royal Kunia, Phase II are projected to be about \$10.3 million per year, and expenditures required to support the project are estimated to be about \$6 million per year (including debt service on school and roadway improvements), for a net income of about \$4.4 million per year.

In summary, the Royal Kunia, Phase II would strengthen State and County finances by providing substantial net income.

Table ES-1.-- ROYAL KUNIA PHASE II:
Impact on County Finances



Impact on State Finances



**PROPOSED ROYAL KUNIA, PHASE II:
IMPACT ON STATE AND COUNTY FINANCES**

INTRODUCTION

The impact of the proposed Royal Kunia, Phase II on State of Hawaii and City & County of Honolulu finances is summarized in this report, with all values expressed in 1987 dollars, except where noted. This analysis discusses assumptions regarding projected growth, revenues and expenditures, and presents a summary of net impacts.

The proposed Royal Kunia, Phase II would contain 2,400 homes, including rental units, townhouses, single-family homes, and larger single-family homes sited along a proposed golf course. Approximately half of the homes would be "affordable" units ranging in price from \$89,000 to \$150,000 (1988 dollars), with the remaining homes being "market" units ranging in price from (\$150,000 to \$275,000).

The intent is to offer a variety of homes to people of differing income levels and to families of various sizes. The majority of the units will be intended for people in the middle-income range of \$30,000 to \$60,000, while the higher priced market units are intended along the perimeter of the golf course. Because buyers are expected to be residents who already live in Honolulu, or new arrivals who would be moving to Honolulu independently of the Royal Kunia, Phase II, the project is not expected to stimulate population growth.

Other developments proposed for the Royal Kunia, Phase II include (1) a 130-acre neighborhood light-industrial area; (2) a 16-acre neighborhood park; (3) a 172-acre golf course; (4) an elementary school; and (4) supporting infrastructure (roads, water, drainage, sewers, etc.). The businesses within the industrial area are expected to service primarily the residents and businesses in the Kunia area.

The industrial activities within Royal Kunia, Phase II are expected to rely upon the "primary" economic activities which drive Hawaii's economy—such as tourism, defense expenditures, and agriculture and other exports. Because the economic activities of the Royal Kunia, Phase II are not primary economic activities, this financial impact analysis addresses only the direct impacts on State and County revenues and expenditures, since the indirect impacts are already correctly assigned to the driving primary economic activities.

The revenue estimates include all sources of government revenues including taxes (property, excise, income, and other taxes), user charges and fees, earnings, etc. The revenue estimates are therefore larger than those which would be based simply on tax revenues. Similarly, the analysis covers capital improvements, operations and maintenance, and services required to directly support the Royal Kunia, Phase II.

GROWTH ASSUMPTIONS

Relevant details of the Royal Kunia, Phase II and corresponding growth assumptions are summarized in Table 1. This includes 2,400 homes, with an estimated 90 percent of them being owner-occupied, and 10 percent of them rental units.

Construction is projected to continue for 5 years, with total expenditure of about \$87.5 million for offsite and intract improvements, or about \$17.5 million per year. Additional construction expenditures would include the cost for homes and apartments, and industrial buildings. Construction employment would average about 300 jobs. Assuming the average Statewide salary of \$34,796 per year for a full-time construction worker, the total amount to be paid to construction workers is estimated to average \$10.4 million per year. It should be noted that actual construction employment and payroll would fluctuate greatly from one year to the next.

When the project is fully developed, it is expected that the Royal Kunia, Phase II will house about 7,500 people, assuming an average of 2.5 people per rental unit, 3 people per townhouse, 3.25 people per single-family home, 3.5 people single-family home on the golf course. On-site employment is projected to be 2000 jobs. This is based on 15 jobs per acre for a light-industry area, and 50 jobs at the golf course.

The property-tax base for the Royal Kunia, Phase II is projected to total \$523.1 million. This assumes an average value of \$118,750 for the "affordable" units, and \$178,167 for the "market" units; a homeowners' exemption of \$20,000 per home; \$1.2 million per acre for light-industry land; and \$17.5 million for the golf course.

Retail sales are estimated to be \$5.4 million per year, based on average rents of \$735 per month, and 180 golfers per day spending an average of \$50 each.

Industrial activities are projected to have a wholesale value of \$97.5 million per year based on sales of \$0.75 million per acre.

Payroll from the 2,000 jobs is expected to total \$38.8 million, based on the Oahu average annual earnings of \$19,392 per job. Total household income of residents, including income from jobs and other sources outside the project, is expected to reach \$113.3 million. This is based on (1) qualifying income for average rent at an income ratio of 3.3 to 1, and (2) qualifying income for owner-occupants at an income ratio of 3.5 to 1, and assuming 20 percent down, and a 30-year mortgage at 9.5 percent interest.

REVENUES

Table 2 shows that, at full development, added County revenues from Royal Kunia, Phase II are expected to reach \$6.4 million per year, with \$3.9 million of this derived from property taxes assessed at \$6.56, \$9.45, and \$9 per \$1,000 value for residential, light industrial, and golf-course property, respectively. The remaining \$2.5 million per year derives from a variety of sources related to population. These revenues, which are estimated at \$331 per resident based on detailed analysis of City & County finances, include taxes, licenses and fees for fuel, motor vehicles, bicycles, animals, sewers, water, public transportation, etc. Federal grants to the County for capital improvements are excluded from the estimate of County tax revenues.

For the State, construction activity is estimated to generate a total of \$38.5 million in tax revenues, or about \$7.7 million per year during the 5-year construction period. This estimate includes excise taxes on finished development, excise taxes on building materials, conveyance taxes, and State income taxes.

At full development, the increase in State tax revenues is expected to be \$10.3 million per year, with the largest revenues deriving from excise taxes of \$4.1 million per year (based on 3.6 percent of household income, including the effect of tax pyramiding) and income taxes of \$3.5 million per year (based on the average State income-tax rate of 3.1 percent). The remaining \$2.7 million per year in State revenues derives from a variety of sources related to population. These revenues, which are estimated at \$365 per resident based on detailed analysis of State finances, include: general excise tax license, corporate income tax, inheritance and estate taxes; liquor permits and taxes, public service companies taxes and fees, tobacco tax, insurance premium tax, franchise tax, conveyance tax, licenses and fees, fines, forfeits, penalties, rentals, charges for services, fuel taxes, vehicle registration fees, and other revenues. Income taxes received from on-site employees are excluded from the estimate of State revenues, since this would amount to double counting. Also excluded are Federal grants for capital improvements.

The combined State and County revenues during full operations is expected to total \$16.7 million per year.

EXPENDITURES

Estimates for State and County expenditures required to accommodate and support the the Royal Kunia, Phase II are given in Table 3.

Capital Improvements

Most of the major improvements would be financed and/or provided by the developer. This would include interior roads, widening of Kunia Road along the project frontage, water development and distribution, drainage, collector sewers and trunks, etc. The only major capital

improvements required by the County to support the project are park improvements on land that is to be donated by the developer, a fire station—which is likely to be located in Kunia—and expansion of the Honouliuli Waste Water Treatment Plant. Park improvements are estimated to cost \$1 million and the fire station at \$500,000 for the share allocated to Royal Kunia, Phase II. The share of the cost for expanding the Honouliuli Treatment Plant is about \$3.4 million. The total capital cost of these three items is \$4.9 million; assuming an 8-percent, 30-year bond, the debt service on this amount would be about \$400,000 per year.

For the State, the major capital improvements required to support the project are school and roadway improvements. According to the Department of Education, facilities would have to be provided for an estimated 675 students. Assuming 25 students per classroom, this translates into a need for 27 additional classrooms; assuming \$200,000 per classroom plus associated improvements, this translates into a cost of \$5.4 million. This is a high estimate in that it assumes no excess capacity of existing schools, and no busing of students to schools having excess capacity. Regarding offsite road improvements, the developer will pay for the widening of Kunia Road as previously mentioned. However, roadway improvements would be required in the vicinity of Kunia Interchange in order to provide better connections to the H-1 Freeway. A \$5 million allowance is provided for these improvements. Thus, the State's capital costs for school and roadway improvements would total at most \$10.4 million. The annual debt service on this sum would be about \$900,000.

It should be noted that the Royal Kunia, Phase II is designed to accommodate growth that is already planned for the Ewa/Central Oahu area. As such, the project would affect the geographic distribution of this growth, but is not expected to generate new growth that would require major capital improvements beyond those which are already planned.

Operations and Maintenance Expenditures

The estimate for State and County operations and maintenance (O&M) expenditures necessary to support the residents of the proposed Royal Kunia, Phase II at full development are \$9.2 million per year, with \$4.2 million of this allocated to the County and \$5 million to the State. For the County, expenditures are estimated at \$559 per resident. For the State, expenditures are estimated at \$672 per resident.

State and County O&M expenditures are expected to provide approximately the same level of per-unit services to residents as is currently the case, or possibly more, given economies of scale (e.g., a 10-percent increase in population is likely to require an increase in general government of much less than 10 percent). The expenditures cover general government, public safety, health, sanitation, education, culture and recreation, water, highways and streets, public transportation, economic development, housing, etc. Per-capita expenditures for education have

been adjusted to reflect the fact that the student population is projected to grow more slowly than total population.

SUMMARY

The net impact on State and County finances of the proposed Royal Kunia, Phase II is summarized in Table 4. For the County, revenues are expected to exceed expenditures by \$1.8 million per year.

For the State, revenues generated by construction are estimated to average \$7.7 million per year over the 5-year construction period, resulting in total construction-generated revenues of \$38.5 million. This total sum greatly exceeds the estimated \$10.4 million which is required for State-financed school and roadway improvements. Upon completion of the project, State revenues are expected to exceed expenditures by about \$4.4 million per year if debt service is included.

The resulting combined fiscal impact on the State and County is that revenues are expected to exceed expenditures by an estimated \$6.2 million per year upon completion of the Royal Kunia, Phase II, when debt service is included.

To summarize the previous discussion and the results of Tables 2 through 4, the proposed Royal Kunia, Phase II would strengthen State and County finances by providing substantial income. Annual revenues which would be derived from this project are expected to be significant, and sufficient to allow the State and County to easily afford the capital improvements and services required to accommodate the project. The revenues are expected to be sufficient to: (1) finance park, fire station, wastewater treatment, school and roadway improvements; (2) provide the same level of per-unit services as are provided currently to island residents; and (3) serve additional community needs with the remaining net revenues. Other major improvements would be financed and/or provided by the developer.

Table 1.— ROYAL KUNIA, PHASE II, IMPACT ON STATE
AND COUNTY FINANCES: GROWTH ASSUMPTIONS

Item	Amount
NEW DEVELOPMENT	
Homes:	
"Affordable" Rental Units	240 homes
Other "Affordable" Units	960 homes
"Market" Units	1,200 homes
Total Homes	<u>2,400</u> homes
Light Industrial	130 acres
Golf Course	168 acres
Public Park	16 acres
School	6 acres
CONSTRUCTION ACTIVITY	
Duration of Construction	5 years
Construction Costs:	
Offsite and Intract Improvements [1]	\$ 87.5 million
Homes and Buildings	n.e
Annual Average, Offsite and Intract Improvements	\$ 17.5 million per year
Average Employment	300 jobs
Average Payroll (\$34,796 per job, 1987 \$) [2]	\$ 10.4 million per year
ADDED POPULATION (3.122 people per unit)	7,493 people
ADDED EMPLOYMENT	
Light Industrial (15 jobs per acre)	1,950 jobs
Golf Course	50 jobs
Total Jobs	<u>2,000</u> jobs

Source: Unless otherwise noted by footnotes, all information is from Halekua Development Corporation or Decision Analysts Hawaii, Inc.

Table 1.— ROYAL KUNIA, PHASE II, IMPACT ON STATE
AND COUNTY FINANCES: GROWTH ASSUMPTIONS
(continued)

Item	Amount	
INCREASED PROPERTY TAX BASE (1987 \$):		
Homes:		
"Affordable" Units (\$118,750 per unit)	\$ 142.5	million
"Market" Units (\$178,167 per unit)	213.8	million
Total Value of Homes	<u>\$ 356.3</u>	million
Owner-occupant Exemptions (\$20,000 per home)	-6.7	million
Total Assessed Value of Homes	<u>\$ 349.6</u>	million
Light-Industrial (\$1.2 million per acre)	156.0	million
Golf Course [3]	17.5	million
Total Assessed Property Value	<u>\$ 523.1</u>	million
INCREASED SALES, RETAIL (1987 \$):		
Rents (\$735 per month)	\$ 2.1	million per year
Golf Courses	3.3	million per year
Total Sales, Retail	<u>\$ 5.4</u>	million per year
INCREASED SALES, WHOLESALE [4]	\$ 97.5	million per year
PAYROLL (\$19,392 per job, 1987 \$) [5]	\$ 38.8	million per year
HOUSEHOLD INCOME (1987 \$):		
Rental (\$29,110 per home) [6]	\$ 7.0	million per year
Owner-occupied (\$49,213 per home) [7]	106.3	
Total Household Income	<u>\$ 113.3</u>	million per year

**Table 1.— ROYAL KUNIA, PHASE II, IMPACT ON STATE
AND COUNTY FINANCES: GROWTH ASSUMPTIONS**
(continued)

n.e.: not estimated.

1. Includes water, drainage, roadways, sewers, landscaping, park improvements.
2. Based on the average weekly earnings for construction workers in 1986, adjusted 4.1 percent for inflation to 1987. DBED "Data Book: 1987," p. 367.
3. 180 customers per day at \$50 for green fees, golf cart, food, etc.
4. \$0.75 million per acre for industrial land, 1987 \$.
5. Average 1986 earnings for Oahu, increased 4 percent for inflation to 1987. DBED "Data Book: 1987," p. 363.
6. Based on a qualifying income for average rent at an income ratio of 3.3.
7. Based on qualifying income for an average-priced home, 20% down, a 30-year mortgage at 9.5%, and an income ratio of 3.5.

Table 2.— ROYAL KUNIA, PHASE II, IMPACT ON STATE
AND COUNTY FINANCES: REVENUES [1]
[In 1987 dollars.]

Item	Amount	
COUNTY, Full Development		
Property Taxes:		
Homes (\$6.56 per \$1,000 assessed value)	\$ 2.3	million per year
Light Industry Facilities (\$9.45 per \$1,000 assessed value)	1.5	million per year
Golf Course (\$9 per \$1,000 assessed value)	0.2	million per year
Total Property Tax Revenues	<u>\$ 3.9</u>	million per year
Other Revenues (\$331 per resident) [2]	2.5	million per year
Total County Revenues	<u>\$ 6.4</u>	million per year
STATE		
Construction Activity:		
Homes [3]	\$ 25.3	million
Industrial and Golf Facilities	13.2	million
Total State Revenues (over 5 years)	<u>\$ 38.5</u>	million
Average Annual State Revenues	\$ 7.7	million per year
Full Development:		
Excise Tax (3.6% of household income)	\$ 4.1	million per year
Income Tax (3.1% of household income)	3.5	million per year
Other Revenues (\$365 per resident)	2.7	million per year
Total State Revenues	<u>\$ 10.3</u>	million per year
TOTAL STATE AND COUNTY REVENUES (Excluding State revenues from construction activity.)	<u>\$ 16.7</u>	million per year

**Table 2.— ROYAL KUNIA, PHASE II, IMPACT ON STATE
AND COUNTY FINANCES: REVENUES**
(continued)

1. Includes tax and non-tax revenues.
2. Includes for the General Fund and all other funds, all tax and revenue sources other than property taxes, but excludes Federal grants for capital improvements. Derived from "Comprehensive Annual Financial Report, Fiscal Year Ended June 30, 1985," and increased 7% for inflation to 1987.
3. 7.1% of the total value of homes. This includes 4% for excise tax on the finished development, 0.1125% for excise tax on building materials, 0.05% for conveyance tax, and 2.92% for income tax. C&C of Honolulu, "Impact of Construction on Employment and Tax Revenues," April 1978.
4. 7.6% of assessed value. This includes 4% for excise tax on the finished development, 0.13125% for excise tax on building materials, 0.05% for conveyance tax, and 3.4% for income tax. C&C of Honolulu, "Impact of Construction on Employment and Tax Revenues," April 1978.
5. 4% of 65% of Household Income increased 37.5% for tax pyramiding = 3.6%. The 65% of Household Income is the estimated share of personal income spent on consumption that is subject to the 4% excise tax. DPED "Data Book: 1985."
6. Average tax rate on personal income, DPED, "Data Book: 1985."
7. Includes for the General Fund and Highway Fund, all tax and revenue sources other than excise and individual income taxes, but excludes Federal grants for capital improvements. Derived from "Annual Financial Report of the State of Hawaii for the Fiscal Year Ended June 30, 1985," and increased 7% for inflation to 1987.

**Table 3.— ROYAL KUNIA, PHASE II, IMPACT ON STATE
AND COUNTY FINANCES: EXPENDITURES**
[In 1987 dollars.]

Item	Amount	
MAJOR CAPITAL IMPROVEMENTS		
County:		
Neighborhood Park [1]	\$ 1.0	million
Police Station [2]	—	million
Fire Station [4]	0.5	million
Interior Roads [3]	—	
Water Wells, Mains, Pumps, and Storage Tanks [3]	—	
Drainage [3]	—	
Collector Sewers and Trunks [3]	—	
Wastewater Treatment Plant Expansion [5]	3.4	million
Solid Waste Disposal [6]	—	
Total County Capital Improvements	\$ 4.9	million
County Annual Debt Service [7]	\$ 0.4	million per year
State:		
School Improvements [8]	\$ 5.4	million
Road Improvements [9]	—	
Freeway Improvements [10]	5.0	million
Total State Capital Improvements	\$ 10.4	million
State Annual Debt Service [7]	\$ 0.9	million per year
Total State and County Annual Debt Service	\$ 1.4	million per year
OPERATIONS AND MAINTENANCE (O&M), FULL DEVELOPMENT		
County O&M (\$559 per resident) [11]	\$ 4.2	million per year
State O&M (\$672 per resident) [12]	5.0	million per year
Total State and County O&M	\$ 9.2	million per year

**Table 3.— ROYAL KUNIA, PHASE II, IMPACT ON STATE
AND COUNTY FINANCES: EXPENDITURES**
(continued)

1. Based on conversations with the City and County Department of Parks and Recreation.
2. New facilities not required.
3. Provided by developer.
4. High allocation to project, assuming that a \$2 million facility eventually will be needed in Kunia. The cost estimate is for a one-engine, fully equipped fire station, and is based on discussions with the Fire Department.
5. Based on 1.77 MGD average wastewater flow, and a increase in the Honouliuli Wastewater Treatment Plant by 13 MGD at a cost of \$25 million, and assuming no Federal Cost sharing. The cost estimate is from the Department of Public Works.
6. Solid waste would be disposed of at the new HPOWER plant, with no additional capacity required for the project.
7. Based on 8-percent, 30-year bonds.
8. Based on a mid-range estimate of 675 students as provided by the Department of Education, 25 students per classroom, and \$200,000 per classroom and related improvements.
9. Widening of Kunia Road along project frontage to be provided by the developer.
10. New roadways in the vicinity of Kunia Interchange to provide better connections to H-1 Freeway.
11. Includes all County O&M programs. Derived from "Comprehensive Annual Financial Report, Fiscal Year Ended June 30, 1985," and increased 7% for inflation.
12. Includes all State O&M programs under the General Fund and Highway Fund, and transfers to support other funds, with adjustments for projected slower growth in student populations. Derived from "Annual Financial Report of the State of Hawaii for the Fiscal Year Ended June 30, 1985," and DPED "Hawaii Population Projection and Simulation Model, Updated State and County Forecasts," Honolulu, Hawaii, July 1984, and increased 7% for inflation.

**Table 4.— ROYAL KUNIA, PHASE II, IMPACT ON STATE
AND COUNTY FINANCES: SUMMARY**
[In 1987 dollars.]

Item	Amount	
COUNTY, Full Development:		
Revenues	\$ 6.4	million per year
Expenditures:		
Debt Service	\$ 0.4	million per year
O&M and Services	4.2	million per year
Total County Expenditures	<u>\$ 4.6</u>	million per year
Net County Revenues	\$ 1.8	million per year
STATE:		
Construction Phase, Average Revenues	\$ 7.7	million per year
Full Development:		
Revenues	\$ 10.3	million per year
Expenditures:		
Debt Service	\$ 0.9	million per year
O&M and Services	5.0	million per year
Total State Expenditures	<u>\$ 6.0</u>	million per year
Net State Revenues	\$ 4.4	million per year
STATE AND COUNTY, Full Development:		
Revenues	\$ 16.7	million per year
Expenditures	10.6	million per year
Net State and County Revenues	<u>\$ 6.2</u>	million per year

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APPENDIX I

MARKET ASSESSMENT

JOHN ZAPOTOCKY

Market Assessment For

**ROYAL KUNIA
Phase II**

Prepared For
**HALEKUA DEVELOPMENT
COMPANY**

Prepared By
John Zapotocky, Consultant

January 1989

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EXECUTIVE SUMMARY

The Halekua Development Company and its predecessor Waitec Development, Inc. have been a major factor in the development of affordable residential housing on the Island of Oahu since 1978 when ground was broken on the Village Park development in Central Oahu. Development of infrastructure within Royal Kunia Phase I is well underway and sales of residential units commenced in September of 1988 and were very well received. All of the units offered were committed within four days. First deliveries are scheduled for early 1989. To insure itself an opportunity to continue to meet the needs of Oahu's growing population for residential, industrial and recreation product, Halekua Development Company is requesting the approval of the Royal Kunia Phase II development.

The purpose of this report is to analyze the demand for the proposed development, project the absorption of the various product types proposed and to assess the relationship between the project proposed and the other projects proposed for the area.

The intent is to offer a variety of homes to people of differing income levels and to families of various sizes. The majority of the units will be intended for people in the middle income range of \$30,000 to \$60,000.

A one hundred thirty acre industrial park is proposed to serve the needs of a variety of businesses that require industrial land in close proximity to the Primary Urban Center. The developer also proposes to offer minimum sized lots to small businesses, a market segment which has, to date, been overlooked by other industrial developments in the Ewa and Central Oahu areas.

An eighteen hole championship golf course is also proposed in order to meet the recreational need of Oahu's residents and visitors as well as to enhance property values of golf course frontage units. The golf facility is for the most part located within areas covered by the Waikale Naval Reservation blast zone and therefore limited in terms of alternate land uses.

Demand for housing on Oahu is not being met as illustrated by high housing costs and a current lack of inventory for sale and for rent. Newspaper articles cite instances of prospective buyers camping overnight at real estate sales offices in order to assure themselves of an opportunity to buy into new projects. State and City agencies have developed studies which indicate an existing unmet need for housing units ranging from 20,000 to 40,000.

Future housing demand will be determined by four basic factors: population growth; changes in household size (resulting from social, demographic and other factors); a

desirable vacancy rate; and the ability of the delivery system to provide housing units that are affordable.

The official state forecast of population for the Island of Oahu thru the year 2010 was recently released. The estimate is for 999,500 persons in 2010.

The household size in the United States, State of Hawaii and City and County of Honolulu, has been declining for at least the past 50 years. Within the State household size has declined from 4.46 in 1940 to 3.15 in 1980. In the United States average household size declined from 3.14 in 1970 to 2.67 in 1986. This trend is expected to continue in the State of Hawaii driven primarily by demographic changes. The average age in the State is projected to increase from 31 in 1986 to 37 by 2010. Extrapolations of past trends in household size for the State and for Oahu indicate household sizes ranging between 2.2 and 2.5 in the year 2010. However for the purpose of this study 2.5 household size has been used. The 2.5 household size translates into 2.7 persons per household to account for persons in group living facilities.

Postal surveys of vacant units conducted on Oahu over the past ten years indicate a vacancy rate fluctuating between 1.3% and 2.5%. This rate is very low for residential property and a higher rate of 5% is recommended to allow for more freedom of movement and a factor to mitigate against the high rental rates that prevail on Oahu. An increase of 3% in overall vacancy rates is recommended by the consultant.

Demand for housing is dependent on the economic well being of the buyer and the general economic environment as well as the ability of the delivery system to provide affordable housing to the persons demanding the housing. For the purpose of this assessment it is assumed that affordable units can be developed to meet the needs described and that the economic environment of the State of Hawaii will remain healthy for the foreseeable future. The stability of interest rates is a major factor impacting the demand for housing over time.

According to City and County data approximately 70,000 residential units are developable on the Island of Oahu. The consultant estimates that 10% of these units, however, will not be developed due to the long term nature of many of the proposed projects. A number of factors including: developer financial problems; an increasingly informed and active public participation in land use issues; and the use of residential units for second homes and transient accommodations, are expected to hinder development of residential units over the planning horizon.

Actions by the Land Use Commission to increase the supply of urban land in the recent past could result in an additional 20,000 units. Special legislation adopted in 1988 by the State Legislature allows the HFDC Kapolei project to proceed without county approval thus providing an additional 5,000 units.

Using the assumptions developed within the text shows total demand of 407,204 units by 2010 and a supply of 273,054 units as of the end of 1987 or a total demand of 134,150 units or an annual demand of 5,800 units per year over the next 23 years (1987-2010). Even assuming that 90% of the units currently approved by either the City or the LUC are developed a shortfall of 49,000 or 2,100 units per year remains.

Industrial land within the Primary Urban Center (PUC) or in close proximity to the PUC is in short supply. The primary reasons for this short supply is the limited opportunities to develop new industrial land within the PUC because of the lack of

available land and State and County policies which encourage higher land uses in the older industrial areas of Kakaako and Kalihi in the primary urban center.

An analysis of industrial lands in the PUC, Ewa and Central Oahu areas indicated that the number of small industrial lots outside of the PUC were relatively few. Thus small business owners desiring to purchase land for their businesses had relatively little opportunity to do so outside the PUC.

Future demand for industrial land in close proximity to the PUC was estimated based on past absorption. When added to the estimated loss of industrial land in the PUC to other uses, the total demand was 33 acres per year.

The sport of golf nationwide has been growing in popularity, due primarily to the level of economic prosperity as well as the ageing of the population.

Golf demand in the State of Hawaii has grown dramatically due to the growth of destination resorts which have fostered a golf industry. The same demographic trends which are driving the growth in the popularity of golf nationally are at work in Hawaii.

While the ratio of golf holes to population in Hawaii compares respectably with other states (21st), if Oahu were to be considered alone it would rank 46th. Oahu has lagged the other islands in the development of resort courses and with the increase in demand among Oahu tourists for golf, local golfers have found themselves facing increasing greens fees and a shortage of starting times.

Based on calculations made by the consultant thirty-five new courses could be required on Oahu by the year 2010. At the present time two new courses are under construction and another 42 equivalent courses have been discussed. The status of the courses discussed ranges from approved for development at Waikele to simple inquiries as to the possibility of developing a course.

In the Ewa, Central Oahu and Waianae areas the demand for new courses is estimated at twenty five while the number discussed is twenty four.

Given the numerous approval and development hurdles which must be overcome prior to development it is unlikely that more than 50-75% of the sites and courses discussed will actually be developed.

The Royal Kunia Phase II development is consistent with past developments in the area as well as other proposed development in the area. Residential, agricultural and military uses in the area have existed together for many years. There are a number of residential planned communities under consideration for the Central Oahu area in addition to the Royal Kunia Phase II project. These developments will offer continued competition among past players, Halekua, Mililani and Gentry with additional competition from Waikele, Melemanu Woodlands and perhaps Waiola.

The proposed Royal Kunia, Phase II differs from other projects in that it has momentum with a qualified management, sales and construction team in place to deliver a continuous stream of housing units. The developer has a track record of delivering affordable housing with a continuous increase in the number of units developed during the past three years.

Absorption of the Royal Kunia, Phase II development is projected as follows: Residential, 480 units per year commencing in 1995; Industrial, 16 acres per year

commencing in 1995; and Golf Course, completed in 1995. Based on these absorption rates the Royal Kunia, Phase II development will continue to be a significant contributor to the supply of residential units for the next ten years and will also make significant contributions to industrial land developments as well as recreational land development.

CONCLUSION

There is an existing unmet need for housing on Oahu and this need is expected to grow larger over the next twenty years.

There is an existing unmet need for industrial land in close proximity to the primary urban center and a market segment for minimum sized lots for small business which has not been addressed in areas outside of the primary urban center.

There is a shortage of golf courses on the Island of Oahu and a need to expand the recreational opportunities for the people of the City and County of Honolulu.

The Royal Kunia, Phase II development offers the community an opportunity to expand housing, accommodate economic growth, provide employment, increase recreational opportunities and to do so in an aesthetically pleasing manner.

ROYAL KUNIA

Phase II

I. INTRODUCTION

The Halekua Development Company and its predecessor Waitec Development, Inc. have been a major factor in the development of affordable residential housing on the Island of Oahu since 1978 when ground was broken on the Village Park development in Central Oahu. The success of the Village Park development and the resultant shortage of inventory of developable land led the developer to apply for redesignation of adjacent lands from agriculture to urban uses in 1985. The new increment originally called the Village Park Expansion was subsequently renamed the Royal Kunia Phase I. In December 1988 the developer received partial development plan approval for 500 units of the 3,480 units approved by the LUC in 1986. Zoning and improvement approvals were received in 1988. Construction was started immediately and the first 150 units were placed on the market on September 8, 1988. Within four days all of the units had been committed. The remaining 150 units will be placed on the market in February 1989. It is anticipated that 150 rental units to be developed in cooperation with the City Department of Housing will be completed by the end of 1989.

With the strong sales acceptance of the initial units of the first phase of Royal Kunia, the decision was made to seek approvals for an additional increment of 670 +/- acres known as Royal Kunia, Phase II. Development of Royal Kunia, Phase II is expected to commence in a phased method as a continuation of the residential development in Royal Kunia, Phase I.

To meet approval requirements, Halekua authorized the consultant (*Appendix A*) to proceed with the market assessment. The purpose of this report is to analyze the demand for the proposed development, project the absorption of the various product types proposed and to assess the relationship between the project proposed and the other projects proposed for the area.

II. PROJECT DESCRIPTION

The Halekua Development Company proposes to develop approximately 670 acres as the second phase of its Royal Kunia development. The development contains a mix of uses including: 329 acres of residential and apartment land with 2,400 residential units; 130 acres for industrial land; 172 acres for an 18 hole golf course and 39 acres for parks, schools and circulation. The following is a more detailed description of the major elements.

A. RESIDENTIAL

The residential development proposed for the Royal Kunia Phase II project will contain five different product types for five different income category buyers. Product is expected to range from one and two bedrooms apartments developed for sale or rental to families whose incomes are at or below 80% of median income as determined by the city and state housing agencies to single family golf course frontage homes. The bulk of the units proposed will be developed for families earning between \$30,000 and \$60,000 per year.

The median price of the units is expected to be \$150,000. (NOTE: PRICES ARE IN 1988 DOLLARS AND MAY CHANGE BASED ON INFLATION IN CONSTRUCTION COSTS AND OTHER FACTORS WHICH IMPACT THE COST OF DEVELOPMENT)

The intended market continues to be the middle income buyers which have been the traditional market for the Village Park product. Phases 12 and 13, the last two increments of the Village Park development, which consisted exclusively of three and four bedroom single family homes priced from \$130,000 to \$160,000, attracted buyers 56% of whom had family incomes defined by the state as requiring affordable housing (140% of median income and below).

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The breakdown of the units proposed is as follows:

<u>%</u>	<u># UNITS</u>	<u>UNIT TYPE</u>	<u>INCOME GROUP</u>	<u>PRICE RANGE</u>
50	1,200	Rental/Sales	80% Median	\$89,000
		1-3 BR TH	TO	TO
50	1,200	2-3 BR TH/ Zero Lot Line	140% Median	\$150,000
		Zero Lot Line Single Family	Market	\$150,000 TO
		Golf Course Single Family		\$275,000

NOTE: The Royal Kunia, Phase II development will be sold in fee simple compared with the leasehold estate offered in the predecessor Village Park community. The fee simple tenure should enhance the marketability of the Royal Kunia Development.

B. INDUSTRIAL

The industrial component is expected to serve the needs of a wide range of businesses. While its primary function is to serve the needs of business for land, in close proximity, and with excellent access to the Primary Urban Center, it is also intended to serve a specialized market for small industrial sites. A portion of the lots developed within the proposed subdivision will be of the minimum permitted size (7,500 sq. ft.) in order to provide small businesses with affordable lots. By developing lots of minimum permitted size small businesses will have the opportunity to purchase industrial land in fee simple in order to control this business cost on a long term basis. At the present time approximately 10% of the industrial acreage is expected to be developed in this manner. However, actual market experience will determine the ultimate percentage of the development that is dedicated to this product type.

C. GOLF

The proposed golf development consists of a single 18 hole championship golf course, clubhouse, maintenance building, driving range and parking. The course is expected to meet a demand for new golf facilities on Oahu through the year 2010. The open space provided is expected to increase values throughout the development, but primarily on the golf front lots.

III. RESIDENTIAL

A. BACKGROUND

The purpose of this section is to identify the demand and supply for residential housing units through the year 2010 and to describe any surplus or shortfall. The text will also discuss the question of affordability and describe how the proposed project fulfills the need described.

The background section of *The Hawaii State Plan - Housing* (Draft) released for public comment in November of 1988 summarizes the existing housing problem in the State of Hawaii. The following is an excerpt from that section:

Today, in the late 1980's, the 1949 national goal of "a decent home and a suitable living environment for all Americans" is as important (if not even more important) as ever. Yet the nation, and Hawaii in particular, is far from reaching this goal, especially in the area of affordable housing.

In 1986, Hawaii experienced America's highest housing costs for both owner-occupied and rental housing. Indications of Hawaii's extremely tight housing market also include the following:

- 1) An estimated housing production shortfall of over 20,000 units of which 14,000 are needed by low- and moderate-income families. (If no action is taken, the total housing need is estimated to grow to 86,000 housing units by the year 2000. Of this it is estimated that some 64,000 would be needed by low- and moderate-income families.)
- 2) Rental vacancy rates which have dropped to as low as 1% in areas which are experiencing economic growth. This is far below the 5% level which indicates a healthy housing market with adequate availability of units.
- 3) Nearly 45,000 families living in overcrowded units.¹
- 4) About 6,500 families living in substandard units.²
- 5) A rising homeless population. The number of homeless persons and families in 1987 was estimated at 4,200, this compares to the 1983 population which was estimated at between 1,450 and 1,600 persons.

1. Overcrowding is represented by those units with an average ratio in excess of one person per room.

2. Substandard housing is represented by units with inadequate plumbing facilities in which any of the following three characteristics is present: (1) there is hot and cold piped water, a flush toilet and a bathtub or shower inside the housing unit, but these three plumbing facilities are also used by another household; (2) some but not all of the plumbing facilities are present; and (3) none of the specified plumbing facilities is present.

B. DEMAND FOR HOUSING ON OAHU

Demand for housing on Oahu is extremely strong as measured by the availability of inventory at major projects. As of December 1988 the major projects on Oahu reported no inventory: Mililani Town, Makakilo, Village Park, Gentry Ewa. Mililani has a long waiting list for its final 300 units of single family product to be developed in 1989, Royal Kunia has sales contracts on 50% of its 1989 units with the remainder expected to be sold in February 1989. The city's West Loch affordable housing project reports all of the market units committed and a lottery was held for the affordable units in December of 1988. Newspaper articles report buyers camping overnight in order to be assured units in new developments such as Honolulu Park Place in downtown Honolulu and The Crest at Wailuna in Pearl City. These incidents were recorded with the average price of \$163,874 (1987) for new single family homes, which, according to Bank of Hawaii required approximately \$45,500 (1987) income to purchase. (*Construction in Hawaii 1988* p. 16) Thus a shortage of inventory occurred despite the fact that the estimated qualifying income for single family homes was 24% higher than the estimated median income for a family of four during the period.

C. FACTORS AFFECTING FUTURE DEMAND

1. Existing Shortages

According to *The Hawaii State Plan - Housing (Draft) 1988* 45,000 families within the State currently reside in overcrowded units (overcrowded defined as units with more than one person per room) and 6,500 families are living in substandard units (substandard defined as lacking basic plumbing facilities). While there is undoubtedly some overlap between overcrowded and substandard units, the total number of families falling into either category is likely to be at least 50,000. Assuming an equal distribution among the counties, approximately 40,000 units of the shortfall would exist on Oahu.

A similar estimate of the backlog of demand was made in a paper entitled *Oahu's Affordable Housing Crisis* prepared by the Office of the Mayor, City and County of Honolulu, March 16, 1987. According to the report 40,717 households paid too much rent while 40,865 households live in substandard units. Further the report estimated that the unsatisfied demand for units was growing at the rate of 2,700 per year (1981 to 1986) based on total housing demand of 5,700 units and supply of 3,000 units per year.

According to Housing Finance and Development Corporation's (HFDC) calculations undertaken in April of 1988, statewide the housing shortfall between 1980 and 1986 was 20,222 units (HFDC document titled *Statewide Housing Demand - Chart 4* provided by HFDC Staff). Shortfall existing prior to 1980 was not addressed.

2. Future Demand for Housing

Future demand for housing on Oahu will result from four primary factors: population growth; household size; desired vacancy rate; and affordability.

a. Population

The anticipated growth in the population is the first parameter in the equation. It determines the number of persons which will require the basic shelter function of housing. The population used in this analysis is that projected by the Department of Business and Economic Development (DBED) for the year 2010. (NOTE: Final report for series M-K projections was not available at the time of the analysis, however, revised page 37 dtd. 10/6/88 was obtained from DBED library) Projected resident population for 2010 is 999,500.

b. Household Size

The number of persons housed in each unit determines the number of units required per given population. The following excerpt from the *State Housing Functional Plan Technical Reference Document (Draft) August 1, 1987 p. 27* illustrates the importance of the social and demographic factors and their resultant impact on household size.

Housing stock increase is meaningful only with regard to changes in the population to be housed. The relationship between increases in the housing stock and the rate of increase in the households since 1970 exhibits the following patterns:

- 1) Between 1960 and 1970, households grew at a rate of 2.8 percent a year compared to 2.6 percent for the housing inventory.
- 2) During the 1970s, housing growth exceeded household growth, growing by 4.4 percent a year compared to 3.8 percent for households.
- 3) In the 1980s, however, housing growth has slowed down to 1.7 percent a year while households have grown at 2.3 percent or roughly 35 percent faster than housing stock.

Greater increases in the number of households has been attributed to a reduction in household sizes. Household sizes have declined from 4.46 in 1940, to 3.87 in 1960, to 3.59 in 1970, and to 3.15 in 1980.¹ This trend reflects the sharply reduced birth rates, fewer families with several generations sharing the same living quarters and the replacement of larger single-family homes by smaller homes or apartments, caused by the inability of most buyers and renters to pay for more spacious housing.

Smaller household sizes are also influenced by cultural and social developments including greater numbers of single-member

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households, both among the young and elderly; higher ages at marriage; delayed child-bearing and lower birth rates; higher incidence of divorce and single-parent households; and the general aging of the population.

Between 1970 and 1980, persons living alone in Hawaii increased from 26,532 to 50,304, or over 89 percent.² Additionally, in 1980, 32 percent of those living alone (16,375) were over 60 years of age; this represented 14.4 percent of all older persons 60 years and over.³

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1. State of Hawaii, Department of Planning and Economic Development, Hawaii State Plan: Socio-Cultural Advancement, December 1984, p.22.
 2. State of Hawaii, Department of Planning and Economic Development, Hawaii State Plan: Socio-Cultural Advancement, December 1984, p. 23.
 3. Ibid.

According to the *Statistical Abstract of the United States 1988* published by the Bureau of the Census the average household size in the United States declined from 3.14 persons in 1970 to 2.67 persons in 1986. The Census Bureau study *Projections of the Numbers of Household and Families : 1986 to 2000* released in May of 1986 indicated that household size in the United States could decline to 2.32 by the year 2000. The ageing of the population is primarily responsible for this shrinking of the household size and it is expected to continue according to an Advertiser story dated 11/17/88 on page A-5 entitled *Hawaii And Mainland Soon To Be The Over-The-Hill-Gang* indicating that the median age in Hawaii in 2010 would be 37 vs. the median age in 1986 of 31.

For the purpose of this analysis the household size by the year 2010 has been estimated to be 2.5 persons per household on Oahu. Regression analysis of past household size trends statewide and on Oahu (see *Exhibits 1 and 2*) indicate household sizes in year 2010 ranging between 2.2 and 2.5 persons. Thus, household size is estimated to continue its decline.

The average household size while an important determinant in projecting the demand for household units over time must be adjusted for persons who are not in households. These individuals in Hawaii are made up primarily of military personnel living in barracks or on shipboard, others include, persons incarcerated or living in long term hospitals or nursing homes. Because of the high concentration of military personnel stationed in Hawaii the number of persons not in households is approximately three times that of the nation as a whole (1980 Census Data). In 1980 5.4% of the population on Oahu was not in households. If the more conservative statewide projections of household size estimated for 2010 are adjusted for the individuals not in households, the persons per household in 2010

HOUSE HOLD SIZE FOR STATE OF HAWAII

Using an Exponential Regression Analysis

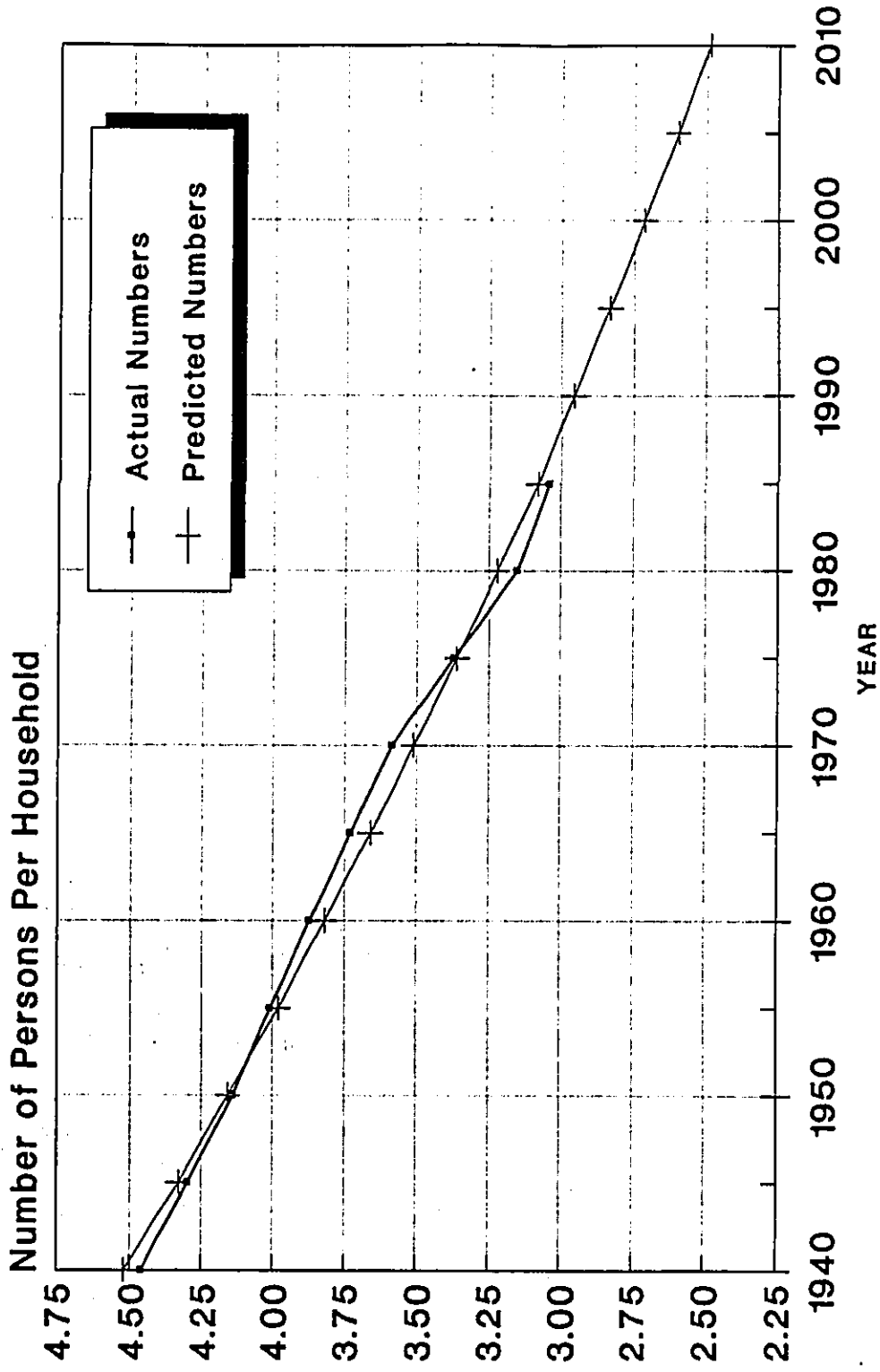


Exhibit 1 - Graph

HOUSE HOLD SIZE FOR OAHU

Using an Exponential Regression Analysis

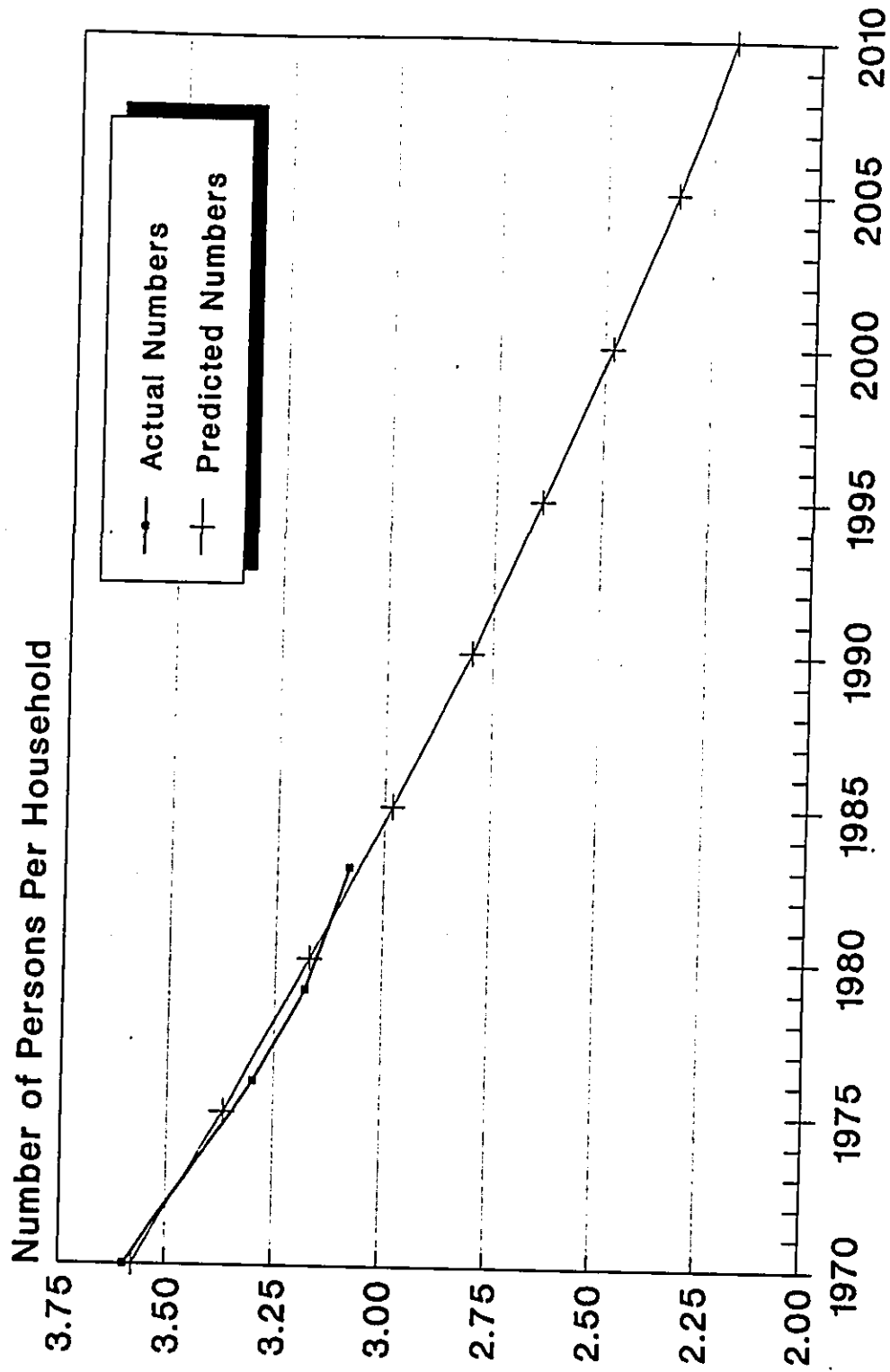


Exhibit 2 - Graph

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would be approximately 2.65. For purposes of this analysis the figure has been rounded to 2.7 persons per household by the year 2010.

c. Desirable Vacancy

Information provided in the *Hawaii State Data Book 1987* Table 632 p. 574 Characteristics of the Housing Inventory, For Oahu; 1970, 1976, 1979 and 1983 indicates that for the years surveyed vacant units on Oahu ranged between 5.2% and 6.8% which includes: units for sale, units for rent, units occupied by transients. For the purpose of this analysis it is assumed that without any change in the policy on housing this range would continue at the same percentage over time.

Approximately 50% of the reported vacancy in the aforementioned surveys are due to the transient occupied units. This is confirmed both by the transient units indicated and by housing vacancy surveys of Oahu 1977 to 1986 contained in the *Hawaii State Data Book* which indicate actual islandwide vacancy rates of 1.3% to 2.5%.

The low vacancy rates contrast sharply with what is considered to be a healthy vacancy rate of approximately 5%. The low inventory of available rental units has caused a shortage of rental units and high rental rates. According to the article *Oahu Rental Prices Soar to New Height* April 1, 1988 in the *Hawaii Realtor Journal*, showed that rental rates between 1983 and 1988 had increased in all areas surveyed for single family dwellings from 13% to 91%. (1986 vacancy rate for single family homes was 1%). Rental rates for apartments and townhouses with the exception of one area showed across the board increases from 12% to 91% (1986 vacancy rates for apartments was 3.9%).

A more normal vacancy rate would be 5% and would allow for more mobility among Oahu homeowners and renters. To achieve this end an additional 3% growth in the housing stock should be accommodated and encouraged.

d. Affordability

The last key element in the equation of housing demand is affordability. Without the presence of this element the demand for housing would be destined to go unsatisfied. In an administrative memo dated May 18, 1988, Mr. Joseph Conant Executive Director of the Housing Finance and Development Corporation (HFDC) defined the term affordable housing and established the target groups for affordable rentals and affordable homes for sale. *Appendix B* contains the complete text of the memo. The following is an excerpt from the text of the report regarding the affordability of for sale housing.

...the purchase price of homes would be as follows in order to be "affordable" by families in the "gap group" range in the City and County of Honolulu

- \$89,000 for a family earning 80% of median or \$29,200 per year
- \$139,800 for a family earning 120% of median or \$43,800 per year
- \$165,300 for a family earning 140% of median or \$51,100 per year

According to HFDC calculations 75% of the demand between the year 1988 and the year 2000 will be for "affordable" homes as defined above.

An analysis of rental household data from the Bureau of the Census *Annual Housing Survey: 1983* (See *Appendix C*) indicates that approximately 33,000 rental households on Oahu had income levels sufficient to purchase homes with prices beginning at \$89,000 in 1988 dollars. The estimated thirty three thousand figure is probably conservative because it does not take into account the increase in the population between 1983 and 1988, the fact that the age of the population has been increasing steadily (which generally indicates higher levels of income), and the record employment levels which have resulting in the lowest level of unemployment in the decade.

Another major potential market for housing units is the 9,100 sub-families which were identified in the 1983 Annual Housing Survey as residing with owner occupants. The median household income of this group was 24% higher than the median household income of homeowners which was 135% higher than the median income for renter occupied households.

The market priced units being offered at Royal Kunia, Phase I which ranged in price between \$160,000 to \$200,000 attracted 60% first time buyers. Forty percent of the buyers were selling other homes. Market priced homes in Royal Kunia, Phase II

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are expected to attract the same types of buyers, i.e. those first time buyers desiring large homes and existing homeowners desiring to trade up from existing apartment or single family homes.

The high level of affordability has been made possible by stable mortgage interest rates in the ten (10%) percent range.

There are substantial waiting lists at major projects including the city's West Loch development, the Mililani and Royal Kunia projects. No projects are reporting unsold inventory. Projects under construction are committed to buyers, often with qualified backup offers ready in case the buyers should decide to cancel the contract.

For the purposes of this analysis it is assumed that housing units can be developed within the price ranges described with government entities concentrating on the lower end of the spectrum and private entities concentrating on the mid and high ranges.

D. SUPPLY (DEVELOPABLE UNITS)

In order to assist the Honolulu City Council in its efforts to plan for growth, the Department of General Planning (DGP) of the City and County of Honolulu annually prepares a report which provides the Council with projections of the development capacity of residential and apartment lands on Oahu. The most recent report available in this series is the *Development Plan Status Review - Volume 1 Status: Fiscal Year 1988* September 1, 1988. DGP takes into account such factors as development plan designation, actual development densities vs. potential development densities, expectations for redevelopment in already developed areas, and other factors to achieve their estimates. DGP emphasizes that the "development capacity" reflects what can potentially be built and not necessarily what will be built. In fact the development capacity of each development plan area is in a constant state of flux with landowners and developers annually requesting development plan land use changes which impact the capacity either up or down depending on the specific request. The inventory of developable units must be reduced by the units which were actually built between reports.

The development capacity of Oahu's lands have remained relatively constant during the past eight years according to a succession of DPG reports, i.e., 1980 - 75,963, 1984 - 73,595, 1985 - 73,110, 1987 - 65,000, and 1988 - 70,297.

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As stated by DGP these estimates of supply are simply that, estimates, and subject to change for a variety of reasons, including the following:

1. Factors Likely to Reduce Supply From DGP Estimates

a. Developer Financial Problems

In July of 1986 the Estate of James Campbell announced the cancellation of development agreements with MSM and Hirano Brothers for the Ewa Marina and Ewa Village Projects respectively. These two projects at the time accounted for 8,100 units or in excess of the ten percent of the units projected for development by the year 2005. Subsequently the Ewa Village project was acquired by the Gentry Companies and initial development has been undertaken. The Ewa Marina project has continued to be the subject of litigation although strong interest in the project has been expressed by Haseko Corporation in the acquisition of the development interest held by MSM. The foregoing, however, illustrates the potential for projects to be delayed for this reason.

b. Social and Political Awareness

The following discussion provides three recent examples of citizens groups which to various degrees have stopped, slowed, reduced the unit count or increased the uncertainties of projects. When combined with numerous other examples of citizen action, i.e., the Nukolii initiative, the Haupuna Beach initiative, the Kaiaka Rock hearings, one can see that the public will play an increasingly important role in future development decisions.

i. Date Laau

In 1983 a group of residents of the various Date Laau cooperative apartments in Moilili banded together to fight the upzoning of the land on which their units were located. Although the impact of the rezoning on the residents would have been of little consequence in the short run due to the length of their existing leases, they saw the upzoning as a long term threat to their ability to extend their ownership beyond the term of the initial lease. The protest set a precedent on Oahu as it eventually ended in the rezoning issue being placed on the ballot through the initiative process. While the validity of the initiative is still being tested in the courts, the success of the protest set the stage for future a citizen actions.

ii. Salt Lake

In 1985 a property owner in the Salt Lake area announced plans to develop a vacant parcel of apartment zoned land for apartment use. Due to a parking shortage in the Salt

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Lake area, existing residents complained that the proposed development would make the existing problem worse. In response to the public protests, the City Council passed an Interim Development Control Ordinance (IDC) which halted all development in the area for a one year period. During the life of the IDC the developer, community and council were able to come to an accommodation. Density of the proposed project was reduced and the amount of parking provided was increased.

iii. Save Sandy Beach

In 1988 a group of concerned citizens opposed to the development of residential units across from the Sandy Beach recreational area met the requirements to have the issue placed on the ballot via the initiative process. Their efforts were successful and the initiative stopping the development was passed by a 2 to 1 margin. The initiative was the last step in a number of steps that the citizens had taken in their attempt to stop the development.

The discussion above is not intended to be judgmental or to comment on any of the issues raised in any of the cases. The sole purpose of the discussion is to comment on the ability of forecast "development capacities" to be met. In the latter two actions development capacities were actually reduced.

c. Long Range Projects

According to DGP records 46% of the developable land on the Island of Oahu is contained in eleven major projects, i.e., seven in Ewa and four in Central Oahu. These major projects are planned communities under single ownership with relatively specific development objectives. To date on Oahu there have been five planned communities similar to the eleven new communities planned: Mililani, Makakilo, Hawaii Kai, Gentry Waipio and Village Park. The first three are still under development after twenty years, while the final phases of the Village Park and Gentry Waipio Projects (less than half the size of the first three projects) are both in the final stages of development approximately 11 years after the first units were built. Only the Mililani, Makakilo and Ewa Gentry developments are actually underway at the present time, thus it seems unlikely that all of the developments included in the "development capacity" estimates will be complete within the 20 year planning time horizon. The consultant has estimated 10% of units identified as developable will not be developed within the 20 year time frame.

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d. **Second Home/Tourist Use of Residential Units**

Not all of the residential units constructed will ultimately be used to provide primary housing for Oahu's population. A number of these units will be used as second homes. The recent well publicized purchases of Kahala homes by wealthy foreigners is a reminder of an alternate use for primary residential property.

According to the Department of Business and Economic Development projections, Series M-K (Preliminary) January 1988 the demand for visitor accommodations on Oahu in the year 2010 will increase by 19,200 units over 1985 levels. This is a 9,900 unit increase over the previous estimate for the year 2005 under the M-F projections. Currently the City's development plans permit development of less than 9,000 new resort units. The bulk of these units are in Ewa (Ko Olina 4,000), Koolauloa (3,500) and Waianae (Makaha 800). Many "residential" units in the Waikiki area are already used as transient accommodations. According to figures published in *Construction in Hawaii 1988* as of April 1, 1987, 9,236 residential units or 3.4% of the units included in the official housing stock estimate of 273,054 were used as non-resident housing units, i.e., housing units rented all or part of the year to tourists. It is likely that this practice will continue and be expanded.

As the attractiveness of placing a unit into a resort rental pool increase, buildings in the tourist areas devoted primarily to residential use would be under pressure to convert to resort use because of the high potential income. Restrictive zoning could be changed or ignored. If only half of the 9,000 unit shortfall projected by 2010 is met by converted residential units it will result in a contraction of supply by 4,500 units. Given the long lead times necessary to obtain approvals for new resort developments (Ko Olina [West Beach] has been over 15 years in the process) it is unlikely that new resort areas will be forthcoming in the immediate future.

2. **Factors Likely To Increase Supply From DGP Estimates**

a. **Impact of Land Use Commission Decisions on Supply**

In recent years the Land Use Commission has acted to approve a number of projects within the Ewa and Central Oahu development plan areas. The following is a discussion of the impact of these decision on the supply of residential properties.

Information made available to the consultant by the Office of State Planning in November of 1988 indicates that the Land Use Commission (LUC) has approved a total of 42,182 residential units in the Central Oahu and Ewa areas in recent years. *Exhibit 3, 4, and 5* compares a breakdown of the units approved

EXHIBIT 3
RECENT RESIDENTIAL APPROVALS
LUC VS. CITY
DECEMBER 1988

	RECENT LUC APPROVALS	RECENT LUC APPROVALS NOT INCLUDED IN CITY DEVELOPMENT PLANS
EWA	21,216	7,425
CENTRAL OAHU	20,966	17,217
TOTAL	42,182	24,642

EXHIBIT 4

**EWA DEVELOPMENT PLANS
LUC AND CITY RESIDENTIAL APPROVALS
DECEMBER 1988**

LOCATION	PROJECT NAME	ACRES	HOUSING UNITS	PETITIONER	DOCKET NUMBER	ACRES	INCR. ACRES	CLASS.	HOUSING UNITS	STATE +/- UNIT DIFFERENCE
Ewa Beach	Puulao Homes	49.353	400							
	Other	12.634	94							
Honouliuli		56.126	347							
Ewa Village	Ewa Elderly	16.358	90							
	Fernandez Lots (DHCD)	5.348	50							
	Other	7.169	115							
Makakilo		505.737	3,817							
Ko Olina		186.200	5,200		83-582	842.0		A-U	5,200	
Ko Olina Exp.		263.742	4,300							
Ewa Marina	Previously MSM	381.514	4,791		83-558	181.0	825	A-U	7,200	2,409
West Loch Estate (DHCD)		202.900	1,500		87-616	212.0		A-U	1,500	
Ewa Gentry		207.000	3,300							
Kapolei Town		155.000	2,300		87-613	135.0	890	A-U	2,445	145
Kapolei Village					88-622	830.0		A-U	4,871	4,871
SUB-TOTAL----->		2,049.081	26,304			2,000.0			21,216	7,425

EXHIBIT 5

**CENTRAL OAHU DEVELOPMENT PLANS
LUC AND CITY RESIDENTIAL APPROVALS
DECEMBER 1988**

LOCATION	PROJECT NAME	ACRES	HOUSING UNITS	PETITIONER	DOCKET NUMBER	ACRES	INCR ACRES	CLASS.	HOUSING UNITS	STATE +/- UNIT DIFFERENCE
Whitmore	Kahi Kane	50.111	300		84-581	50.00		A-U	300	
	Other	0.371	3							
Wahiawa	Leilehua Village (HFDC)	5.900	40							
	Elderly I & II	1.280	122							
	Other	28.702	299							
Melemanu	Woodlands III	58.498	1,100							
	Other	32.648	182							
Milliani		156.922	1,107		87-809	723.00	1205	A-U	6,640	6,640
Walawa		61.887	300		87-810	1,395.00		A-U	7,908	7,808
Waipio Gentry	Cliffside I, II, III	13.391	184							
	Other	4.002	48							
Village Park		39.340	332							
Village Park Expansion	Royal Kunia	54.087	299		86-808	547.50			3,480	3,031
	Townhouse Dev.	9.830	150							
Crestview		17.735	150							
Waipahu	Crown (HFDC)	21.983	200							
	Other	55.268	460							
Waikale		319.243	2,700		85-594	577.21		A-U	2,640	(60)
Other	Horita	16.403	282							
	Other	16.942	122							
SUB-TOTAL----->		982.521	8,360			3,292.71			20,968	17,217

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by the LUC and those which are included in the inventory of developable lands prepared by DGP which have been included in the supply equation of the analysis. The exhibit indicates that 17,543 of the units approved by the LUC have been included in the DGP tally while 24,642 remain unaccounted for.

While the 24,642 unit figure represents an increase of 35% over the units identified by DGP as developable, it must be remembered that the urban designation by the Land Use Commission does not permit any specific development within the designated area. The designation represents a grant by the State to the County (in this case the City and County of Honolulu) to determine the uses within the area designated urban. Thus while the urban designation permits the City and County of Honolulu to allow residential, industrial or other urban uses within the urban district there is no requirement for the City to do so.

A case in point involves the Queens Beach lands owned by Bishop Estate and via a development agreement under the control of Kaiser Development Company. These lands have had an urban designation for some time, however, have been designated by the City for preservation.

Actual development of residential property requires that a series of governmental and private actions all be accomplished in order for the development to take place. In the case of residential development, the LUC must give its urban designation, the city must provide a residential development plan designation and a residential zoning designation, the developer must then develop the property for residential use. Any of the participants, LUC, City Council, or developer may prevent the property from being developed, but all working together are required to allow the development to be accomplished. Thus, in the opinion of this consultant if the goal is to assure that adequate residential development is to occur the bias should be in favor of providing additional land rather than providing just the right amount.

b. **Kapolei Village Special Legislation**

Special legislation adopted in 1988 permits HFDC to develop 4,871 units at Kapolei Village without City approval. These 4,871 units are included in the 24,646 discussed above. HFDC has announced its intention to work with the County to assure that County concerns are met.

c. **Pending City Council Actions**

The City Council is considering applications from various developers in the Ewa and Central Oahu areas to increase the

ROYAL KUNIA
Phase II

number of developable units by 20,000. Most of these applications are for projects with LUC approval.

E. SHORTFALL OF RESIDENTIAL HOUSING UNITS BASED ON ESTIMATED SUPPLY AND DEMAND

Using the assumptions developed within the text of the residential section *Exhibit 6* shows as total demand of 407,204 units by 2010 and a supply of 273,054 units as of the end of 1987 or a total demand of 134,150 units or an annual demand of 5,800 units per year over the next 23 years (1987 - 2010). Even assuming that 90% of the units currently approved by either the City or the LUC are developed a shortfall of 49,000 or 2,100 units per year remains.

EXHIBIT 6

Summary of Housing Unit Shortfall 1987 to 2010
Island of Oahu
December 1988

Assumptions		Source				
Population 2010	999,500	Series M-K Final Projections DBED October 1988.				
Persons Per Household	2.7	Consultant Estimate				
Unoccupied Units	6%	Characteristics of Housing Inventory 1970-1983, U.S. Census				
Desired Increase in Vacancy Rate	3%	Desirable Vacancy Rate 5% per Hawaii State Plan (Draft) 11/88				
Demand Computations						
Population/Households	370,185	Resident Population/Household Size (999,500/2.7)				
Normal Vacancy	25,913	Households/Normal Vacancy (370,185/1.06)				
Vacancy Increase	<u>11,106</u>	Households/Desired Increase in Vacancy (370,185/1.03)				
Total Demand	407,204	Sum of Demand Factors				
Supply Computations						
Existing Inventory (1987)	273,054	Dept. of General Planning "Development Plan Status Review: Sept. 1988				
Housing Capacity	70,000	Dept. of General Planning "Development Plan Status Review: Sept. 1988				
Kapolei Village (HFDC)	4,871	Special Legislation 4/88 Exempts Project from County Approval				
Approved by LUC						
	<table border="1"> <tr> <td>Ewa</td> <td>2,554</td> </tr> <tr> <td>Central</td> <td>17,217</td> </tr> </table>	Ewa	2,554	Central	17,217	
Ewa	2,554					
Central	17,217					
	19,771	Consultant Exhibits 4, 5, and 6				
Deduction for Timing (10%)	<u>(9,464)</u>	Consultant Estimate				
	<u>358,232</u>	Sum of Supply Factors				
Estimated Shortfall	<u><u>48,972</u></u>	Sum of Supply and Demand Factors				

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F. HOW ROYAL KUNIA, PHASE II MEETS THE RESIDENTIAL NEED IDENTIFIED

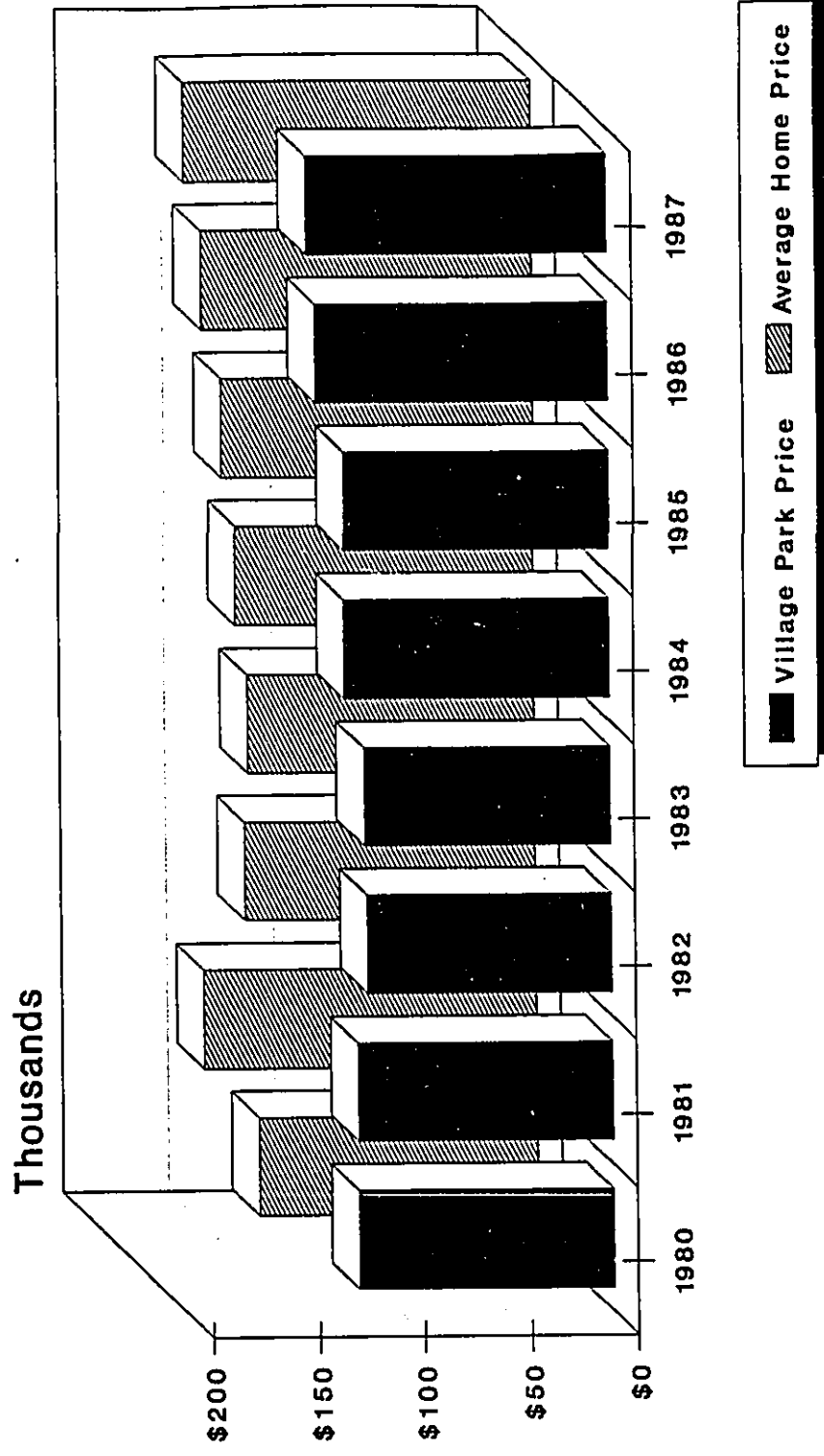
The Royal Kunia, Phase II meets the needs for primary housing which have been identified above as follows:

1. The Royal Kunia, Phase II development will provide 2,400 primary residential units which in conjunction with other developments proposed will help to meet a projected shortfall of 49,000 primary residential units by the year 2010.
2. The Royal Kunia, Phase II units will be affordable. Fifty percent of the units proposed will be priced to be affordable by buyers with incomes identified by the State Housing Finance and Development Corporation as requiring affordable housing. *Appendix C* demonstrates a pool of approximately 33,000 rental households as qualified first time buyers. The developer of Royal Kunia has demonstrated in the Village Park predecessor project an ability to deliver residential units at an average price consistently below the average price of units offered during the past seven years (See *Exhibit 7-Graph* and *Exhibit 7-Table*).
3. The Royal Kunia, Phase II will provide a broad range of unit types and unit prices which will appeal to a wider range of home buyers and a wide range of family sizes.
4. The development team for the Royal Kunia, Phase II project is in place and currently demonstrating its ability to do the job.
5. The Royal Kunia, Phase II development is located within the Central Oahu Development Plan area. During the past eleven years this area has been the fastest growing on the island. The number of residential units in the area grew by over 10,000 which was more than double the growth of any other development plan area except the PUC. However, its rate of growth in housing units was approximately triple that of the PUC. See *Exhibit 8*. Thus Central Oahu has demonstrated its attractiveness to new home buyers during the past 11 years.

Exhibit 7 - Graph

Single Family Housing on Oahu

Average Price Vs. Village Park



See Attached Table for Listing of Various Sources of Data

EXHIBIT 7 - TABLE

FACTORS DETERMINING HOUSING AFFORDABILITY IN HAWAII

FOOTNOTES	In dollars, except as noted	1980	1981	1982	1983	1984	1985	1986	1987
1	Mortgage Interest Rate	12.7%	14.8%	15.1%	12.6%	12.4%	11.6%	10.2%	9.3%
2	Average Single-Family Home Price	131,693	157,026	137,267	135,357	140,700	147,093	156,189	163,874
	Down Payment (20% of Price)	26,339	31,405	27,453	27,071	28,140	29,419	31,238	32,775
	Loan Amount (80% of Price)	105,354	125,621	109,814	108,286	112,560	117,674	124,951	131,099
	Monthly Principal and Interest	1,137	1,565	1,401	1,162	1,191	1,170	1,112	1,084
3	Annual Median Family Income	24,813	27,499	27,840	29,742	32,831	33,244	34,665	36,710
	Monthly Median Income	2,068	2,292	2,320	2,479	2,736	2,770	2,889	3,059
4	Monthly Income Required	3,981	5,479	4,903	4,065	4,168	4,094	3,893	3,795
	Payment as a Percent of Income	55.0%	68.3%	60.4%	46.9%	43.5%	42.2%	38.5%	35.4%
5	Monthly Income Gap	(1,913)	(3,187)	(2,583)	(1,587)	(1,432)	(1,324)	(1,004)	(736)

VILLAGE PARK UNITS SUBSTITUTED FOR AVERAGE NEW SINGLE FAMILY HOME
FACTORS DETERMINING HOUSING AFFORDABILITY IN HAWAII

FOOTNOTES	In dollars, except as noted	1980	1981	1982	1983	1984	1985	1986	1987
1	Mortgage Interest Rate	12.7%	14.8%	15.1%	12.6%	12.4%	11.6%	10.2%	9.3%
2	Village Park (Bankoh Estimate)	120,000	120,000	115,000	116,000	125,000	125,000	138,000	142,000
	Average Single-Family Home Price	24,000	24,000	23,000	23,200	25,000	25,000	27,600	28,400
	Down Payment (20% of Price)	96,000	96,000	92,000	92,800	100,000	100,000	110,400	113,600
	Loan Amount (80% of Price)	1,037	1,196	1,174	995	1,058	994	983	940
	Monthly Principal and Interest	24,813	27,499	27,840	29,742	32,831	33,244	34,665	36,710
3	Annual Median Family Income	2,068	2,292	2,320	2,479	2,736	2,770	2,889	3,059
	Monthly Median Income	3,628	4,187	4,108	3,484	3,703	3,479	3,440	3,288
4	Monthly Income Required	50.1%	52.2%	50.6%	40.2%	38.7%	35.9%	34.0%	30.7%
	Payment as a Percent of Income	(1,560)	(1,895)	(1,788)	(1,006)	(967)	(709)	(551)	(229)
5	Monthly Income Gap								

1 Federal Home Loan Bank Board; effective rate on conventional mortgages, reflecting fees and charges as well as contract rate.

2 Bank of Hawaii Survey of Residential Construction on Oahu (see p. 15)

3 U.S. Bureau of the Census, as reported in Hawaii DBED, State of Hawaii Data Book (1987); (1987 data estimated)

4 Based on 3.5:1 ratio

5 Required monthly income less monthly median income

SOURCE: Bankoh Construction in Hawaii 1988. Modified by John Zapotocky, Consultant, to show Village Park.

Exhibit 8

Housing Unit Growth on Oahu
Year 1976 to Year 1987
By Development Plan Area

Development Plan Area	Year 1976 (2)	Year 1987 (3)	Change Units	Change Percent
PUC	142,543	166,317	23,774	16.68%
EWA	8,743	9,856	1,113	12.73%
CENTRAL OAHU	23,461	33,783	10,322	44.00%
EAST HONOLULU	12,350	15,161	2,811	22.76%
KOOLAUPOKO	29,059	33,359	4,300	14.80%
(1) KOOLAULOA	4,470	3,933	(537)	n/a
(1) NORTH SHORE	3,197	5,118	1,921	n/a
WAIANAE	9,677	10,798	1,121	11.58%
	233,500	278,325	44,825	

- (1) Definition of Development Plan Areas Altered
- (2) DGP "Development Plan Land Use Analysis" April 1980, p.
- (3) DGP "Development Plan Status Review" September 1988

IV. INDUSTRIAL

A. INTRODUCTION

A total of 130 acres of land have been proposed for Industrial designation. The purpose of the business park is to provide for a strong demand for well located industrial land in Central Oahu. An article in the Hawaii Realtor Journal of November 1, 1988 discusses the shortage of industrial space and indicates that "Base rental rates in these areas (Kalihi to Pearl City) have climbed 25 percent to 40 percent during the past 18 months, with no significant discounts for larger users." In addition, the article states that "Island wide vacancy rates of less than 2 percent have caused fee land values to rise above \$60 a square foot in the central Sand Island corridors."

The reasons for this rapid escalation of rents include a number of factors: a rapid increase in demand generated by recent strong growth in tourism; a strong demand for commercial properties which in turn compete with industrial uses; a lack of vacant space within the Primary Urban Center; the unlikelihood of an increase in supply of land for industrial uses in the PUC in the future; and with the exception of the James Campbell Industrial Park in Ewa, almost no availability of land in the Central Oahu and Ewa areas. This situation has been especially acute as the slow growth during the early 1980's due to national recession and high interest rates, discouraged planning for additional industrial space. Another factor which may have had a negative impact on the planning of additional industrial developments was the planning study conducted by the City Department of General Planning "Development Plan Land Use Analysis" dated April of 1980 which indicated an abundant supply of industrial land through the year 2000 and beyond.

To assess the future demand for new industrial lands it is necessary to assess the growth in demand for industrial land as well as the anticipated contraction of supply of existing industrial areas. It should be noted that the contraction in supply within existing industrial areas need not be a physical or a legal contraction but may also take the form of an economic contraction.

B. DEMAND FOR INDUSTRIAL LAND

The most recent reviews of demand for industrial land on Oahu conducted by the City and County of Honolulu Department of General Planning were undertaken in 1980 (*DGP Development Plan Land Use Analysis* April 1980) and in 1983 (*DGP Industrial Land Needs on Oahu* April 1983). The 1980 study concluded that there was no need for additional industrial land on Oahu thru the year 2000 based on an assumed growth in jobs traditionally linked to industrial land use. The 1983 study concluded that there was much less certainty about the adequacy of the supply of industrial land. Points raised in the 1983 study included: the loss of existing industrial lands to "higher" economic uses particularly in the Kakaako area and the change

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in the mix of uses requiring industrial land. The 1983 study did not quantify a specific need for additional industrial lands.

Given the tight market for industrial land identified previously, the following scenario for quantification of the demand for industrial land has been developed by the consultant. To estimate the total future need for industrial land the historic absorption of Industrial land is added to the estimate loss of existing Industrial land to higher uses.

Basic data on various industrial subdivisions is from the publication by the Department of Planning and Economic Development entitled Industrial Parks and Areas in Hawaii 1985 Exhibits 9 indicate that past demand for industrial land on Oahu has averaged approximately 68 acres per year for the past thirty year. This demand is segmented into demand for light, general and commercial industrial of 26 acres per year and demand for heavy industrial (at Campbell Park) at 42 acres per year.

Exhibit 9			
OAHU DEVELOPED INDUSTRIAL PARKS AND AREAS			
<u>AREA</u>	<u>YEAR</u>	<u>ACRES</u>	<u>TYPE</u>
Airport	1964	133	General
Bouganville	1979	24	Light
Central	1979	33	General
Gentry	1979	120	Light
Heeia	1960	25	General
Kapalama	1960	43	Light
Keapuka	N/A	18	Light
Mapunapuna	1962	87	General
Newtown	1973	11	Light
Pearl City	1974	106	Light
Puuhale	1958	60	General
Sand Island Access	N/A	4	Light
Shafter Flats	1968	19	Light
Waiau	1973	33	Light
Waipahu	1963	103	General
		819	
Gentry Inventory		-50	
Campbell	1958	1,314	
		-50	
TOTAL		<u>2,033</u>	

Based on the above annual demand for industrial space on Oahu during the last thirty years has been approximately seventy acres per year.

Demand Summary:

Light/Commercial/General = 769 acres / 30 years = 25.63 acres/yr
Heavy = 1,264 acres / 30 years = 42.13 acres/yr
TOTAL <u>67.77 acres/yr</u>

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C. REVIEW OF EXISTING AND POTENTIAL SUPPLY

1. Existing Island Wide Supply of Industrial Land

According to records available at the City Department of General Planning as of December 1987 there were 7,074 acres of land zoned Industrial on Oahu. In 1980 there were 5,906 acres of land zoned Industrial on Oahu. Thus there was an apparent gain of approximately 1,170 acres of industrial land during the past 7 years. On closer review, however, most of this "new" industrial land was recognition of existing uses within the Primary Urban Center Development Plan area. A large portion of the change occurred in 1982, with the adoption of the Comprehensive Zoning Code Maps to implement the development plans adopted for the PUC and Ewa areas. Implementation of the remainder of the development plans occurred in 1984 on the CZC maps. These plans resulted in the rezoning of large acreages to recognize existing uses (Note: At the same time approximately 300 acres of land carried in the City's inventory of Industrial zoned land was removed to recognize the Hawaii Community Development Authority control of land use within the Kakaako area). The second major increase in the amount of industrially zoned land occurred in 1986 with the adoption of the Land Use Ordinance. This event resulted in another use assessment of many properties and subsequent rezoning to Industrial for a number of parcels. Thus the increase in "new" land zoned industrial was limited to approximately 60 acres of land in Central Oahu at Gentry's Waipio Business Park, 78 acres in Kapaa Quarry and 240 acres of land at the Barbers Point Harbor (actual harbor site and surrounding lands owned by the State of Hawaii).

In essence, the "actual" amount of "new" non harbor industrial land on Oahu has remained static for approximately 7 years except for the increases at Gentry Business Park. With the exception of lands at Campbell Industrial Park and 60 acres at Gentry Business Park (which is not currently on the market) other Industrial lands are under the control of end users or investors.

A more concise synopsis of planned industrial development is contained in the DPED publication "Industrial Parks and Areas in Hawaii 1985" which provided an indication of proposed light, general and commercial industrial developments as well as specialized and heavy industrial developments. The information provided in the report was supplemented by the consultant and the resultant summary is shown on *Exhibit 10*. The information has been broken down to indicate proposed industrial developments which are actually competitive with other PUC and Central Oahu industrial properties because of their location. A total of 134.2 acres were identified of which 43.2 is the Hawlawa Valley Industrial Park under construction. According to the owner/developer Royal Construction Company all of the lots in the project are sold. The remaining properties to be developed are the Gentry Waiawa and Royal Kunia, Phase I developments. Neither of these developments has final development

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Phase II

approvals. Thus, very little inventory will be available in the next few years in the PUC or Central Oahu area.

Exhibit 10		
Proposed Industrial Development		
	<u>ACRES</u>	<u>PUC OR CENTRAL</u>
Halawa Valley Industrial Park ¹	43.2	43.2
Hawaii Kai	17.0	
Kapaa Valley Industrial Park	78.0	
Laie Industrial Park	30.0	
Lanakona Industrial Park	7.5	
Sand Island Industrial Park ²	60.0	
Gentry Waiawa Industrial	70.0	70.0
Royal Kunia Phase I	<u>21.0</u>	<u>21.0</u>
	326.7	134.2
PROPOSED LONGER TERM		
Campbell Park Expansion ³	320	
Mililani Technology Park ⁴	<u>250</u>	
	570	
¹ - Under Construction. All lots sold. ² - The site of this development is on State land which already contains numerous business operation on month-to-month revocable permits. It is unlikely that this development would add much to existing inventory. ³ - Limited value to users requiring location in proximity to PUC. ⁴ - Limited to high technology uses.		

2. Alternate Land Uses for Honolulu Industrial Land

Industrial areas within the Primary Urban Center which provided opportunities for businesses to service the urban core have been converted to uses of higher economic value. The conversion process is being accelerated by State and City planning policies which are currently in place as well as by recent proposals which would bring competing development into existing industrial areas.

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a. Existing State Policies

i. Kakaako

The Kakaako Community Development District is a State planning area administered by the Hawaii Community Development Authority (HCDA) a state agency. These lands contain the bulk of the 347.5 acres of I-1 zoned lands in the downtown Honolulu area. They are at the center of the Honolulu urban and commercial core and for many years have served as the most desirable location for industrial activity. The HCDA has planned these lands for a mix of residential, commercial and industrial uses. However, recent trends indicate a move away from industrial uses in favor of higher density (and higher value) residential and commercial uses. This trend was recognized in the DGP *Industrial Land Needs On Oahu* study dated April 1983. Many landowners and tenants are faced with substantial improvement district assessments so that even existing owners and long term lessees are faced with increased costs. The successful completion of Kakaako's first major redevelopments One Waterfront (office and commercial) and the Royal Capital Plaza (residential) has spurred other developers to commence a number of projects which had languished during the early 1980's. Two major projects, Pacific Park Plaza (office) and One Waterfront Towers (residential) are under construction with a number of projects including the first phase of the Naaru (residential) project set to commence shortly.

ii. Aloha Tower

The Aloha Tower Development Corp. is a state agency responsible for the redevelopment of the Aloha Tower area which fronts the Honolulu Harbor. The site has already been designated for Mixed Use Commercial Activities and although it is still unclear what the ultimate development of the site will be, the thrust of the development proposals that have been viewed to date are aimed primarily at businesses not generally related to the efficient movement of cargo or the servicing of harbor activities, thus putting increased pressure on the activities currently undertaken on the site to locate elsewhere.

iii. Honolulu Waterfront Plan

A more sweeping waterfront revitalization program is under consideration by the State. While planning is currently at the conceptual stages, changes are expected to have a major impact on the uses of industrial lands in the harbor area and in surrounding areas.

b. Existing County Policies

i. Chinatown

While not noted for a high degree of industrial use, the Chinatown area is developed with a mix of uses including industrial. Food processing and warehousing (especially oriental foods and products) as well as a number of small manufacturing operations including garment making are among the industrial uses currently contained within the area. Due to its location next to the city center and the high profile (both visual and political) any changes in uses for the area are likely to receive careful scrutiny. New or expanded industrial uses are unlikely to be viewed as suitable for this area and even less likely to be able to compete with the overflow demand for commercial office space, commercial retail and residential redevelopments that have been the norm for development in the area over the past decade.

In fact the City's Chinatown Special District which governs development of the area contains the following objectives: preservation of architecture and design scale; preservation of ethnic, social and human uses; compatibility of new development with existing development; and an improvement of the physical appearance of the area.

ii. Iwilei and Kalihi

The Iwilei and Kalihi industrial areas, the center of Oahu's pineapple processing activities, have seen a contraction of food processing and an expansion of commercial and light industrial activities. The city's 1986 Land Use Ordinance designated the bulk of both of these areas as IMX - Industrial Mixed Use. The purpose and intent of the Industrial Mixed Use District according to the Land Use Ordinance (LUO) is "to provide a gradual transition from industrial areas to non-industrial areas by permitting a broad range of uses". Therefore it is city policy to phase out industrial usage in favor of other uses including commercial and residential. Redevelopment in the area has been occurring at a rapid pace with major redevelopments including the Gentry Pacific Center (Formerly the American Can Company Plant) and the Dole Warehouse conversion on Nimitz Highway to a mix of industrial and commercial uses. A major office redevelopment of the Dole Company offices is underway and the former Gas Company Plant is being dismantled to make way for a major office complex.

3. Estimated Impact of Current Policies on the Existing Supply of Industrial Land

Based on the above discussions, the consultant has estimated that Industrial uses within areas targeted by State and County governments for redevelopment to alternate uses will result in a reduction of industrial uses as follows:

Exhibit 11			
IMPACT OF GOVERNMENT POLICIES EXISTING PRIMARY URBAN CENTER INDUSTRIAL AREAS			
<u>KAKAAKO</u>	- Area in industrial use 1980 -	147.0	acres ¹
	- Area in industrial use 2010 -	74.0	acres
	Reduction in area -	73.0	acres ²
	Annual reduction 73/30 -	2.4	acres/year
<u>IWILEI</u>	- Area designated in 1987 -	513.0	acres
<u>KALIHI</u>	- Annual reduction 1% -	5.1	acres/year ²
	Total land lost to industrial use -	7.5	acres per year

1 - DGP Industrial Land Needs On Oahu April 1983
2 - Consultant Estimate

4. Supply of Small Industrial Lots

One area of industrial demand which has not been satisfied to a significant degree outside of the PUC is in the area of small lots. *Exhibit 12* shows the results of a search of the DGP computer files. The results indicate that the bulk of the industrial land in small lot sizes is contained in the PUC. No doubt much of this variance results from zoning ordinances which were adopted after development in the PUC which require minimum lots sizes. Hence newer industrial developments outside of PUC are likely to contain larger lots on the average. The Land Use Ordinance adopted in 1986 requires that industrial lots contain a minimum of 7,500 square feet. Another factor influencing lot sizes is the cost of development. Subdivisions with large lots are generally cheaper to develop as the percentage of land dedicated to roads and other infrastructure is typically less on a percentage basis the larger the lot size.

Exhibit 12

SMALL INDUSTRIAL LOTS
PUC, CENTRAL, EWA
December 1987
(Special Computer Run DGP Files December 1988)

LOT SIZE SQ. FT	PUC		CENTRAL OAHU		EWA	
	LOTS	ACRES	LOTS	ACRES	LOTS	ACRES
5,100 >	852	69.52	18	1.83		
5,100 TO 7,599	175	24.94	27	3.82	3	1.18
7,599 TO 21,999	505	170.57	111	39.90		
	<u>1,532</u>	<u>265.03</u>	<u>156</u>	<u>45.55</u>	<u>3</u>	<u>1.18</u>

The lack of availability of smaller lot sizes is an impediment to small businesses purchasing the real estate which their business occupies. The limited availability of smaller lots requires that a small business acquire lands beyond its own needs and thus become a landlord in order to keep costs within a reasonable range. The business may not be financially able or desire to become a landlord thus discouraging land ownership. As a secondary matter the size of parcels also determines the minimum investment necessary to participate in the industrial land market as an investor. The larger the parcel the larger the investment.

5. Vacant Industrial Land

Annually the Department of General Planning inventories the developable lands by land use category. For a number of years DGP has indicated that approximately 700 acres of industrial land are vacant. Reviewing the details of the most recent report indicate approximately 450 acres in Ewa (Campbell Park), 100 acres in Central Oahu, 100 acres in the PUC and the balance elsewhere, primarily in Koolaupoko. While such an analysis may have a number of uses it is not a valid indicator of the adequacy of supply of Industrial land. As discussed previously in this report, industrial land available in various development plan areas may not be a suitable substitution for industrial land in the PUC. In addition, holding vacant industrial land for future expansion or relocation is a legitimate business use of industrial property. Lastly, during the development phase land must necessarily be vacant. The Halawa Industrial Park is an excellent example. The lots within the development are under contract, however, have not yet closed due to the necessity to complete the improvements.

D. PROJECTED FUTURE DEMAND AND SUPPLY OF INDUSTRIAL LAND

Based on the past absorption of industrial land identified as light, general and commercial by DBED, plus the amount of industrial land in the PUC which the consultant estimates will be lost on an annual basis to higher uses in Kakaako and Iwilei results in an estimated total demand for approximately 33 acres per year (25.5 acres historical demand plus 7.5 acres estimated to be lost to the road.

A review of industrial developments planned updated by the consultant to reflect the most recent information indicates that approximately 135 acres of land is under consideration for development within the PUC and Central Oahu development plan areas for industrial use which currently have either Land Use Commission Boundary or City Development Plan approval.

Based on the estimated supply of 135 acres and the annual demand of 33 acres there appears to be a four year supply of suitable industrial land in the approval process. However, given the existing shortfall in supply of industrial land, it would appear prudent to provide for a much larger reservoir of industrially designated lands from which prospective businesses might choose.

E. SUMMARY

There is a long term demand for industrial land within or in close proximity to the Primary Urban Center. At the present time, there is an acute shortage of industrial properties as the sharp escalation in industrial rents and land prices demonstrate.

1. The immediate shortfall in industrial properties is due to strong economic conditions which are increasing demand for industrial land while at the same time increasing demand for other types of uses which compete with the industrial uses.
2. Government land use policy for the Kakaako and Kalihi areas which emphasize "higher" land uses including commercial and high density residential.
3. On the supply side there is a lack of developable properties within the PUC. While there has been an increase in the amount of land designated for industrial use the majority of that land is either unsuitable from a locational stand point or use (high tech and waterfront industrial) which make it unsuitable for the general market. In addition, at least a portion of the newly designated lands will require relatively long lead times to develop due to the major infrastructure required for their implementation.

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2. Government land use policy for the Kakaako and Kalihi areas which emphasize "higher" land uses including commercial and high density residential.
3. On the supply side there is a lack of developable properties within the PUC. While there has been an increase in the amount of land designated for industrial use the majority of that land is either unsuitable from a locational stand point or use (high tech and waterfront industrial) which make it unsuitable for the general market. In addition, at least a portion of the newly designated lands will require relatively long lead times to develop due to the major infrastructure required for their implementation.

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F. EMPLOYMENT

The Royal Kunia, Phase II industrial development is expected to generate 1,950 jobs. The total number of jobs is estimated by multiplying the number of acres (130) by the number of jobs per acre of industrial land (15/acre). See *Appendix D*.

G. HOW ROYAL KUNIA, PHASE II MEETS THE INDUSTRIAL NEED IDENTIFIED

The Royal Kunia, Phase II development meets the need for industrial land identified as follows:

1. It provides industrial land in close proximity to the Primary Urban Center. The Royal Kunia, Phase II has excellent freeway access.
2. The project will provide minimum sized industrial lots within a portion of the development. This size of lot is generally not available outside of the PUC.

V. GOLF

A. DEMAND FOR GOLF FACILITIES

1. Background

According to the State of Hawaii Data Book, 1986, there are fifty-seven golf courses in the State of Hawaii. These courses are further broken down by type; seven municipal; twenty resort; sixteen public; nine military and five private. During the past ten years almost all of the golf course development has taken place as an integral part of resort or other land development projects. This situation follows closely the national experience.

The City and County of Honolulu which, for all practical purposes, encompasses the Island of Oahu, contains 28 golf courses consisting of: four municipal, three resort, eight public, nine military and four private courses. Thus Oahu, which accounts for approximately 80% of the State's population, contains less than 50% of the State's golf courses. Further, Oahu, which has an average visitor census of approximately 50% to 60% of the State total, contains only 15% of the State's resort golf courses. In addition, the nine military golf courses included in the Oahu total are restricted (for all practical purposes) to active military, retired military and selected civil servants that account for less than 20% of Oahu's population.

At the present time, municipal golf courses on Oahu are operating at capacity, the four private country clubs all have waiting lists, the military courses are said to be at capacity, and the public daily fee courses are nearing capacity with fee increases anticipated as course capacity is approached.

While a number of new courses have been proposed, only two new courses—the Ko Olina (West Beach) Golf Course and the City's West Loch Course—are under construction. The first full year of operation for both courses is expected to be 1990.

2. National Golf Trends

Statistics provided in the National Golf Foundation's publication *Golf Facilities in the United States — 1985* attest to the growth of golf in the United States over the past 30 years. Between 1955 and 1985 the number of golf courses in the country grew from 5,218 to 12,346, a 136% increase. At the same time, population grew from 164 million to 237 million, a gain of only 44%. The number of private facilities have decreased from approximately 54% to 39%, indicating a broadening of the participation in the sport to include a wider spectrum of the American population (See *Exhibit 13*).

At a 1986 symposium sponsored by the National Golf Foundation, a nationally recognized organization of golf related operators,

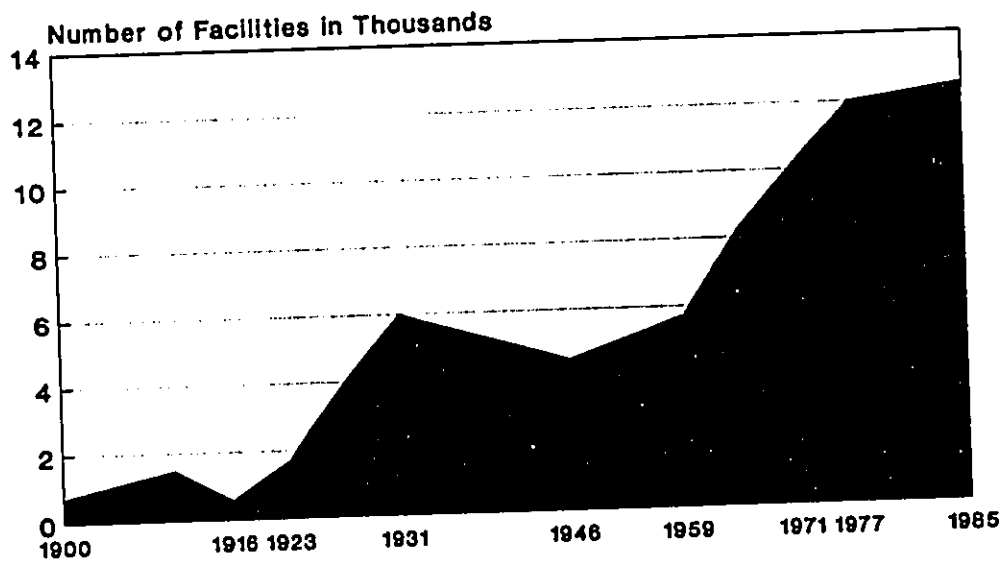
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managers, manufacturers and related affiliates, Dr. John F. Rooney of Oklahoma State University presented a paper on the *Demand for Golf in the Year 2000*. The paper presented historical data on the growth of golf in the United States and those factors which would be predictive of future growth. Dr. Rooney estimated that in 1986 there were 17,500,000 golfers being accommodated by 12,500 golf facilities. (See *Exhibit 14*)

Growth generators for the future were projected to be: higher incomes; aging population; early retirement; more leisure time; flex time and residential mobility. Using alternate growth rates ranging from 0% to 5% and including only the known demographic changes in the population results in a range of 19,900,000 to 41,450,000 golfers by the year 2000. (See *Exhibit 15*) Thus in the short time between now and 2000 golf demand nationally would rise between 10% and 100%+.

At the same symposium in a paper titled *The Crisis in Public Golf Course Development*, Dr. Robert Adams of the University of New Hampshire attempted to quantify the demand for new golf facilities. Dr. Adams' research indicated that golf facilities nationwide are in tight supply (thus frustrating the desire for golf among the "wider spectrum" of golfers identified previously) and that the availability of public golf facilities declined in 23 of 50 states, including Hawaii. (See *Exhibit 16*) Dr. Adams, using the same alternate scenarios cited in Dr. Rooney's paper, but eliminating the 5% scenario, developed projected increases in golf facilities to maintain present levels of course availability. The results of his analysis showed the need for a range of 1,400 to 7,900 courses by the year 2000 if growth rates of 0% and 3% were assumed respectively. (See *Exhibit 17*) Annualized, these projections would result in increased golf course inventory of 100 to 560 per year. Need for additional facilities is expected to be the greatest in the south and the west, where population growth has outstripped new golf facilities in the recent past.

Exhibit 14 Growth of U.S. Golf Facilities



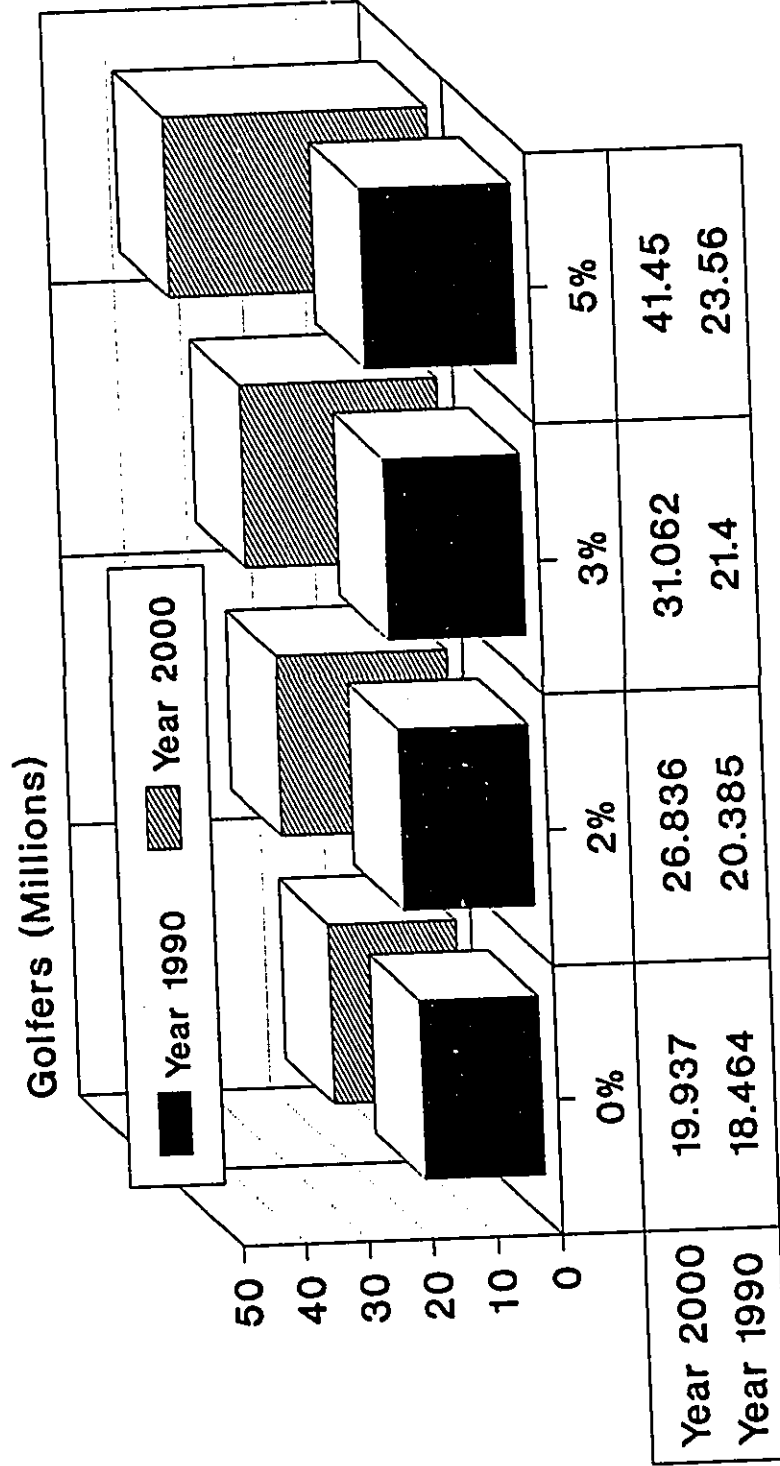
Source: G. Cornish and R. Whitten
The Golf Course and NGF

Golf Growth: 1960 - 1986

	<u>1960</u>	<u>1970</u>	<u>1980</u>	<u>1986</u>
Number of Facilities	6,400	10,200	12,000	12,500
Number of Golfers	5.0M	11.2M	15.1M	17.5M
Annual Facility Growth Rate		4.7%	1.5%	0.7%
Annual Golfer Growth Rate		8.5%	2.1%	1.1%

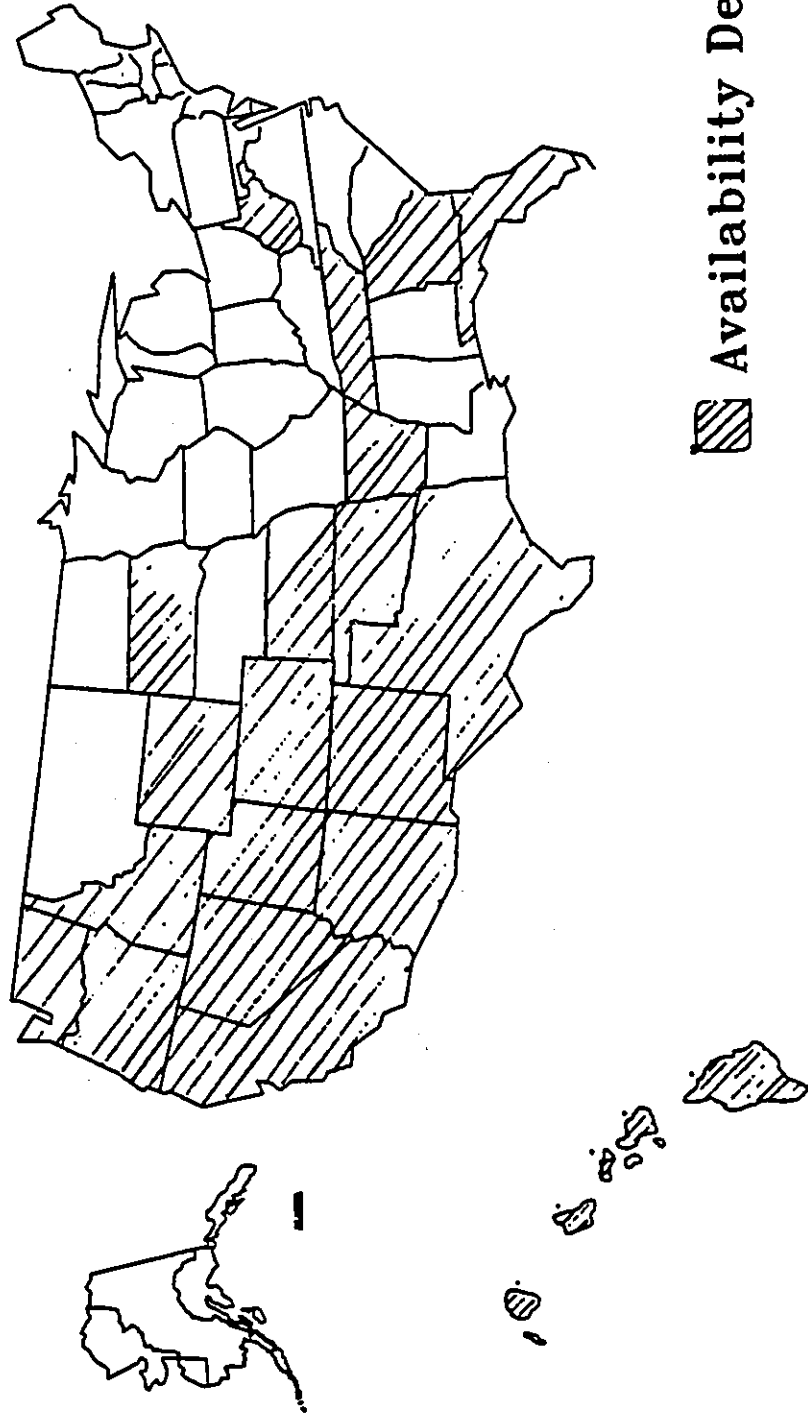
Source: NGF/Market Facts, Inc.

Exhibit 15 Potential Growth in Golf Participation



Source: National Golf Foundation
*Golf Projections 2000: Golf
 Summit '86 Research Presentation*

EXHIBIT 16
States that Declined in Availability
of Public Golf Facilities: 1975 - 1985



Source: U.S. Bureau of the Census and NGF

U.S. GOVERNMENT PRINTING OFFICE: 1985 O - 341-100

EXHIBIT 17

**COURSE DEVELOPMENT REQUIRED
TO MEET POTENTIAL GROWTH**

<u>Year</u> % Growth in Golf Population	Today	2000 @ 0% Growth	2000 @ 2% Growth	2000 @ 3% Growth
Number of Golfers	17,500,000	19,900,000	26,800,000	31,100,000
Number of Courses ¹ That must be added to Maintain Current Availability ²	0	1,399	5,420	7,926
Required Average Yearly Increase in Number of Courses to 2000 ³	--	100/year	387/year	566/year

¹ Course = 18-Hole Equivalents

² Current Availability = 58 Courses/100,000 Golfers

³ Average Yearly Growth 1983-1985 = 116 Courses/Year (Not 18-Hole Equivalents)

SOURCE: Market Facts, Inc. and NGF

Similar projections have been made by others. The following quote from an article in the January 1987 issue of Urban Land Magazine illustrates the point.

Golf will be a major beneficiary of the aging of the population. A disinterested baby boom generation slowed golf play growth considerably in the 1970s. However, as this generation moves into the 35- to 54-year-old age bracket group with the highest golf participation rate—and as growth accelerates in the 65-and-over population—the group exhibiting the highest per capita play—golf will benefit greatly. Today there are approximately 6 million golfers in the 35- to 54-year-old age bracket. By 1990, there will be approximately 7.2 million, and by 2000, golfers in that age group will swell to over 9 million, a 50 percent increase in 15 years. In addition, golf is becoming increasingly popular with women.

Thus, the number of golfers is expected to increase significantly by 1995 (See *Figure 1*). And, because of the aging population, golf demand (number of rounds) will rise at an even faster rate. Moreover, with a growing retirement population, golf demand during mid-week periods should accelerate, a major factor in improving the profitability of golf course operations.

FIGURE 1

GROWTH IN GOLF PLAY

Year	Number (Millions)	Percent Increase	Number of Rounds (Millions)	Percent Increase
1985	18.1	—	440	—
1990	19.1	5.5	466	5.9
1995	19.9	4.2	491	5.4

Source: Economics Research Associates

The awareness of golf has grown, in part, due to its prime time weekend television exposure supported by major sponsors who target their message at the middle income and affluent market. Golf awareness has also grown due to an increase in junior golf programs and the emergence of golfers as sports heroes.

3. Golf Trends In The State Of Hawaii

Golf in the State of Hawaii has also exhibited strong growth for many of the same reasons identified as golf generators nationally. Hawaii has been identified as one of the states in the nation with high golf intensity. (See *Exhibit 18*) The most explosive growth in golf in Hawaii during the past 20 years has been the development of the resort golf industry. This growth is described more fully later in the text.

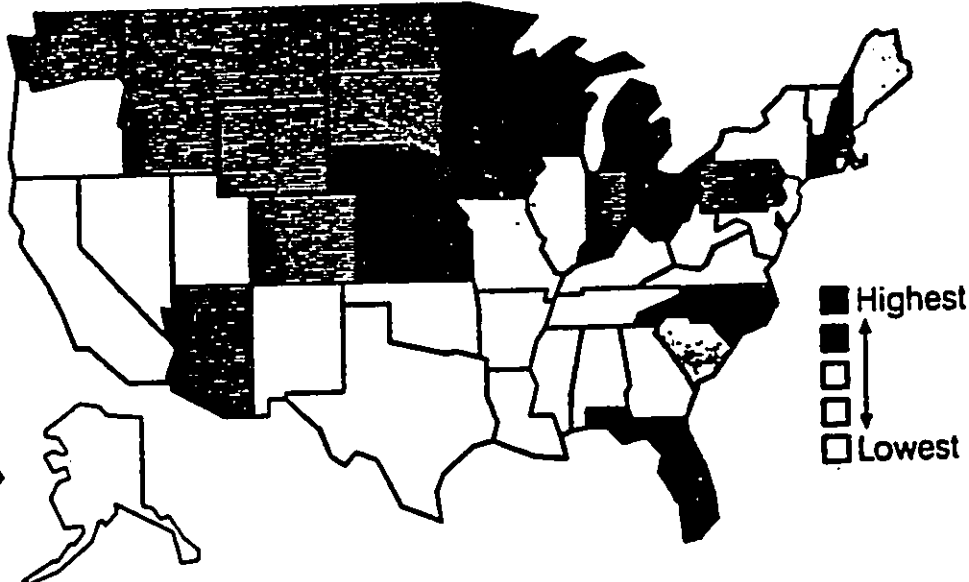
Golf growth in Hawaii is expected to come from two distinct factors: growth in the demand by residents and growth in the demand by tourists.

Demand for golf by residents is expected to grow at rates consistent with national trends. Based on the Department of Planning and Economic Development's M-F Series projections the median age of Hawaii's population is expected to increase from 29.9 in 1985 to 33.7 in the year 2000 with the 35- to 54-year-old population expected to grow by 40%. The aging of the population follows national trends. Demand for golf by tourists is expected to continue to increase with the growth of the visitor industry and may accelerate if the mix of Hawaii's visitors shift towards the up-scale market.

**EXHIBIT 18
GOLF INTENSITY**



Golf Intensity



Source: Rooney, Adams Golf Involvement Index

4. Resort Golf

The growth in golf as a leisure time activity has translated into the growth of golf as an activity for tourists. In 1955, none of the golf courses in the State of Hawaii could be classified as being resort courses; in 1965 only the Mauna Kea and the Kaanapali Golf Facilities could be classified as resort courses; by 1985 there were 20 golf courses in the state classified as resort golf courses.

An examination of golf courses by island (See *Exhibit 19*) indicated that resort courses have developed on the neighbor islands to a greater degree than on Oahu when measured against average visitor census or visitor expenditures by county (*Exhibits 20 and 21*). This can probably be explained by the fact that growth of the neighbor island visitor industry has taken place more recently and, to a large degree has focused around destination resorts. Proposed additions to Oahu's visitor plant such as West Beach and the Kuilima Expansion include golf facilities as prominent features of the proposed resort development plans. A recent study¹ commissioned by the State Legislature stated that Hawaii attracted approximately 200,000 golfers in 1985 and that they expended \$30,000,000 at the state's resort golf courses.

5. Background - Hawaiian Resort Golf

The development of destination resorts in Hawaii, starting with the development of Kaanapali on Maui over 20 years ago, have followed a more or less standard formula for success. In general, resorts have been sited in coastal areas with prevailing good weather and provided a variety of self-contained recreational amenities, including ocean activities, golf course(s), tennis facilities, shopping and various other amenities. In the early years golf and other recreational facilities were considered to be necessary cost centers for the resort development. Costs for these amenities were generally allocated to parcels for sale or lease and were recovered by sales of developable land within the resort. The basic reason for this assumption was that golf course fees and demand was relatively low in comparison to golf course operating and capital costs. During the past five years there has been an increase in the level of demand, and fees have been increased to allocate scarce playing times on an economic basis. Golf course operations have become self-supporting and, in a number of cases, profitable. This change in demand at Hawaiian resort courses is the result of maturation of the Hawaiian destination resort industry.

¹ Coopers & Lybrand, *A Master Plan for the Continued Development of Hawaii as a Sports Center*, February 1987.

**EXHIBIT 19
GOLF COURSES, BY ISLANDS: 1984**

Island and type of operation	Number of courses				Number of holes
	Total	9-hole	18-hole	27-hole	
State total ..	57	12	44	1	927
Hawaii	11	2	9	-	180
Public 1/	4	2	2	-	54
Municipal	1	-	1	-	18
Resort	6	-	6	-	108
Maui	10	2	8	-	162
Private	1	1	-	-	9
Public 1/	1	1	-	-	9
Municipal	1	-	1	-	18
Resort	7	-	7	-	126
Lanai	1	1	-	-	9
Public 1/	1	1	-	-	9
Molokai	2	1	1	-	27
Public 1/	1	1	-	-	9
Resort	1	-	1	-	18
Oahu	28	5	23	-	459
Private	4	-	4	-	72
Public 1/	8	1	7	-	135
Municipal	4	1	3	-	63
Military	9	3	6	-	135
Resort	3	-	3	-	54
Kauai	5	1	3	1	90
Public 1/	1	1	-	-	9
Municipal	1	-	1	-	18
Resort	3	-	2	1	63

1/ Privately owned courses open to the public on daily-fee basis.

Source: Bill Gee, 1984 Hawaiian Golf Almanac (Hawaii Junior Golf Association), pp. 3 and 8.

**EXHIBIT 20
WESTBOUND VISITOR ARRIVALS, BY COUNTIES VISITED
1980 TO 1985**

[Covers westbound visitors staying overnight or longer anywhere in the State, and any overnight or non-overnight interisland trips reported by these visitors. Based on a 20-percent sample through 1983 and a 10-percent sample for 1984 and 1985]

Year	State total ^{1/}	City and Co. of Honolulu	Hawaii County	Kauai County	Maui County
1980 ...	3,046,132	2,398,740	761,103	781,409	1,378,189
1981 ...	2,974,791	2,398,480	672,683	757,811	1,389,892
1982 ...	3,278,525	2,589,190	678,170	733,295	1,550,080
1983 ...	3,396,115	2,591,635	712,380	691,940	1,644,605
1984 ...	3,721,380	2,901,320	760,940	814,590	1,854,690
1985 ...	3,708,610	2,828,640	697,380	832,580	1,831,110

^{1/} Because many visitors visited more than one county, county data sum to totals greater than the State totals shown here.
Source follows next table.

AVERAGE VISITOR CENSUS, BY COUNTIES: 1980 TO 1985

[Unlike the preceding table, this table includes eastbound and north-bound visitors as well as westbound arrivals. Based on a 20-percent sample through 1983 and a 10-percent sample for 1984 and 1985]

Year	State total	City and Co. of Honolulu	Hawaii County	Kauai County	Maui County
1980 ...	96,497	66,680	7,195	7,259	15,363
1981 ...	95,968	66,455	6,561	7,225	15,727
1982 ...	105,310	73,445	6,725	7,050	18,090
1983 ...	108,045	66,695	8,690	7,990	24,670
1984 ...	118,660	67,370	7,570	10,930	32,790
1985 ...	116,700	65,280	8,040	11,470	31,910

Source: Hawaii Visitors Bureau, release dated March 1986 and records.

EXHIBIT 21
ESTIMATED EXPENDITURES BY VISITORS TO HAWAII,
BY COUNTIES: 1970 TO 1985

[Millions of dollars. Excludes expenditures by Hawaii residents]

Year	State total	City and County of Honolulu ^{1/}	Other counties ^{1/}			
			Total	Hawaii	Kauai	Maui
1970	595	442	153.0	53.4	45.1	54.5
1971	705	507	198.0	67.7	56.1	74.2
1972	840	609	231.0	77.0	61.9	92.1
1973	1,020	777	243.0	81.9	63.2	97.9
1974	1,225	928	297.5	99.3	73.9	124.3
1975	1,360	1,004	355.9	114.6	87.2	154.1
1976	1,640	1,213	427.2	126.8	101.8	198.6
1977	1,845	1,377	468.5	131.2	109.9	227.4
1978	2,146	1,569	577.0	152.9	137.9	286.9
1979	2,537	1,867	669.8	162.0	159.1	348.7
1980	2,875	2,097	777.5	187.6	189.3	400.6
1981	3,200	2,394	805.9	179.2	197.3	429.4
1982	3,700	2,748	951.8	200.9	210.6	540.3
1983	3,974	2,653	1,320.9	277.2	250.8	792.9
1984 ^{2/} ...	4,582	2,895	1,686.6	248.9	359.4	1,078.3
1985 ^{2/} ...	4,884	3,056	1,828.0	285.9	407.9	1,134.2

^{1/} Interisland air fares have been distributed on a prorata basis. Expenditures by eastbound visitors have been included with Oahu.

^{2/} Preliminary estimate.

Source: Hawaii Visitors Bureau, "Neighbor Island Statistics," tabular release dated March 1986.

6. Destination Resort Industry

As destination resorts have matured, the number of resort units providing potential golf users has increased, occupancy rates have improved and generally planned densities for developments have been reduced with a consequent upscaling of accommodations. These factors have encouraged the growth of the golf playing visitors.

Another factor encouraging the expansion of the golf playing visitor market has been the expansion, availability and marketing of resort golf facilities. The islands of Maui and Hawaii have led the state in the expansion of golf facilities. Twenty years ago on Maui, there was a single golf facility at the "infant" Kaanapali Resort. Today there are seven resort golf courses with a number of new facilities in the planning stages. Unlike a tennis court, each golf course is unique. Avid golfers seek opportunities for experiencing a number of championship facilities, thus encouraging them to return year-after-year. This has also resulted in word of mouth advertising upon their return home. Maui has marketed its golf on a national (U.S.) basis under the heading "Maui Golf Coast".

B. FUTURE PROSPECTS

Future prospects for growth in demand for Hawaiian resort golf look extremely bright for the following reasons:

- (a) Continued maturation of the Hawaii destination resort industry;
- (b) Favorable demographic trends in the United States (primary source of the Hawaiian visitor market);
- (c) Growth of eastbound tourist business (primarily Japanese) who also exhibit a high propensity for golf.

C. MATURING INDUSTRY

While golf course play at selected resorts shown in *Exhibit 22* shows a matching of play with resources, it does not take into account that, with the exception of Kaanapali, the resort developments shown have reached less than 50% of their ultimate size in terms of total units.

Further, Wailea and Kaanapali benefit from the availability of neighboring courses such as Makena and Kapalua, respectively, where development of visitor accommodations (hotels and condos) is, at a very early stage,

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comprising only 20 to 30% of ultimate development. It should be noted that all of the resort facilities shown in *Exhibit 22* are planning additional golf courses.

EXHIBIT 22

<u>RESORT AND NUMBER OF GOLF COURSES</u>	<u>ACTUAL ROUNDS FY 1988</u>	<u>DESIRED MAXIMUM ROUNDS¹</u>	<u>TWO TIERED PRICING²</u>	<u>ROUNDS RESERVED FOR HOTELS³</u>	<u>% ROUNDS FROM RESORT COMPLEX</u>	<u>COMMENTS</u>
Princeville 1 Course	70,000 ⁴	50,000	\$65/\$44	100	over 50%	Additional course is under construction
Kaanapali 2 Courses	106,000	108,000	No	No ⁵	60%	Additional course is under consideration for N. Beach Expansion
Wailea 2 Courses	98,000	100,000	\$80/\$45	90	70%	Additional course is under consideration
Mauna Lani 1 Course	43,000	44,000	\$100/\$50	No	66%	Additional course is being designed

- ¹ - Desired Maximum Rounds refers to rounds which the operator feels are achievable under current conditions due to seasonality of play. Theoretical maximum capacity is approximately 70,000 rounds per course.
- ² - Two tiered Pricing refers to a policy of pricing which discriminates in favor of complex (resort) guests. Resorts have priority reservations policies which give priority to hotels in making reservations for golf play. Operators have seasonal pricing policies. Rates shown are for high season. Kaanapali did not offer low season rates in 1987 or 1988.
- ³ - Wailea and Princeville have guaranteed availability for hotel guests. Kaanapali provides no guarantee but gives reservation priority. Mauna Lani owns both resort and hotel.
- ⁴ - Princeville course is 27 holes and capable of higher level of play; however, management considers the course the principal recreational asset and therefor wishes to maintain the lower level of play. The Sheraton Princeville opened in advance of the new golf course and therefore Princeville is accommodating demand on the existing course.
- ⁵ - While no two tiered pricing is available, a coupon book allowing the bulk purchase of 15 plays allows for lower priced golf for complex and local residents.

SOURCE: John Zapotocky, Consultant

D. GROWTH OF EASTBOUND TOURIST BUSINESS

Eastbound tourists are expected to account for a larger and larger share of the Hawaiian visitor industry. The Japanese are well known for their "national golf obsession". Japanese interest in golf is attested to by the purchase of a number of Oahu and neighbor island golf courses by Japanese investors in recent years. To date, the Japanese golfer has been a significant but not overwhelming factor in Hawaiian golf play, but this is expected to change. As the Japanese tourist market grows and the market matures, more and more Japanese visitors can be expected to take advantage of the availability and affordability (compared with Japan) of Hawaiian golf.

From 1980 to 1986 westbound tourists increased by 40% while eastbound tourists increased by 52%. (See *Exhibit 23*) This, coupled with the fact that Japanese visitors, the primary component of eastbound visitors, spend, on the average, 25% more per trip than westbound visitors, indicates a trend towards higher average visitor spending (Note: The average Japanese tourist spends (1988 est.) approximately \$400 per day vs. \$112 for U.S. tourists, however, their stay is shorter bringing spending per trip closer together). The July/August 1988 issue of Bank of Hawaii's *Business Trends* publication indicates that figures for 1987 show westbound visitors decreased by 1.2% while eastbound visitors increased by 18.2%.

It is anticipated that the Eastbound tourist market particularly the Japanese market will continue to grow over the long term. In the short term the Japan Ministry of Transport in September of 1987 announced "The Ten Million Plan — A Plan to Double the number of Japanese Outbound Travelers". This plan aimed at reducing Japan's foreign trade surplus is expected to double the number of Japanese that travel to foreign countries during the next five years. The program is a comprehensive effort on the part of the Japanese government to encourage foreign travel through: expanding destinations; promoting longer holidays; establishing the International Tourism Development Institute; offering incentives to promote travel. The incentives include: simplifying visa requirements; expansion of the working holiday program; increasing the tax exemption from 100,000 to 200,000 yen (\$800 to \$1,600 at current exchange rates); and providing tax incentives.

While there is no specific goal for increasing tourism to Hawaii as part of the program, it is logical to assume that with its existing tourist infrastructure and the familiarity of Japanese tourists with the Hawaiian vacation experience, Hawaii should be a major participant in the increase in Japanese foreign tourism. The tremendous growth in the number of Japanese visitors during the first half of 1988 tend to bear this out.

Over the longer term, it is anticipated that the number of eastbound visitors will increase substantially. The Department of Business and Economic Development Series M-K projections (Preliminary) dated January 1988 assume that Japanese tourists will account for 25% of the tourist business by 2005 vs. the 20% assumed in the previous M-F projections. In addition, the

EXHIBIT 23
VISITOR ARRIVALS AND AVERAGE DAILY VISITOR
CENSUS: 1980 TO 1987

Year 1/	Visitors staying overnight or longer			Average daily visitor census	
	Total	Westbound 2/	Eastbound 3/	Westbound 2/	All
1980	3,934,504	3,046,132	888,372	86,788	96,497
1981	3,934,623	2,974,791	959,832	85,449	95,968
1982	4,242,925	3,278,525	964,400	94,740	105,310
1983	4,368,105	3,396,115	971,990	97,390	108,040
1984	4,855,580	3,721,380	1,134,200	106,260	118,660
1985	4,884,110	3,708,610	1,175,500	103,820	116,700
1986	5,606,980	4,256,390	1,350,590	118,210	134,850
1986: 1st Q ...	1,393,170	1,087,640	305,530	127,060	142,340
2nd Q ...	1,421,160	1,094,260	326,900	118,670	134,840
3rd Q ...	1,450,850	1,073,130	377,720	114,120	132,600
4th Q ...	1,341,800	1,001,350	340,440	113,070	129,720
1987: Jan-Feb..	944,570	706,190	238,380	(NA)	(NA)
Percent change from corresponding period in previous year					
1980	-0.7	-3.0	8.2	-3.2	-2.2
1981	0.0	-2.3	8.0	-1.5	-0.5
1982	7.8	10.2	0.5	10.9	9.7
1983	3.0	3.6	0.8	2.8	2.6
1984	11.2	9.6	16.7	9.1	9.8
1985	0.6	-0.3	3.6	-2.3	-1.7
1986	14.8	14.8	14.9	13.9	15.6
1986: 1st Q ...	7.0	7.5	5.5	6.1	7.3
2nd Q ...	25.8	30.2	13.0	32.6	31.9
3rd Q ...	14.5	12.0	22.2	10.1	13.3
4th Q ...	13.1	11.5	18.5	12.0	14.3
1987: Jan-Feb..	6.9	3.1	19.8	(NA)	(NA)

NA - Not available.

1/ Beginning in 1984, sample size reduced from 20 to 10 percent and numbers rounded to the nearest 10.

2/ Arriving from the Mainland United States or Canada.

3/ Arriving from the Orient and Pacific areas.

Source: Hawaii Visitors Bureau.

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M-K projections assume a higher growth rate for tourism than the previous M-F projections.

E. POTENTIAL IMPACT OF JAPANESE TOURISTS ON GOLF DEMAND

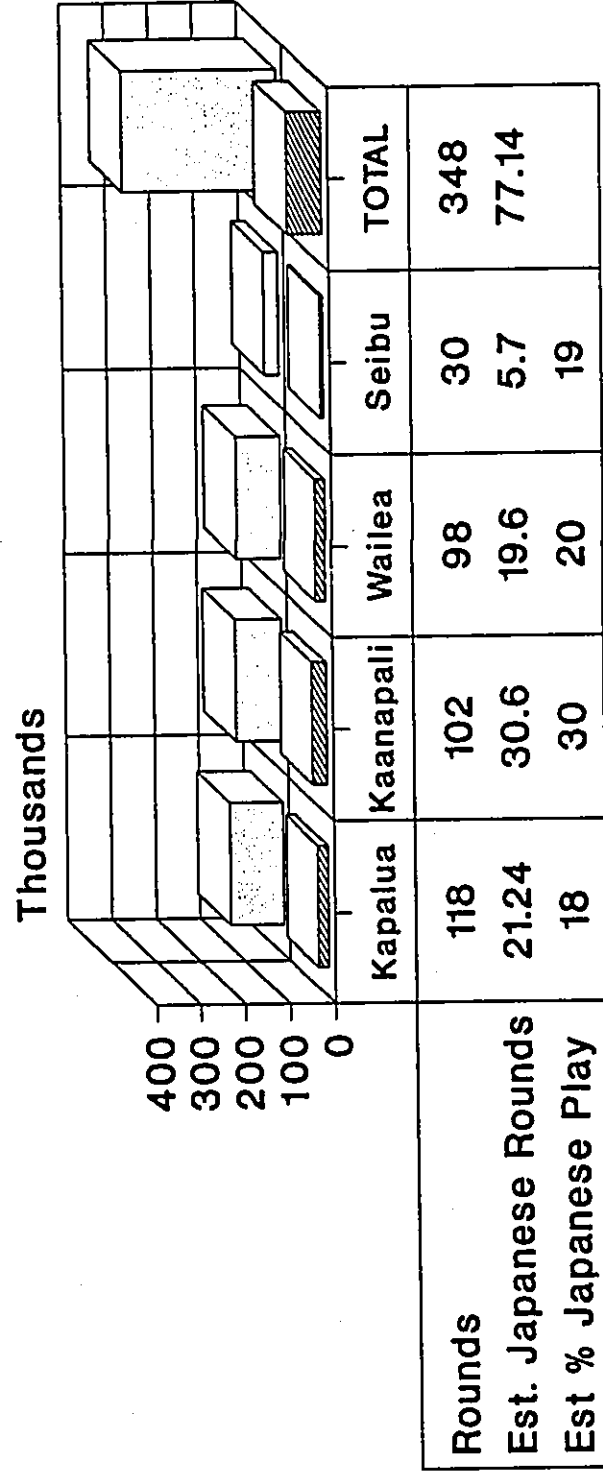
In order to estimate the potential impact of Japanese golfers the consultants undertook a survey of Japanese golf play on the island of Maui. The reason for using the island of Maui is that it is noted for its availability of golf, seven resort courses to serve approximately 2,000,000 visitors, three on Oahu for approximately 4,000,000 visitors². (See *Exhibits 24 and 25.*)

While Japanese travel (overnight or longer) totaled only 8% of total overnight or longer visitors to Maui³, they accounted for 77,000 or 22.2% of the 348,000 rounds of resort golf played on Maui in 1987. In 1985, the Maui courses estimated that the Japanese golfers accounted for only a negligible amount of the play. It should be noted that there is a significant amount of Japanese play on Oahu golf courses, however, for the most part Oahu golf courses are operating at capacity and increases in golf play by visitors must necessarily come from reductions in golf availability to local residents. The historic reliance by local golf facilities on local golfers and club play as well the potential for negative publicity have resulted in a relatively stable balance of play. In most cases Maui resort courses with the exception of the months of January, February and March operate at less than full capacity so that increases in play can be accommodated.

² Hawaii Visitor's Bureau 1987 Annual Research Report. May 1988.

³ IBID.

Exhibit 24 Japanese Golf Demand Maui Island 1987



Resort Golf Rounds

Est. Japanese Rounds
 Rounds

Estimated Number of Japanese Visitor Arrivals Maui 1987: 164,300
 Est Rounds per Japanese Visitor: 0.47

EXHIBIT 25

**Japanese Golf Demand
Maui Island 1987
Resort Golf Courses**

<u>Maui Resort Golf Courses</u>	<u>Rounds</u>	<u>Estimated Japanese Play (%)</u>	<u>Estimated Japanese Rounds</u>
Kapalua	118,000	18%	21,240
Kaanapali	102,000	3%	30,600
Wailea	98,000	2%	19,600
<u>Seibu</u>	<u>30,000</u>	<u>19%</u>	<u>5,700</u>
Total	<u>348,000</u>		<u>77,140</u>

Percent of Resort Rounds 22.2%

Estimated Number of Japanese Visitor Arrivals Maui 1987: 164,300

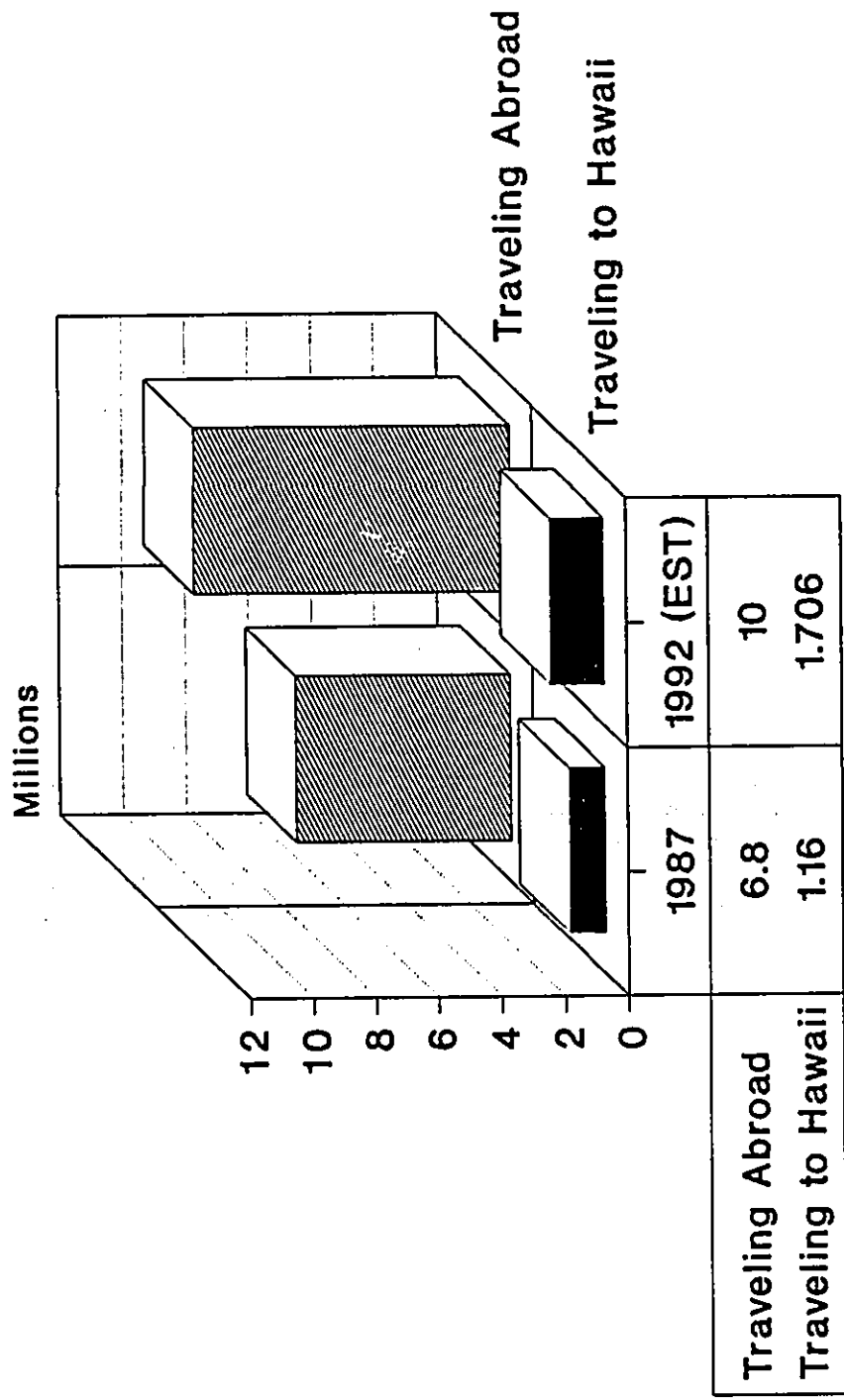
Estimated Rounds per Japanese Visitor Arrival: .47

Exhibit 25 indicates that if the ratio of golf play to Japanese tourists currently experienced on Maui were achieved on Oahu, Japanese tourists alone would require 11 golf courses by the year 1992 assuming that the 10 million abroad program currently in place met its target and if Hawaii got the same share of the market.

F. SEASONALITY OF RESORT GOLF

Maintaining the quality of resort play has been stressed time and again by resort management and development executives. Review of desirable annual levels of play and desirable daily levels of play indicate a wide discrepancy between a desirable annual level of play versus the theoretical annual level of play at the stated desired daily level. The reason for this situation is that demand for resort golf is seasonal in nature (See *Exhibit 27*). In fact, it is not unusual at Hawaiian resort developments for January and February to account for 20% to 25% of total annual rounds played. This seasonality has been recognized by resort managers for many years. The competition for high season starting times at many resorts has led to the allocation of these starting times. Many courses have supplemented existing priority of reservation schedules with high and low season rates as well as pricing policies designed to give favorable treatment to guests of the

Exhibit 26
Estimated Japanese Visitor Arrivals
Island of Oahu: 1987 - 1992



Est. Rounds Golf =
 Japanese Visitors X .46 = 800,924
 # of Golf Course @ 70,000/course = 11

complex. As the marketing strategies have become more sophisticated for the high season times, low season times have been getting extra attention, benefitting local players with lower rates and more starting times. (Resort managers have become increasingly aware of the large number of starting times which go unused during the low season and have been attempting to attract local play to tap this unused resource.

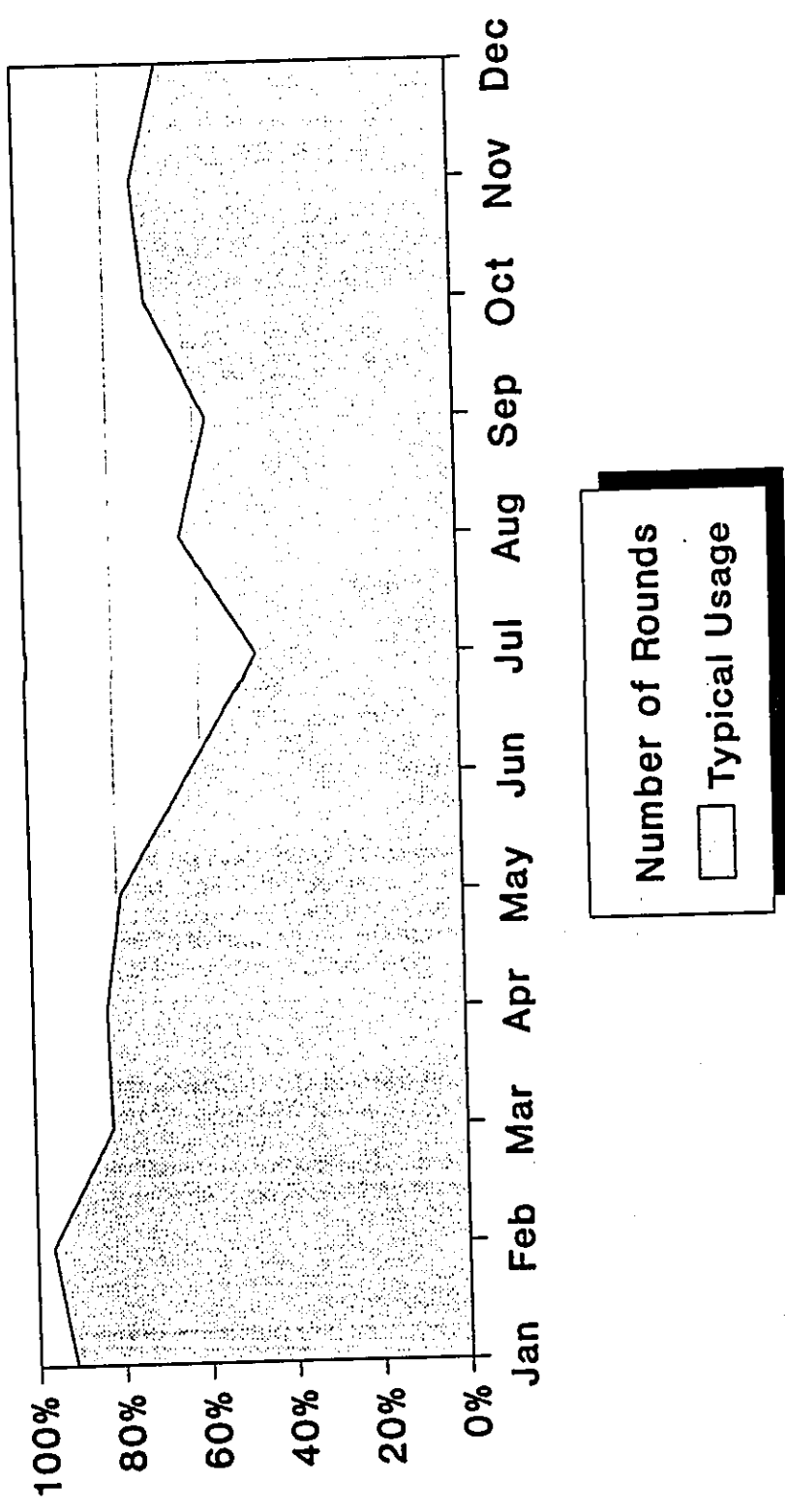
G. NUMBER OF ROUNDS AVAILABLE PER GOLF COURSE

Golf course capacity itself is the product of a number of physical and aesthetic considerations. Resort courses in Hawaii have in general limited play to between 175 and 215 rounds per day. At this level of play, golfers can enjoy the game at a leisurely pace with only a minimum of waiting and with minimum interaction with others playing on the course. Assuming an average of 200 rounds per day and 350 playing days per year, the capacity of resort courses should be at 70,000 rounds annually. Experience has shown that demand for golf from resort guests is strongest during the winter months. (*Exhibit 27*) In addition, demand for golf is also skewed in favor of morning times. Therefore, resort courses are generally operated below capacity during most of the year. A yearly average of 50,000 rounds per year is considered achievable and desirable by resort golf operators.

H. COMPUTATION OF DEMAND FOR RESORT GOLF

While the guests' desire for golf is impacted by the demographics of a typical guest and by pricing, a fair indicator of the golf requirements of guests can be estimated by the demands for golfing privileges made by potential hotel developers and operators. These individuals, due to their experiences at other resort properties, have determined the level of golf availability to make their operations competitive with other resort operations of similar types. While this figure varies from resort to resort, a ratio of one round of golf per ten rooms per day is a standard commitment sought by resort operators in today's marketplace. It is further estimated that every 15 residential units in a destination resort will generate one

Exhibit 27 Typical Utilization of Mature Hawaiian Resort Golf Facilities



Source: Chaney Brooks and Company
and John Zapotocky, Consultant

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round of golf per day. See *Exhibit 28* for demand experience and estimates of selected resorts.

EXHIBIT 28		
GOLF DEMAND FOR RESORT HOTEL AND RESORT RESIDENTIAL DEVELOPMENT AT SELECTED DESTINATION RESORTS IN HAWAII		
	<u>ANNUAL ROUNDS PER HOTEL ROOM</u>	<u>ANNUAL ROUNDS PER RESORT RES. UNIT</u>
ISLAND OF HAWAII¹		
Mauna Kea Beach Hotel	145	
Mauna Lani Bay Hotels	145	
Other Mauna Lani Hotels	100	
Mauna Lani Resort Res.		25
ISLAND OF MAUI²		
Wailea Development Company Hotels	30	
Resort Residential		39
ISLAND OF KAUAI³		
Princeville Development Company Hotels	125	
Resort Res. Owners		31
Resort Res Guests		19

¹ - Belt, Collins & Associates, *Final EIS Revised Master Plan for Mauna Lani Resort*, June 1985 and Updated Information from Mauna Lani Planning Staff.
² - Unpublished Information Wailea Development Co. Operating Plan Assumptions.
³ - Princeville Development Co., *Projection of Golf Rounds at Princeville Due to Phases One and Two Development*, Land Use Commission Filing 1985.

NOTES:

HOTELS: Information presented above shows hotel generated rounds on a daily basis ranging from 1 round per 2.5 rooms at Mauna Kea to 1 round per 12 rooms at Wailea.

RESORT RESIDENTIAL: Information presented above shows resort residential units generating between 1 round per 9 units at Wailea and 1 round per 19 units at Princeville.

SOURCE: John Zapotocky, Consultant

I. GOLF DEMAND AND SUPPLY ON OAHU

The Island of Oahu has twenty-eight golf courses. Of these, four are private country clubs, nine are military, four are municipal courses, eight are privately owned but open to the public (daily fee), and three are considered resort courses. After eliminating the military courses and the population

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eligible to use the military courses, the ratio of golf holes to population is one hole to 1,888 population. (The number of golf holes is used in order to eliminate discrepancies caused by courses of varying size, i.e., 9-hole, 18-hole and 27-hole). (See Exhibit 29)

EXHIBIT 29

**CITY & COUNTY OF HONOLULU
PER CAPITA GOLF ANALYSIS 1980**

Per capita golf analysis performed by the National Golf Foundation (1,105 persons per hole)¹ indicates that Hawaii ranks 21st among the states in population per golf hole, a respectable showing. However, if this analysis is applied on a countywide basis, military golf courses and population are excluded from the analysis, the island of Oahu and the City & County of Honolulu would rank 46th out of 50 states in persons per golf hole (1,888), ahead of only Maryland, California, Louisiana and Alaska.

Resident Population ²	1980	964,700
Resident Population ³	1980 Oahu	765,900
Military Population ²	Armed Forces	61,000
	Dependents	64,000
	Total	125,000

Number of retirees 9,040⁴ × 3.15 average persons per household 1980 = 28,500

Number of Golf Holes on Oahu⁵ (less military courses): 324

C & C Honolulu	765,900	Population less military	612,400
Military Pop. (Oahu)	125,000	Golf Holes	324
Retirees & Families	28,500	Persons per golf hole =	1,888

-
- ¹ - National Golf Foundation, *Golf Facilities in the United States - 1985*, Table D, Page 16.
 - ² - Table, *State Data Book 1981*, "Resident Population by Military Status."
 - ³ - Table 6, *State Data Book 1981*, "Resident Population by County 1970 to 1981."
 - ⁴ - Table 240, *State Data Book 1981*, "Military Personnel Receiving Retired Pay 9/30/80."
 - ⁵ - Table 179, *State Data Book 1981*, "Golf Courses and Tennis Courts, By Islands 1980-1981," p. 201. Revised by Consultant to reflect actual courses in existence since 1980. Eighteen additional holes as reflect in subsequent reports.

SOURCE: John Zapotocky, Consultant

During the past few years, interest in golf at local courses has increased with most of the local courses, increasing utilization and fees. Municipal courses on Oahu are some of the busiest in the country and the world. (See Exhibit 30) Public pressure has been increasing to construct new municipal courses and several alternative sites are under consideration. There is strong interest in development of private courses with forty courses under

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consideration by various developers. Others may be under consideration that have not been announced. (See *Exhibit 31*).

While the total potential supply of 44 courses looks overwhelming in light of the number of existing courses it must be viewed in terms of the likelihood of development and the long term demand for golf on Oahu.

A number of factors suggest that not all of the courses will be built, including: unsuitable infrastructure, including water availability and access; incompatibility with surrounding uses; incompatibility with city and state use guidelines; and the inability to obtain the necessary financing.

EXHIBIT 30

**CITY & COUNTY OF HONOLULU
MUNICIPAL GOLF COURSES
FY 1986, FY 1987 and FY 1988**

	<u>1986</u>	<u>1987</u>	<u>1988</u>
Ala Wai	197,000	198,000	188,000 ¹
Pali	144,000	140,000 ²	144,000
Makalena	155,000	165,000	165,000
Kahuku	38,000	42,000	48,000
TOTAL	534,000	545,000	545,000

¹ - Ala Wai Course undergoing major renovation in FY 1988 and FY 1989.
² - Increased rainouts experienced in 1987.

NOTES:

The City has started construction of a new municipal golf course in the West Loch area. The first full year of operation for this course is estimated to be Fiscal Year 1990 if no snags develop during the construction phase of the project. The City's golf administrator believes that a total of eight municipal golf courses would be needed to accommodate the current level of demand at municipal golf courses.

According to the *Golf Course Operating Survey* June 1986, prepared jointly by the National Golf Foundation and the Professional Golfing Association of America, average total rounds for municipal golf courses in the United States were 50,000 on 18-hole courses and 18,000 on 9-hole courses.

SOURCE: Dave Mills, Golf Administrator, City & County of Honolulu

J. GROWTH IN DEMAND ON OAHU TO 2010

The Consultants have developed trend analysis which project golf demand based on past growth in golf holes and based on the trend in the relationship of golf holes to population. Using the analysis an estimated 28 courses would be required by 2010 (See *Exhibits 32, 33 and 34*).

**EXHIBIT 31
GOLF COURSES PROPOSED
ISLAND OF OAHU
NOVEMBER 1988**

LOCATION	HOLES	RESORT	DAILY FEE	PRIVATE	MUNICIPAL
EWA:					
Ko Olina	54	54			
Meyers/Selbu	27		27		
Gentry West	18		18		
Kapolei/HFDC	18		18		
Puualoa	18		18		
Makakilo	18		18		
West Loch/City	18				18
West Hills/CE	18		18		
	189	54	117	0	18
CENTRAL OAHU:					
Waikale	18		18		
Royal Kunia	54		54		
Waiawa/Gentry	36		18	18	
Nihonkai Lease Co.	18			18	
Walola	18				18
	144	0	90	36	18
WAIANAE:					
Alpha Kai	18		18		
Mall Kai	36		18		18
Waianae Kai	27		27		
Lualualei/Nakade	18		18		
	99	0	81	0	18
OTHER OAHU:					
Mokuleia	36	36			
Waialau	18		18		
Pupukea	36		18	18	
Kullima	18	18			
Kahuku/CE	90		72		18
Waikane	54		54		
Tobashima	18		18		
Royal Haw'n C. C.	36			36	
Minami/Iolani	18			18	
Olomana/Kaliua	18		18		
Hawaii Kai	18		18		
	360	54	216	72	18
Grand Total	792	108	504	108	72
Equivalent Courses / 18	44.0	6.0	28.0	6.0	4.0

Source: Department of Land Utilization & John Zapotocky, Consultant

NOTE: Golf course development proposals without a specific designation have been included in daily fee courses.

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By using assumptions of resort demand developed in this report and recent population projections developed by the State, the consultants have constructed a demand analyses for golf on Oahu.

Exhibit 32

Oahu Golf Course History

<u>GOLF COURSE</u>	<u>LOCATION</u>	<u>TYPE</u>	<u>YEAR OPENED</u>	<u>Size</u>
Moanalua G.C.	Moanalua	Semi-Private	1898	9
Oahu C.C.	Nuuanu	Private	1906	18
Kalakaua G.S.	Schofield	Military	1918	18
Fort Shafter G.C.	Fort Shafter	Military	1919	9
Mid-Pacific C.C.	Lanikai	Private	1927	18
Waialae C.C.	Kahala	Private	1927	18
Ala Wai G.C.	Honolulu	Municipal	1931	18
Kahuku G.C.	Kahuku	Municipal	1937	9
Navy Marine G.C.	Aliamanu	Military	1948	18
Leilehua G.C.	Schofield	Military	1949	18
Kaneohe Klipper	Kaneohe	Military	1949	18
Pali G.C.	Kaneohe	Municipal	1953	18
Hawaii C.G.	Kunia	Daily-Fee	1957	18
Ford Island G.C.	Ford Island	Military	1962	9
Hawaii Kai (Executive)	Hawaii Kai	Daily-Fee	1962	18
Bay View G.C.	Kaneohe	Daily-Fee	1963	18
NAS Barbers Point G.C.	Ewa	Military	1966	18
Hickam G.C.	Hickam AFB	Military	1966	18
Hickam G.C.	Hickam AFB	Military	1966	9
Makaha West G.C.	Makaha	Resort	1966	18
Mililani G.C.	Mililani	Daily-Fee	1967	18
Pearl C.C.	Aiea	Daily-Fee	1967	18
Olomana Golf Links	Waimanalo	Daily-Fee	1968	18
Makaha East G.C.	Makaha	Resort	1969	18
Ted Makalena G.C.	Waipio	Municipal	1971	18
Turtle Bay C.C.	Kahuku	Resort	1972	18
Hawaii Kai (Regulation)	Hawaii Kai	Daily-Fee	1973	18
Honolulu International C.C.	Salt Lake	Private	1977	18

SOURCE: Gee 1984 *Hawaiian Golf Almanac*, 1984.

As shown on *Exhibit 35*, golf demand on Oahu will increase by 14 courses by the year 2010 if projected resort and population growth follow estimates made by the City's Department of General Planning. Total golf courses on Oahu by 2010 should then be 42 (28 existing plus 14 additional).

If, however, it is assumed that interest in the sport of golf grows by 2% per year in the City & County of Honolulu as has been predicted nationally, demand will grow by approximately 65% by the year 2010. If it is further assumed that this growth factor is applied only to the non-military courses,

EXHIBIT 33
NUMBER OF PERSONS PER HOLE
 Using a Linear Regression Analysis
 and Projection

YEAR	PERSONS PER HOLE		GOLF HOLES		POPULATION
	ACTUAL	PROJECTED	PROJECTED	ACTUAL	
1950	2,064	2,243	157	171	353,020
1960	2,417	2,043	245	207	500,409
1970	1,629	1,843	342	387	630,528
1980	1,661	1,644	464	459	762,565
1990		1,444	601		867,100
2000		1,244	760		945,400
2010		1,044	970		1,013,000

**EXHIBIT 34
GOLF HOLES ON OAHU PROJECTIONS BASED ON
PERSONS PER HOLE**

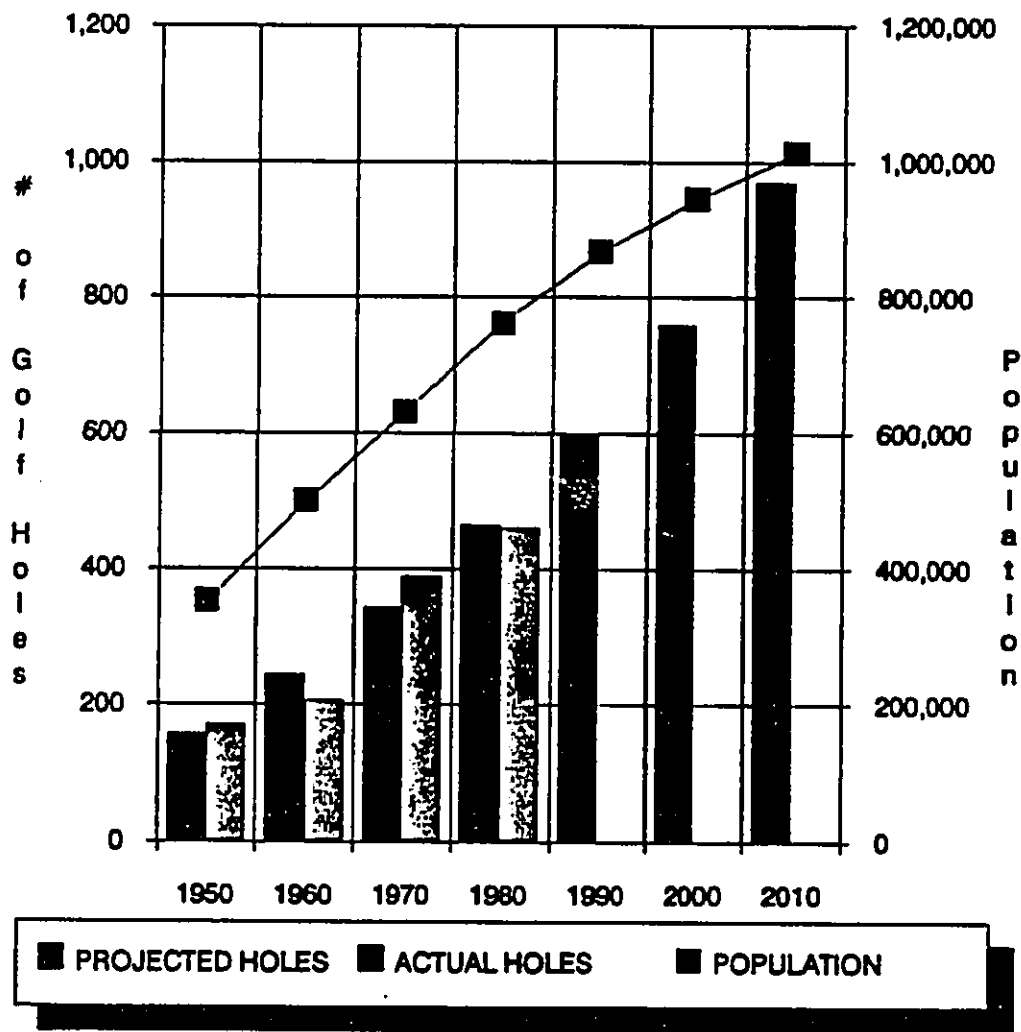


Exhibit 35
Growth In Demand For Golf Holes
Island of Oahu
1987 to 2010

Resort	Total	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
Hotel(1)	88.4	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
Condo(1)	57.6	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	
Resid.(2)	108.9	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	
TOTAL	250.9	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Cumm. Holes	10.0	20.1	30.1	40.2	50.2	60.2	70.3	80.3	90.3	100.4	110.4	120.5	130.5	140.5	150.6	160.6	170.6	180.7	190.7	200.8	210.8	220.8	230.9	240.9	250.9	250.9	
No. of Courses (18 Holes)	13.9	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Cumm. Courses	0.6	1.1	1.7	2.2	2.8	3.3	3.9	4.5	5.0	5.6	6.1	6.7	7.2	7.8	8.4	8.9	9.5	10.0	10.6	11.2	11.7	12.3	12.8	13.4	13.9	13.9	

(2) Residential growth based on M-K projections is 1,013,000 in 2010 vs. 811,100 in 1985. Number of population per hole is estimated at 1,888.

Population 2010 (1,000)	1013
Population 1985 (1,000)	811.1
Growth (1,000)	201.9
Population/Holes	1888
Number of Holes	106.9
Number Holes/Year	4.3

(1) Based on DBED M-K preliminary projections (1985 - 2010)
 Total Growth in visitor accommodations is 19,200 assume 50% hotel and 50% condo. Thus golf demand equals:

	Hotel	Condo
Units	9600	9600
Rounds/Units	10.0%	6.7%
Rounds	960	640
Courses	4.8	3.2
Holes	88.4	57.6
Per Year	3.46	2.30

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then an additional 35 courses (19 existing plus 14 new = 33 courses \times 65% = 21.5 courses) will be required.

Thus a grand total of 63 courses (35 new and 28 existing) could be required by the year 2010 if a 2% per year growth in golf participation is assumed.

Failure of supply to keep pace with demand is expected to result in a portion of the demand going unsatisfied. This unsatisfied demand is expected to hit the local resident golfer (adult and juniors) the hardest for two reasons: the tourist can outbid (pay a higher greens fee) and in general has a more flexible schedule which will enable him to take advantage of available times. Thus a lack of supply can be expected to result in higher fees and limited availability of starting times. Recent articles in the local print media attest to the difficulty local golfers are having in securing golf times particularly during "golden week". The result of demand from Japanese tourists and no new golf courses on Oahu for the past ten years.

K. SUPPLY AND DEMAND FOR GOLF COURSES IN THE EWA / CENTRAL AND WAIANA E OAHU AREA

The Ewa, Central Oahu and Waianae Development Plan areas currently contain approximately 25% of the population and 25% of the Oahu golf courses. These Development Plan areas are the basic market area for the proposed golf expansion at Ko Olina. There are eight golf courses located in the area; three are military, one is municipal, two are daily fee courses and two are resort courses. Military courses at Schofield Barracks and Barbers Point are not considered in this analysis because they operate solely for the benefit of military personnel. The remaining three courses — Mililani, Hawaii Country Club, Ted Makalena, Makaha West and Makaha East — are currently well utilized. Mililani is operating at capacity with a mix of local and tourist play, primarily Japanese. Hawaii Country Club is at capacity on weekends but has some additional capacity during the weekdays. According to the manager, approximately 80% of business is local and 20%, tourist. Ted Makalena golf course is a municipal facility, which, according to Dave Mills, the City's director of golf, is currently operating near capacity (165,000 rounds). Makaha West and East courses continue to operate with a mix of tourists and local residents.

There are presently twenty-four golf courses which are planned for the Ewa, Central Oahu and Waianae Development Plan areas. Two courses, the West Loch and the Ko Olina (West Beach) course, are currently under construction.

The General Plan for the City & County of Honolulu and the implementing Development Plans for Ewa, Central Oahu and Waianae specify that growth in employment and residential development be directed at the Ewa area. Based on DGP residential population allocation (Lot DBED M-K Projections), approximately two-thirds of the residential growth for all of Oahu between 1985 and 2010 will take place in Ewa, Central Oahu and Waianae. In addition approximately 75% of the growth in resort development proposed for Oahu is projected for the West Beach

Development in Ewa and resort expansion in Makaha. Thus additional courses needed in the Ewa, Central Oahu and Waianae areas can be estimated by adding resort and residential demand.

Exhibit 36 shows future demand for golf courses in Ewa, Central Oahu and Waianae to be approximately ten golf courses. If added to the five non-military courses currently operating in the area, a total of eleven courses will be required by 2010.

Assuming 2% annual growth in golf participation is applied to these eleven non-military courses, then a further seven courses will be required. A total of approximately thirteen new courses is indicated. Thus the total demand for golf courses in Ewa, Central Oahu and Waianae ranges between ten and twenty new courses by the year 2010.

Oahu demand for golf courses indicates a potential demand of 14 to 35 courses. A review of the potential sites under consideration for the development of additional golf courses on Oahu (*Exhibit 31*) indicates none of the potential sites are located in the Primary Urban Center, which is expected to house 50% of Oahu's population by the year 2010. The reason for this locational discrepancy is that the Primary Urban Center represents the urban core of the island of Oahu, which is heavily developed with urban uses. Any increase in demand for golf by residents of the Primary Urban Center will of necessity have to be satisfied outside of the Primary Urban Center. The most likely areas this overflow demand are Central Oahu and Ewa, because of the availability of land and an excellent transportation network of roads which have excess capacity during non-rush hour times.

Thus the demand of ten to twenty golf courses estimated for the Ewa, Central Oahu and Waianae areas could easily total twenty-five courses if the growth in demand from the primary urban center is satisfied in these areas.

L. SUPPLY OF GOLF COURSES IN THE EWA, CENTRAL OAHU AND WAIANAЕ DEVELOPMENT PLAN AREAS

At the present time there are twenty four golf courses proposed for the Ewa, Central Oahu, and Waianae DP areas. This avalanche of interest in golf development has been sparked by the fact that no new golf facilities have been developed on Oahu in over ten years and escalating green fees at Oahu golf facilities as well as at neighbor island facilities have led to a recognition the unfilled demand. The location of Oahu's first new resort area (Ko Olina) in over 15 years has also sparked interest in the potential for golf demand.

Two courses are under construction, one at West Beach and one at West Loch. Of the 22 remaining proposed golf developments for the area, two, Waikele and Meyers have for the most part completed the governmental approval process. The remainder of the proposed developments are at various stages in the approval process from having partially approved applications to having expressed only an interest in a golf development. It

EXHIBIT 36

Growth In Demand For Golf Holes
Ewa, Central Oahu and Waianae Development Plan Areas
1985 to 2010

	Total	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Resort																										
Hotel(1)	68.8						4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Condo(1)	42.0						3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Resid.(2)	70.4	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Total	179.0	2.8	2.8	2.8	2.8	2.8	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2
Cumm. Holes		2.8	5.6	8.5	11.3	14.1	24.3	34.6	44.9	55.1	65.4	75.6	85.9	96.2	106.4	116.7	122.9	129.1	135.4	141.6	147.9	154.1	160.3	166.6	172.8	179.0
No. of Courses (18 Holes)	9.9	0.2	0.2	0.2	0.2	0.2	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Cumm. Courses		0.2	0.3	0.5	0.6	0.8	1.4	1.9	2.5	3.1	3.6	4.2	4.8	5.3	5.9	6.5	6.8	7.2	7.5	7.9	8.2	8.6	8.9	9.3	9.6	9.9

(1) Based on DBED M-K preliminary projections (1985 - 2010)
Total Growth in visitor accommodations is 19,200 assume 50% hotel and 50% condo. The bulk of the resort development identified for Oahu is located in the Ewa and Koolauloa DP areas. Based on the development schedules for West Beach and Makaha areas the consultants have assumed the bulk of the growth in the 1991 to 2000 timeframe.

	1990 to 2000		2001 to 2010(a)	
	Hotel	Condo(b)	Hotel	Condo
Units	4800	5200	2600	1800
Rounds/Units	10.0%	6.7%	10.0%	6.7%
Rounds	480	346.6	260	120
Courses	2.4	1.733	1.3	0.6
Holes	43.2	31.2	23.4	10.8
Per Year	4.32	3.12	2.34	1.08

(a) Assumes growth in tourist accommodations allocated between Ewa & Koolauloa.
(b) The West Beach plan designates only 4,000 units as resort units, however, the proximity of the condo units to the resort suggest that they may ultimately take on resort characteristics as has occurred in other areas.

(2) Residential growth based on M-K projections is 202,000 by 2010 of which 133,000 or 65% are allocated to the Ewa, Central Oahu and Waianae DP areas. Estimated per capita per hole is 1,888.

Population 2010 (1,000)	300
Population 1985 (1,000)	167
Growth (1,000)	133
Population/Holes	1888
Number of Holes	70.4
Number Holes/Year	2.8

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should be noted that a number of the proposed golf courses are part of the planned development not included in population projections used by DGP. If approved and built, these courses would generate demand from residential and resort elements of the planned communities. It is the consultants' opinion that not all of the golf developments proposed will be approved and of the ones which are approved not all will be built for the same reasons expressed previously, i.e., lack of infrastructure; lack of compatibility with existing and proposed uses; and incompatibility with government plans. The four golf sites proposed in the Waianae area are generating strong community opposition and have resulted in vocal public protests. A number of bills have been introduced at the city council to address the community concerns.

In addition to the aforementioned bills, the city administration has submitted a bill to the council which if enacted would result in a moratorium on golf course development on agricultural land until question relating to the cumulative impact of such development have been assessed and a county policy formulated.

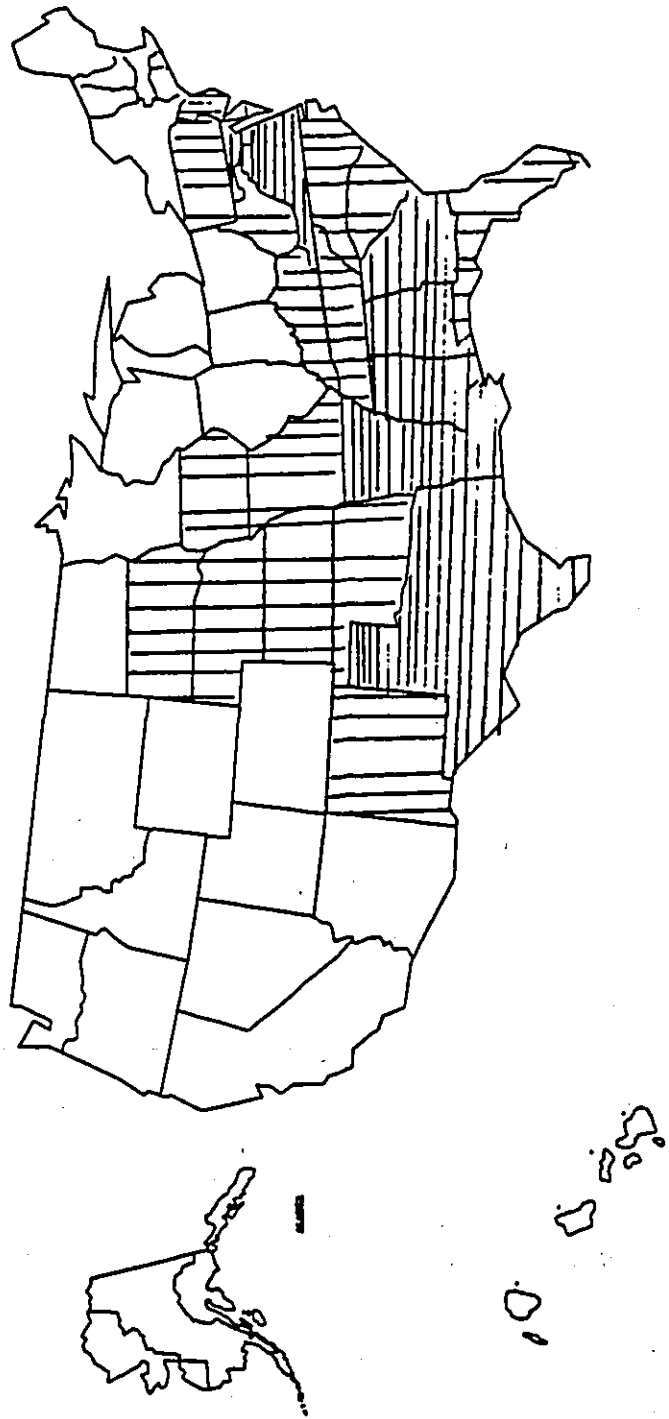
Given this setting and taking into account those impediments normally associated with the development process including: infrastructure availability; design; financing; marketing and development of a major real estate venture, the consultants believe that only 50% to 75% of the seventeen golf course developments under consideration in the area will be developed within the twenty year planning horizon.



M. DEMAND FOR PRIVATE GOLF COURSES

Exhibit 37 indicates that Hawaii is one of twenty-seven states where the number of private courses is less than 37% of the total. In fact, only four of Oahu's courses are private, for a total of 21% of non-military courses. A survey of Oahu's four private courses indicated that at the present time membership at all courses was closed. Oahu's newest country club, Honolulu International Country Club, closed its membership in August of 1987. The other three clubs—Waiialae, Oahu and Mid-Pacific—have had closed memberships for a number of years. Waiting lists range from 40 at Mid-Pacific to over 100 at Oahu Country Club. Time waits of one to five years are almost certainly discouraging new applicants.

The pent up demand for country club membership as evidenced by the waiting lists at the various existing clubs, indicates that a portion of the demand for new golf facilities will be for private country clubs. Of the estimated forty-four courses proposed, six courses have been proposed for private membership: Royal Hawaiian Country Club (two courses), Minanmi, Nihonkai, one of the Ohbayashi (Pupukea), and one of the Gentry (Waiawa) The Waiawa membership course would serve the retirement community proposed for Waiawa. The Ohbayashi Pupukea (private) course is part of a golf/residential complex. Thus both the Gentry Waiawa and Ohbayashi Pupukea development will provide demand internally for their developments. With the exception of the Gentry proposal targeted at the retirement market, the remaining development

Exhibit 37
**PERCENTAGE OF GOLF FACILITIES
THAT ARE PRIVATE**



 % Private > 55%
 % Private 37% to 55%



Source: NGF

proposals have been made by Japanese companies, a number of which have experience with golf course development operations in Japan.

N. DEMAND FOR MEMBERSHIP GOLF COURSE IN EWA, CENTRAL OAHU, AND WAIANAE

The nearest private golf facility to the Ewa, Central Oahu, and Waianae areas is the Honolulu International Country Club, which is six miles from the boundary of the Central Oahu area. As indicated previously, memberships for all existing private facilities are closed. *Exhibit 38* shows a demand for a private club membership in the area may reach 2,000 membership by the year 2010. Resident demand alone would be enough to sustain between 1.2 and 2 courses, depending on the maximum number of golfing members desired.

If the ratio of private clubs remains constant at 21% of non-military golf facilities, then the demand for private facilities in Central Oahu, Ewa and Waianae should be between 2 and 4 courses by the year 2010.

As indicated in *Exhibit 38* the demand for non-resident golf memberships could be substantial. It is uncertain how many non-resident memberships could be accommodated at club facilities. Existing courses provide little guidance on the matter as only Honolulu International Country Club has a substantial non-resident membership and the club has been reevaluating its membership policies.

However, for all of the reasons cited previously; growth in golf participation; pent up demand for private memberships; the virtually untapped Japanese market and unavailability of land in the PUC the consultants believe these figures could easily double over the 1.2 to 2 courses estimated in *Exhibit 38*. Thus, total demand including resident and non-resident demand for private membership facilities in the areas is estimated to range from two to four.

O. EMPLOYMENT

The golf course is expected to generate a minimum of fifty jobs, including proshop employment, maintenance employment and food service employment. See *Appendix E* for further details.

EXHIBIT 38
Growth In Demand For Golf Holes
Ewa, Central Oahu and Waianae Development Plan Areas
For Membership Golf Courses
1985 to 2010

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
Total																										
Non-Resident																										
Resort					26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
Non-Res.		33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Resident																										
Resort					26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
Resid.(2)	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
Total	16	49	49	49	49	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101
Cumm. Members Non-Resident	0	33	66	99	132	191	250	309	368	427	486	545	604	663	722	764	806	848	890	932	974	1016	1058	1100	1142	
Cumm. Members Resident	16	31	47	63	78	120	162	203	245	286	328	370	411	453	495	519	544	569	593	618	643	667	692	717	741	
Cumm. Members Res. & Non. Res.	16	64	113	162	210	311	412	512	613	713	814	915	1015	1116	1217	1283	1350	1417	1483	1550	1617	1683	1750	1817	1883	
Golf Hole Demand (Cumm.)																										
High	0.7	1.4	2.1	2.8	3.5	5.4	7.3	9.1	11.0	12.9	14.8	16.6	18.5	20.4	22.3	23.4	24.5	25.6	26.7	27.8	28.9	30.0	31.1	32.2	33.4	
Low	0.5	0.9	1.4	1.9	2.3	3.6	4.8	6.1	7.3	8.6	9.8	11.1	12.3	13.6	14.8	15.6	16.3	17.1	17.8	18.5	19.3	20.0	20.8	21.5	22.2	
Golf Course Demand (Cumm.)																										
High	0.0	0.1	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.4	1.5	1.5	1.6	1.7	1.7	1.8	1.9	
Low	0.0	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.5	0.6	0.7	0.8	0.8	0.9	0.9	0.9	1.0	1.0	1.1	1.1	1.2	1.2	1.2	

NOTES FOR EXHIBIT 38

(2) Residential growth based on M-K projections is 202,000 by 2010 of which 133,000 or 65% are allocated to the Ewa, Central Oahu and Waianae DP areas. Estimated private golf membership=per 100,000=340.

Population 2010 (1,000)	300
Population 1985 (1,000)	167
Growth (1,000)	133
Population/Membership	340
Number of Memberships	391.2
Number Memberships/Year	15.6

(3) Resident golfing members at the existing private clubs range from four hundred to six hundred members. Non-resident membership at existing clubs ranges from 13 to 645. Only Honolulu International Country Club has a substantial non-resident membership. For the purpose of this assessment it is assumed that demand will be determined by the number of local members. Therefore, demand is estimated by the number of local memberships.

Members	Holes	Members/Holes
High 600	18	33.33
Low 400	18	22.22

(1) Based on DBED M-K preliminary projections (1985 - 2010) Total Growth in visitor accommodations is 19,200 assume 50% hotel and 50% condo. The bulk of the resort development identified for Oahu is located in the Ewa and Koolauloa DP areas. Based on the development schedules for West Beach and Makaha areas the consultants have assumed the bulk of the growth in the 1991 to 2000 timeframe.

	1990 to 2000		2001 to 2010 (a)	
	Hotel	Condo(b)	Hotel	Condo
Units	4800	5200	2600	1800
Member (%)	0.0%	10.0%	0.0%	10.0%
Members	0	520	0	180
Members/Year	0	52	0	18

(a) Assumes growth in golf demand generated by anticipated growth in tourist accommodations allocated 75% to Ewa, Central Oahu and Waianae.

(b) The West Beach plan designates only 4,000 units as resort units, however, the proximity of the condo units to the resort suggest that they may ultimately take on resort characteristics as has occurred in other areas.

ADDITIONAL NOTES

Demand for private clubs in the Ewa, Central Oahu and Waianae areas will come from three distinct sources.

FOREIGN MEMBERSHIPS: The Honolulu International Country Club demonstrated the feasibility of marketing international memberships (primarily to Japanese Nationals) by selling 500 memberships over a ten-year period. Thus a demand has been shown for at least 50 memberships per year. Because of the growth in Japanese tourism and the three golf facilities (containing four golf courses) proposed to market at least a portion of their membership to this market it is estimated that this market can be increased to approximately 100 memberships per year. The Ewa share of this market is estimated to be 33%, assuming an even distribution over the three facilities. Thus demand from this source is estimated at 33 per year.

RESORT MEMBERSHIPS: The Wailea, Princeville and Kaanapali Resort courses have golf membership program to varying degrees. At the present time, approximately 25% of the Wailea Units have golf memberships, 10% of Princeville units have memberships. At Kaanapali, no memberships were offered after thirty memberships were sold in the early 1960's.

LOCAL MEMBERSHIPS: At the present time there are approximately 2,000 local members of private country clubs. There are approximately 680,000 non-military residents of Oahu. Thus the ratio of private club members to population is one per 340 persons. If this ratio is applied to the projected population growth then 133,000 / 340 = 391 members.

VI. RELATIONSHIP OF THE DEVELOPMENT WITH OTHER PROJECTS PROPOSED FOR THE AREA

The proposed Royal Kunia Phase II development is located within the Central Oahu Development Plan area. The project is an increment of the Royal Kunia Phase I project which itself is a continuation of the Village Park Development. The Royal Kunia Phase II/Royal Kunia Phase I development is one of six major residential projects planned for the area. The other projects are Mililani Mauka, Gentry Waiawa, Waikele, Melemanu Woodlands and Waiola. All six proposed development have residential land use as their primary focus. The Royal Kunia Phase II, Gentry Waiawa, and Waikele developments include significant components of employment oriented acreage including commercial and industrial lands beyond the internal needs of the residential components of the development. Mililani Mauka is adjacent to the Mililani High Technology Park which is potentially a major employer in the area. The Royal Kunia, Waiawa, and Waikele also contain major components of recreational open space in the form of golf courses which will provide for recreational opportunities for area residents as well as other island residents and tourists.

The Central Oahu area has been the location of significant residential development on Oahu for the past twenty years. It is the second most populous development plan area on Oahu and will retain that distinction at least through the year 2010 if projections by the City Department of General Planning are accurate. The area contains a wide variety of public facilities including, schools, libraries, police and fire facilities and major transportation links to the city center of Honolulu. During the past ten years three major developments have operated simultaneously in the area, Mililani (Makai), Village Park and Gentry Waipio.

A summary of existing and proposed project in the central Oahu area follows:

EXISTING PROJECTS

Gentry Waipio

The remaining units in the project should be complete and delivered by the first quarter of 1989.

Mililani Makai

The remaining 700 units are expected to be completed by the end of 1990.

Village Park/Royal Kunia, Phase I

The last Village Park units were delivered in the summer of 1988. All of the units approved for development in the first increment of Royal Kunia, Phase I (450) will be completed in 1989.

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Phase II

PROPOSED PROJECTS

Mililani Mauka

Mililani Mauka has been approved by the LUC for 6,600 residential units on 1,205.4 acres. The City and County of Honolulu Development Plan permits no units at the present time. The developer has made application for a development plan amendment to permit the development approved by the LUC. As of the date of this report no action had been taken on this request.

Royal Kunia, Phase I

Royal Kunia, Phase I has been approved by the LUC for 3,480 units on 547 acres. The City and County of Honolulu, Central Oahu Development Plan permits only 500 units. However, due to a reconfiguration of the development only 2,000 additional units are being requested. (Reconfiguration required to mitigate safety concerns raised by the Waikele Naval Reservation) The developer has requested an amendment to the CODP which will permit the remaining 2,000 residential units.

Gentry Waiawa

Gentry Waiawa has been approved by the LUC for 7,900 units. The CODP permits only 300 units. The Gentry Companies have applied for a DP amendment to permit development as approved by the Land Use Commission.

Waikele

The Waikele development has LUC and CODP approval for 2,640 residential units. The project has had City and County zoning for all of the proposed units. To date no actual development activity has been undertaken. The owner of the Waikele development Amfac Inc. was recently acquired by JMB. The new owner is said to be interested in pursuing the development of the project.

Melemanu Woodlands Phase III

The Melemanu Woodlands Phase III development has LUC and CODP approval for 1,100 units. The developer is requesting a Planned Development approval from the City Department of Land Utilization.

Waiola

The City Department of Housing and Community Development's 1,500 unit Waiola project has been rejected by the LUC. The project is expected to be resubmitted to the LUC in 1989.

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NOTE: All projects in the CODP area without DP approval require that the City and County of Honolulu General Plan be amended to permit additional development within the CODP. At the present time the population capacity of the CODP will be exceeded if units already permitted on the CODP are built.

There are two other major land users in the area, agriculture and the military.

Agriculture uses, primarily cane cultivation (Oahu Sugar) and pineapple cultivation (Dole and Del Monte) as well as diversified agriculture are undertaken in the area. Military uses are primarily the Schofield Army Base, Wheeler Air Force Base, and the weapons storage facilities in Waikele Gulch.

Development of major projects within the Central Oahu area has been ongoing for the past twenty years. These developments have been for the most part compatible with surrounding uses and each other. The major projects of Mililani, Gentry Waipio and Village Park have been competitors providing a choice in living environments. These developments have been responsible for a number of innovations in planned residential communities and in residential product design which over the years have been adopted by other developers on Oahu and in the State.

Approval of the Royal Kunia Phase II development will assure that the competition among various developers in the Central Oahu area will continue over the long term.

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61% of the units were sold to first time home buyers. This is consistent with a survey conducted in 1985 which indicated that 62% of the buyers at Village Park were first time homebuyers. Royal Kunia and predecessor development (Village Park) have consistently delivered single family housing at or near the lowest unit price offered for sale in the Central Oahu development plan area and propose to continue this program in the Royal Kunia Phase II development.

D. DELIVERY OF QUALITY PRODUCT

Royal Kunia and predecessor development (Village Park) have demonstrated that it can produce a quality product and deliver value for the money. The developer knows its costs and can speak authoritatively based on real life experience.

E. MOBILIZATION

Royal Kunia Phase II does not require a mobilization of development disciplines but is the continuation of a successful long term development project.

In summary, the Royal Kunia Phase II offers an opportunity to continue an existing project which has been providing moderately priced housing to local families over the past ten years. It will maintain the momentum of an ongoing project with a successful development team and a proven product. Approval of the project will assure the product will be available on a continuous basis in the moderately priced range for the next ten years.

VII. DISTINGUISHING CHARACTERISTICS OF THE ROYAL KUNIA PHASE II DEVELOPMENT

As discussed previously in this report the Department of General Planning has identified approximately 70,000 developable units on Oahu including eleven major developments in the Ewa and Central Oahu development plan areas. Most have also shown that the Central Oahu and Ewa areas are: (1) Acceptable locations for housing from the consumers point of view; (2) Permit development at reasonable costs; (3) Have access to existing or planned infrastructure; and show that their projects are viable and reasonable. The Royal Kunia Phase II development offers an opportunity to meet a portion of the identified housing needs by timely delivery of new units based on the following factors:

A. MOMENTUM

A study prepared by Belt, Collins & Associates indicated that it took on the average 6 years from the time a project was proposed until the first units were delivered. In the case of the original Village Park the process took an incredible 13 years. Any large new development faces the problems of getting approvals and developing product for the target market as well as assembling the staff necessary to carry out the development. All of this takes time. In the case of the Royal Kunia Phase II the development team is in existence and has a track record of being financially able and technically competent in production and marketing. Continuation of the Royal Kunia development will enable this development team to continue the momentum gained through years of experience and deliver units sooner than other projects.

B. INFRASTRUCTURE

Other major developments proposed for the Central Oahu area including: Mililani Mauka; Waikele and Gentry Waiawa will to one degree or another require that major infrastructure developments such as new water systems, freeway connections, and pump stations be developed. The details of these improvements often require negotiations between the developer and respective government agencies which will add to the time necessary for product to be delivered. By contrast the infrastructure improvements needed at Royal Kunia Phase II are primarily evolutionary in nature generally requiring that incremental additions be made.

C. TRACK RECORD IN PRODUCTION AND SALES OF AFFORDABLE HOUSING

The developer of the Royal Kunia Project has demonstrated the capability of delivering homes at its predecessor development (Village Park). With the exception of 1981 - 1983 when extremely high interest rates disrupted the home building industry and construction industry strikes in 1984 and 1986, the developer consistently delivered affordable units. A survey of the buyers of the last 200 units in the Village Park development indicated that

VIII. ABSORPTION

The following absorption schedules assume previous estimates regarding the absorption of units at Royal Kunia Phase I are met. NOTE: Only 450 units (including 150 low/moderate income units) within Royal Kunia Phase I have development plan approval. As discussed earlier in the text of this report the first 150 units were placed on the market in September 1988 and were selected within four days. Sales contracts are pending final subdivision approval. The remainder of the homes are to be placed on the market in February 1989 with all homes delivered by August 1989. Deliveries of the remaining 2,000 units of Phase I, under the most optimistic scenario for approval will not commence prior to November of 1990. Assuming previous estimates of absorption of these units of approximately 500 units per year (Brooks & Zapotocky Market Analysis for the Proposed Village Park Expansion October 1985) the remainder of units in Phase I will be absorbed by the end of 1994. Absorption of Phase II as follows:

A. RESIDENTIAL ABSORPTION

The proposed residential absorption assumes that a mix of the five product types proposed by the developer are developed over the life of the project (See Exhibit 39). During the last three years of the predecessor Village Park development only a very narrow range of product was developed, \$130,000 to \$152,000 single family homes, yet the developer was able to increase sales and deliveries in each year as follows: In FY 1986 (ending August 31) 300 units; in FY 1987, 360 units; and in FY 1988, 384 units. Based on this performance it is reasonable to predict that with four other product types being offered an average of 500 units per year of volume could be maintained throughout the project. NOTE: In FY 1989 it is anticipated that 450 units will be sold and delivered by the developer, 300 market single family homes and 150 low/moderate rental units.

Thus demand for the Royal Kunia, Phase II residential product is expected to be approximately 9% of the total residential demand for the Island of Oahu of 5,800 identified in Section III E. of this report.

The Royal Kunia Phase II has been planned to offer a variety of housing types and prices. The bulk of the product is expected to be affordable to the traditional Royal Kunia/Village Park buyer, the family with incomes ranging between \$30,000 and \$60,000 (See Exhibit 40). It is anticipated that first time homebuyers will continue to comprise approximately 60% of the product offered at Royal Kunia.

There absorption of the residential product proposed for the Royal Kunia Phase II development is shown on Exhibit 39 and more fully discussed below.

NOTE: Pricing and income levels described below are in 1988 dollars will be adjusted over time to reflect changes in incomes and costs.

Affordable Units (80% to 140% of Median) - Twelve hundred affordable residential units are planned for Royal Kunia Phase II. These units will

Exhibit 40

**Royal Kunia Phase II
Income Requirements**
Criteria Per HFDC Admin. Memo 1
In 1988 Dollars

RANGE OF AFFORDABLE PRODUCT TO BE OFFERED

Affordable Units (1)

Apartments	
Low	
Price	\$89,000
90% Mortgage	\$80,100
Debt Service (2)	\$702
CTF (3)	\$100
Total	\$802
Required Monthly Income (4)	\$2,432
Annual Income Range	\$29,181

TH/Zero Lot Line	
High	
	\$150,000
	\$135,000
	\$1,184
	\$100
Total	\$1,284
Required Monthly Income (4)	\$3,891
Annual Income Range	\$46,689

Market Units (1)

Zero Lot Line/SFD	
Low	
Price	\$150,000
90% Mortgage	\$135,000
Debt Service (2)	\$1,184
CTF (3)	\$125
Total	\$1,309
Required Monthly Income (4)	\$3,967
Annual Income Range	\$47,598

Golf Course Single Family Dwelling	
High	
	\$275,000
	\$247,500
	\$2,171
	\$229
Total	\$2,400
Required Monthly Income (4)	\$7,273
Annual Income Range	\$87,263

- (1) Fee Simple
- (2) Thirty Year Mortgage @ 10% Interest
- (3) Customer Trust Fund (Real Property Tax, Insurance)
Affordable Units \$100 per month
Market Units @ 1% of Sales Price / 12
- (4) Based on 33% of Income

NOTE: HFDC criteria assume 10% down payments. Traditionally, buyers of market priced units have larger down payments and hence lower qualifying requirements.

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include one and two bedroom apartments, one, two and three bedroom townhouses and zero lot line single family product. The units will be priced from \$89,000 to \$150,000 and are meant for a wide range of households. According to Exhibit 40 qualifying incomes for the affordable product would range from \$29,181 to \$46,689. Information developed by the consultant in Appendix C indicates that approximately 33,000 Oahu rental households have income levels which would qualify them to purchase units starting at prices of \$89,000. Units priced in this range should appeal to a wide variety of buyers. The units are expected to be absorbed over a five year period. Exhibit 39 shows the absorption of 240 units per year. This is likely to be a conservative figure given the pent up demand for affordable units and is likely to be even more likely if the developer is able to offer the lowest priced units as rental units. According to the Hawaii Housing Authority staff, there were approximately 8,000 families on the waiting list for public housing as well as 3,200 on the waiting list for Section 8 certificates, as of August 1987.

Market Units - Twelve hundred market housing units are planned for the Royal Kunia Phase II development. A range of product will be offered including zero lot line homes, single family homes and single family golf frontage homes. These homes will appeal persons with incomes ranging from \$47,500 to \$87,000. While a number of the buyers are expected to be first time homebuyers there will also be a number of buyers who are selling smaller residential units or less well located units in order to purchase at Royal Kunia Phase II. This is expected to be especially true of the larger golf course frontage homes. For persons who are trading up income levels necessary to qualify for the market homes are expected to be substantially lower as the down payments are expected to be much larger. Downpayments of \$30,000 to \$60,000 are common in upscale developments where a previous residence has been sold. Market units are expected to sell briskly over a five year period. Exhibit 39 shows the absorption at 240 units per year. This is a reasonable level of absorption given the experience of market product in Royal Kunia Phase I and of other market product currently on the market.

B. INDUSTRIAL ABSORPTION

Absorption of industrial property in close proximity to the Primary Urban Center is estimated to be approximately 33 acres per year. Absorption of the Royal Kunia Industrial area is expected to be approximately 50% of this total based on its location and the lack of potential competitors within the estimated development timeframe. The remainder of the demand is expected to be met by infill, encouraged by escalating rental rates and outlying industrial areas as described in the text. The industrial development proposed at the Gentry Waiawa development would offer strong competition to the Royal Kunia development. Given the limited availability of a existing and planned industrial development in the PUC and Central Oahu areas it is anticipated that the Gentry Waiawa and Royal Kunia Development will be competing primarily with each other. Thus it appears reasonable that the Royal Kunia Phase II development could obtain a 50%

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share or 16 acres per year absorption rate over eight years beginning in 1995.

NOTE: An application on file at the Department of General Planning indicates that the Gentry Business Park in Waipio which is currently approved for an additional 50 acres of I-2 development, has requested a modification to its industrial designation which would provide for a wider variety of uses. According to Gentry representatives this request is being made to restore a number of uses for Industrial land which were lost, due to the adoption of the Land Use Ordinance in 1986. In addition, Gentry has suggested that a number of retail type operations, i.e. Toys R Us and Factory Outlet would also be sought. Gentry also proposed a business hotel be developed at the site. Thus the change has been requested not because of a lack of demand for industrial land but to enable the Gentry Companies to complete the development of the Business Park with a wider range of land uses.

C. GOLF

The demand for golf development in the Ewa, Central and Waianae areas has been estimated in the text of this report to be as high as 25 courses. Demand for golf courses in the Ewa, Central and Waianae areas could be as high as ten courses by 1995. A total of 24 potential courses have been identified in the area, however, this potential ranges from courses under construction to land on which inquiries have been made. The impetus for the growth in demand in the area is the Ko Olina Resort Development in Ewa. The uncertainty of the approvals of potential competitor courses makes specific absorption projections subject to question, however, as the Royal Kunia Phase II Golf course is a part of a housing development it would be desirable to undertake the development at an early stage. This would assure increased values for all properties within the Phase II development but primarily for the proposed golf front homes. Therefore it is the developer's intention to undertake the development of the golf course at the earliest possible time. Development time is estimated to be two years. Thus completion is estimated in 1996.

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D. SUMMARY OF ABSORPTION

The following table describes the absorption of the Royal Kunia Phase II development and how it relates to the absorption of the existing Royal Kunia Phase I development currently underway.

SUMMARY OF ABSORPTION

	RESIDENTIAL		INDUSTRIAL		GOLF	
	ROYAL KUNIA Phase I	ROYAL KUNIA Phase II	ROYAL KUNIA Phase I	ROYAL KUNIA Phase II	ROYAL KUNIA Phase I	ROYAL KUNIA Phase II
1989	500					
1990						
1991	500		20		1	
1992	500					
1993	500					
1994	500					1
1995		480		40		
1996		480		30		
1997		480		30		
1998		480		30		
1999		480		30		
2000				30		
2001						

IX. CONCLUSION

There is an existing unmet need for housing on Oahu and this need is expected to grow larger over the next twenty years.

There is an existing unmet need for industrial land in close proximity to the primary urban center and a market segment for minimum sized lots for small business which has not been addressed in areas outside of the primary urban center.

There is a shortage of golf courses on the Island of Oahu and a need to expand the recreational opportunities for the people of the City and County of Honolulu.

The Royal Kunia, Phase II development offers the community an opportunity to expand housing, accommodate economic growth, provide employment, increase recreational opportunities and to do so in an aesthetically pleasing manner.

APPENDIX A
List of Consultants

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LIST OF CONSULTANTS

JOHN ZAPOTOCKY, Real Estate Consultant, has an MBA Degree from the University of Hawaii. MR. ZAPOTOCKY has been a financial analyst for Kaiser Aetna (Hawaii Kai) and Wailea Development Company. He has served as Project Manager for the proposed Mokuleia Homesteads Development on Oahu's North Shore and has provided consulting services for a wide range of real estate projects.

APPENDIX B

HOUSING FINANCE AND DEVELOPMENT CORPORATION

May 18, 1988

ADMINISTRATION NO. 1

ADMINISTRATIVE MEMORANDUM

TO: All Concerned
FROM: Executive Director
SUBJECT: DEFINITION OF "AFFORDABLE HOUSING"

The attached is a revised definition of "affordable" housing which replaces the definition which was previously outlined in HHA Administrative Memorandum No. 7, dated June 15, 1987.

The basic changes are as follows:

1. The groups targeted under HFDC's Housing Development Program have been expanded to include families earning up to 140% of the area median income. This brings us in line with the scope of the Governor's Comprehensive State Housing Plan.
2. The "gap group" has been further segmented into the low-moderate and moderate income groups.
3. The income limits have been adjusted to reflect the FY 1988 income levels set by the U.S. Department of Housing and Urban Development.


JOSEPH K. CONANT

Attachment

cc: All Branches, Sections, Projects

DEFINING "AFFORDABLE HOUSING"

"Affordable housing" is a frequently used and often misused expression, particularly when describing certain homes for sale. All homes are affordable to some segment of the population, and the term is not necessarily synonymous with low-priced, low-income, or low-rent housing as the term often connotes. For example, a house with a \$500,000 price tag may be affordable to a millionaire investor, but is certainly not affordable to a family earning \$18,000 a year.

Thus when used by the Housing Finance and Development Corporation, the term "affordable housing" means housing which is affordable to certain target groups. Additionally, the term is broken down into two sub-categories, namely "affordable rental housing" and "affordable for-sale housing".

Target Group for Affordable Rental Housing

The target group for affordable rental housing is guided by the income limits established by the U.S. Department of Housing and Urban Development (HUD) for its rental housing programs. Use of HUD program limits as guidelines are recommended because of the following reasons:

- 1) HUD periodically updates the State's median income and income limits for its rental housing programs (including the Section 8 Existing Housing Certificates Payments Program, the Low-Rent Public Housing Program, the Section 236 Program, and the Section 221(d)(3) Program);
- 2) HUD's rental programs are well-recognized, and are aimed at assisting those families which have difficulty renting homes on the open market because of their limited incomes;
- 3) The HUD-established income limits are readily available; and
- 4) There exists the possibility that HUD moneys may be used to fund the development or rehabilitation of rental housing projects.

HUD has established very low income and lower income limits for participation in its rental programs. These FY 1988 Statewide limits for a family of four are currently as follows:

	<u>C&C of Honolulu</u>	<u>County of Hawaii</u>	<u>County of Maui</u>	<u>County of Kauai</u>
Very low income	\$18,250	\$16,950	\$17,000	\$16,950
Lower income	\$29,200	\$23,050	\$27,200	\$25,200

A rule of thumb states that a family should not have to pay more than 30% of its adjusted gross annual income for rent. This being the case, a very low-income family with an adjusted gross annual income of \$18,250 should not have to pay more than

\$456, and a lower income family with an adjusted annual income of \$29,200 should not have to pay more than \$730 a month for rent.*

A complete table showing Statewide income limits and maximum affordable rents for different family sizes is included as Attachment A.

It should be noted, however, that the HFDC should not necessarily be precluded from developing rental projects for those with higher incomes than the very-low or lower income target groups if there is a demand for such projects and if they are economically feasible. Furthermore, while a family's income level is an important factor in the development of affordable rental units, consideration should also be given to the special housing needs of such groups as the homeless, elderly, handicapped, abused spouses and displacees.

Target Group for Affordable Homes for Sale

If guidelines for the affordable rental target group are capped at 80% of the HUD established median income, then the income level of the target group for affordable for-sale

*These maximum rents are approximations. They may have to be adjusted downward depending on the target group to be serviced. Under the Section 8 Existing Housing Certificate Payments Program, for example, adjustments to a family's gross income are made to derive adjusted income. Adjustments are based upon such factors as number of dependents; whether a family member is elderly, handicapped or disabled; child care expenses incurred to permit the heads of household to be employed; and excessive medical expenses incurred by the elderly.

housing should theoretically start at 80% and range upward to approximately 140% of the HUD established median income. This translates to an annual gross family income range of \$29,200 to \$51,100 for a family of four in the City and County of Honolulu.

This affordable housing target group is often referred to as the "gap group" because it consists of families whose incomes are too high to qualify for government-assisted rental housing, but are often too low to qualify for conventional financing of a market-priced, for-sale housing unit. However, these "gap group" families are likely to be able to qualify for a mortgage loan if the mortgage interest rate and the home purchase price are sufficiently low.

The "gap group" can be further segmented by income level. That is -- (1) low-moderate income families who earn from 80%-120% of the HUD-established median income and (2) moderate-income families who earn from 120%-140% of the HUD-established median income. The FY88 income levels for a family of four in the "gap group" are as follows:

	<u>C&C of Honolulu</u>	<u>County of Hawaii</u>	<u>County of Maui</u>	<u>County of Kauai</u>
Low-moderate	\$29,200- \$34,800	\$23,050- \$34,560	\$27,200- \$40,800	\$25,200- \$37,800
Moderate	\$34,800- \$51,100	\$34,560- \$40,320	\$40,800- \$47,600	\$37,800- \$44,100

Many variables, particularly interest rates, must be considered in establishing the price of affordable homes for sale. Based on certain assumptions, the purchase price of homes would be as follows in order to be "affordable" by families in the "gap group" range in the City and County of Honolulu.

- . \$ 89,000 for a family earning 80% of median or \$29,200/yr
- . \$139,800 for a family earning 120% of median or \$43,800/yr
- . \$165,300 for a family earning 140% of median or \$51,100/yr

Assumptions:

The hypothetically affordable home sales price was derived by performing the following calculations, and was based on certain assumptions including a 30-year mortgage, a 10% interest rate, and a 10% down payment on a fee simple, single family dwelling unit.

The annual gross income was divided by 12 to arrive at a monthly income. This monthly income was then multiplied by a 33% qualifying ratio. \$100 was then subtracted from the product for estimated reserves for real property tax and insurance, with the remainder representing an amount available each month for principal and interest (P & I).

Working backwards, the mortgage principal amount was calculated based on the amount available each month for principal and interest; the sales price was then calculated by dividing the mortgage principal amount by 90% (to take into consideration a 10% downpayment).

Example:

Annual income.....	\$29,200/12
Monthly income.....	\$ 2,433
Qualifying ratio.....	x 33%
Amt. available for hsg. payment....	\$ 803
Less estimated reserves.....	(100)
Amt. available for P & I.....	\$ 703
Mortgage principal amount.....	\$ 80,100/90%
"Affordable" sales price.....	\$ 89,000

Although "gap group" families within the 80% to 140% income range are targeted for housing development, the HFDC should not rule out developing homes for those whose incomes are substantially less than the target group, if attractive financing programs (such as the Farmers Home Administration 502 Program) are made available.

Summary

The following are recommended income guidelines for the development of "affordable rental housing" and "affordable for-sale housing".

Affordable rental housing should be targeted for very low income and lower income families as defined by the U.S. Department of HUD. Generally, very low income families earn not more than 50% of the HUD area median income and lower income families earn not more than 80% of the HUD area median income. Attachment A sets forth the income limits for these families and the maximum rents which should be charged for each income category.

Affordable for-sale housing should be targeted to benefit the "gap group", comprised of families earning 80% to 140% of the HUD area median income. Attachment B depicts an affordability index for for-sale housing, which is based on certain assumptions.

Attachment A

AFFORDABLE RENTAL HOUSING TARGET GROUP
RECOMMENDED INCOME LIMITS AND RECOMMENDED MAXIMUM RENTS

VERY LOW INCOME	COUNTY OF HONOLULU		COUNTY OF HAWAII		COUNTY OF MAUI		COUNTY OF KAUI	
	Income Limits	Rent	Income Limits	Rent	Income Limits	Rent	Income Limits	Rent
Family Size								
1	\$12,800	\$320	\$11,850	\$296	\$11,900	\$298	\$11,850	\$296
2	\$14,600	\$365	\$13,550	\$339	\$13,600	\$340	\$13,550	\$339
3	\$16,400	\$410	\$15,250	\$381	\$15,300	\$383	\$15,250	\$381
4	\$18,250	\$456	\$16,950	\$424	\$17,000	\$425	\$16,950	\$424
5	\$19,700	\$493	\$18,300	\$458	\$18,350	\$459	\$18,300	\$458
6	\$21,150	\$529	\$19,650	\$491	\$19,700	\$493	\$19,650	\$491
7	\$22,650	\$566	\$21,000	\$525	\$21,100	\$528	\$21,000	\$525
8	\$24,100	\$603	\$22,350	\$559	\$22,450	\$561	\$22,350	\$559
LOWER INCOME								
Family Size								
1	\$20,450	\$511	\$16,150	\$404	\$19,050	\$476	\$17,650	\$441
2	\$23,350	\$584	\$18,450	\$461	\$21,750	\$544	\$20,150	\$504
3	\$26,300	\$658	\$20,750	\$519	\$24,300	\$608	\$22,700	\$568
4	\$29,200	\$730	\$23,050	\$576	\$27,200	\$680	\$25,200	\$630
5	\$31,050	\$776	\$24,500	\$613	\$28,900	\$723	\$26,800	\$670
6	\$32,850	\$821	\$25,950	\$649	\$30,600	\$765	\$28,350	\$709
7	\$34,700	\$868	\$27,350	\$684	\$32,300	\$808	\$29,950	\$749
8	\$36,500	\$913	\$28,800	\$720	\$34,000	\$850	\$31,500	\$788

Recommended income limits are based on the U.S. Department of HUD's income limits as of 1/15/88 for its rental housing programs and are therefore subject to change periodically. These maximum rents are approximate and may have to be adjusted downward depending on the target group to be serviced. Under the HUD Section 8 Existing Housing Certificate Program, for example, adjustments to a family's gross income are based upon such factors as number of dependents; whether a family member is elderly, handicapped or disabled; child care expenses incurred to permit the heads of households to be employed; and medical expenses incurred by the elderly.

(Rents\$8)

"AFFORDABLE" SALES PRICES OF GAP GROUP HOMES

Attachment B

CITY & COUNTY OF HONOLULU

Family Size	Income Ranges of Gap Group Families	Range of Monthly P&I Payments	Range of Affordable Home Sales Prices
1	\$20,450 - \$35,770	\$462 - \$884	\$58,542 - \$111,884
2	\$23,350 - \$40,880	\$542 - \$1,024	\$68,640 - \$129,676
3	\$26,300 - \$45,990	\$623 - \$1,165	\$78,911 - \$147,468
4	\$29,200 - \$51,100	\$703 - \$1,305	\$89,008 - \$165,260
5	\$31,050 - \$54,294	\$754 - \$1,393	\$95,450 - \$176,380
6	\$32,850 - \$57,488	\$803 - \$1,481	\$101,717 - \$187,501
7	\$34,700 - \$60,681	\$854 - \$1,569	\$108,158 - \$198,621
8	\$36,500 - \$63,875	\$904 - \$1,657	\$114,426 - \$209,741

COUNTY OF HAWAII

Family Size	Income Ranges of Gap Group Families	Range of Monthly P&I Payments	Range of Affordable Home Sales Prices
1	\$16,150 - \$23,224	\$344 - \$676	\$43,570 - \$85,610
2	\$18,450 - \$32,256	\$407 - \$787	\$51,579 - \$99,649
3	\$20,750 - \$36,288	\$471 - \$898	\$59,587 - \$113,687
4	\$23,050 - \$40,320	\$534 - \$1,009	\$67,595 - \$127,726
5	\$24,500 - \$42,840	\$574 - \$1,078	\$72,644 - \$136,509
6	\$25,950 - \$45,360	\$614 - \$1,147	\$77,692 - \$145,275
7	\$27,350 - \$47,880	\$652 - \$1,217	\$82,567 - \$154,049
8	\$28,800 - \$50,400	\$692 - \$1,286	\$87,616 - \$162,823

COUNTY OF MAUI

Family Size	Income Ranges of Gap Group Families	Range of Monthly P&I Payments	Range of Affordable Home Sales Prices
1	\$19,050 - \$33,320	\$424 - \$816	\$53,608 - \$103,353
2	\$21,750 - \$38,080	\$498 - \$947	\$63,069 - \$119,927
3	\$24,300 - \$42,840	\$568 - \$1,078	\$71,947 - \$136,500
4	\$27,200 - \$47,600	\$648 - \$1,209	\$82,045 - \$157,074
5	\$28,900 - \$50,575	\$695 - \$1,291	\$87,964 - \$167,432
6	\$30,600 - \$53,550	\$742 - \$1,373	\$93,883 - \$177,791
7	\$32,300 - \$56,525	\$788 - \$1,454	\$99,802 - \$188,149
8	\$34,000 - \$59,500	\$835 - \$1,536	\$105,721 - \$198,509

APPENDIX C

**Rental Households With Income Levels
Adequate to Qualify for For Sale Housing
Priced at \$89,000
Based on Criteria Established in
HFDC Administrative Memo 1 (Appendix B)**

Income Range 1983		Household Size						1988 Income Range 1983 * 123%		
Low	High	1	2	3	4	5	6	Total Households	Low	High
0	2,999	1,500	900	800	500	300	100	4,100	0	0
3,000	6,999	6,100	3,900	1,700	1,600	400	500	14,200	3,690	3,690
7,000	9,999	3,400	4,500	2,300	1,500	800	800	13,300	8,610	8,610
10,000	14,999	6,700	6,800	4,500	4,700	2,000	1,600	26,300	12,300	12,300
15,000	19,999	4,400	5,200	4,300	2,800	1,800	1,000	19,500	18,450	18,450
20,000	24,999	3,000	4,300	3,300	2,000	1,100	1,200	14,900	24,600	24,600
25,000	34,999	3,400	4,200	3,800	2,700	1,600	800	16,500	30,750	30,750
35,000	49,999	1,100	2,700	1,700	2,800	500	1,100	9,900	43,050	43,050
50,000	74,999	500	1,000	800	600	500	500	3,900	61,500	61,500
75,000	75,000	700	600	300	400	200		2,200	92,250	92,250
		30,800	34,100	23,500	19,600	9,200	7,600	124,800		
								124,800		

**1983 Rental Gap
Single Person Household**

0	2,999	1,500	0	3,539	5,899	318	
3,000	6,999	6,100	3,540	8,259			
7,000	9,999	3,400	8,260	11,799			
10,000	14,999	6,700	11,800	17,699			
15,000	19,999	4,400	17,700	23,599			
20,000	24,999	3,000	23,600	29,499	3,000	5.39%	162
25,000	34,999	3,400	29,500	41,299	3,400	100.00%	3,400
35,000	49,999	1,100	41,300	58,999	1,100	100.00%	1,100
50,000	74,999	500	59,000	88,499	500	100.00%	500
75,000	75,000	700	88,500	88,500	700	100.00%	700
		30,800					5,862

Minimum Income Level for
For Sale Affordable Housing 29,181

**1983 Rental Gap
Two Person Household**

0	2,999	900	0	3,539	5,899	318		
3,000	6,999	3,900	3,540	8,259				
7,000	9,999	4,500	8,260	11,799				
10,000	14,999	6,800	11,800	17,699				
15,000	19,999	5,200	17,700	23,599				
20,000	24,999	4,300	23,600	29,499	4,300	5.39%	232	
25,000	34,999	4,200	29,500	41,299	4,200	100.00%	4,200	
35,000	49,999	2,700	41,300	58,999	2,700	100.00%	2,700	
50,000	74,999	1,000	59,000	88,499	1,000	100.00%	1,000	
75,000	75,000	600	88,500	88,500	600	100.00%	600	
		-----					-----	
		34,100					8,732	

Minimum Income Level for
For Sale Affordable Housing 29,181

**1983 Rental Gap
Three Person Household**

0	2,999	800	0	3,539	5,899	378		
3,000	6,999	1,700	3,540	8,259				
7,000	9,999	2,300	8,260	11,799				
10,000	14,999	4,500	11,800	17,699				
15,000	19,999	4,300	17,700	23,599				
20,000	24,999	3,300	23,600	29,499	3,300	6.41%	211	
25,000	34,999	3,800	29,500	41,299	3,800	100.00%	3,800	
35,000	49,999	1,700	41,300	58,999	1,700	100.00%	1,700	
50,000	74,999	800	59,000	88,499	800	100.00%	800	
75,000	75,000	300	88,500	88,500	300	100.00%	300	
		-----					-----	
		23,500					6,811	

Minimum Income Level for
For Sale Affordable Housing 29,121

**1983 Rental Gap
Four Person Household**

0	2,999	500	0	3,539	5,899	318		
3,000	6,999	1,600	3,540	8,259				
7,000	9,999	1,500	8,260	11,799				
10,000	14,999	4,700	11,800	17,699				
15,000	19,999	2,800	17,700	23,599				
20,000	24,999	2,000	23,600	29,499	2,000	5.39%	108	
25,000	34,999	2,700	29,500	41,299	2,700	100.00%	2,700	
35,000	49,999	2,800	41,300	58,999	2,800	100.00%	2,800	
50,000	74,999	600	59,000	88,499	600	100.00%	600	
75,000	75,000	400	88,500	88,500	400	100.00%	400	
		-----					-----	
		19,600					6,608	

Minimum Income Level for
For Sale Affordable Housing 29,181

**1983 Rental Gap
Five Person Households**

0	2,999	300	0	3,539	5,899	318		
3,000	6,999	400	3,540	8,259				
7,000	9,999	800	8,260	11,799				
10,000	14,999	2,000	11,800	17,699				
15,000	19,999	1,800	17,700	23,599				
20,000	24,999	1,100	23,600	29,499	1,100	5.39%	59	
25,000	34,999	1,600	29,500	41,299	1,600	100.00%	1,600	
35,000	49,999	500	41,300	58,999	500	100.00%	500	
50,000	74,999	500	59,000	88,499	500	100.00%	500	
75,000	75,000	200	88,500	88,500	200	100.00%	200	
		-----					-----	
		9,200					2,859	

Minimum Income Level for
For Sale Affordable Housing 29,181

**1983 Rental Gap
Six Person Households**

0	2,999	100	0	3,539	5,899	318	
3,000	6,999	500	3,540	8,259			
7,000	9,999	800	8,260	11,799			
10,000	14,999	1,600	11,800	17,699			
15,000	19,999	1,000	17,700	23,599			
20,000	24,999	1,200	23,600	29,499	1,200	5.39%	65
25,000	34,999	800	29,500	41,299	800	100.00%	800
35,000	49,999	1,100	41,300	58,999	1,100	100.00%	1,100
50,000	74,999	500	59,000	88,499	500	100.00%	500
75,000	75,000		88,500	88,500	0	100.00%	0
		-----					-----
		7,600					2,465

Minimum Income Level for
For Sale Affordable Housing 29,181

<i>Summary of Households</i>		Affordable House- holds
1	5,862	
2	8,732	
3	6,811	
4	6,608	
5	2,859	
6	2,465	
		33,336

Assumptions:

Affordability - HFDC Administrative Memo No. 1 May 18, 1988

Income Data - Financial Characteristics of the Housing Inventory

Annual Housing Survey: 1983 U. S. Census Bureau

Escalation - Income data from 1983 escalated by 23% to reflect 1988 Dollars

based on the relationship between median income for the respective years

APPENDIX D

INDUSTRIAL EMPLOYMENT

The consultant has estimated the employment at the proposed Royal Kunia, Phase II industrial park as follows:

Average Employment per acre Oahu Industrial Land 1975 ¹	12.88 workers/acre
Average Employment per acre Campbell Industrial Park ²	2.5 workers/acre
Average Employment per acre Gentry Business Park ³	26.0 workers/acre

The consultant has selected a figure of 15 jobs per acre. The rationale for the figure selected is that land intensive industrial uses are more likely to locate to the more remote industrial locations such as Campbell industrial park. Developments such as the Royal Kunia, Phase II industrial park would tend to attract more intensive land users which would require a more convenient location. Thus the workers per acre should exceed the average for the island, hence the selection of 15 workers per acre.

- ¹ Based on survey conducted by Department of General Planning for "Development Plan Land Use Analysis" April 1980 p. 92. Total industrial jobs equal 53,363 and total industrial acreage employed is 4,143.
- ² Survey of James Campbell Industrial Park provided by Walter Yoshimitsu, Park Manager.
- ³ Survey of Gentry Business Park June 1986. Total employees is 447 and total land developed is 17.25 acres. Note: Only developed lots included in survey.

APPENDIX E
Golf Course Employment

Golf course employment has been estimated by the consultant to be fifty persons. The following is a general breakdown of the golf course employment and is assumes a minimum level of staffing as follows:

Maintenance crew of fifteen including a superintendent, an assistant superintendent, two mechanics and eleven maintenance workers.

Pro Shop staff of fifteen including a golf pro, two assistant pros, cart mechanics, cashiers/starters, cart washers, marshals, janitors and an accounting clerk.

Snack Bar/Restaurant staff of twenty people.

Resort golf courses providing a high level of service often range between forty and fifty persons exclusive of food operations.

APPENDIX J

SOCIAL IMPACT ASSESSMENT

EARTHPLAN

J

ROYAL KUNIA PHASE II
SOCIAL IMPACT ASSESSMENT

Prepared by Earthplan
For Halekua Development Corporation
March 1989 (Revised)

1 Introduction and Background

This Social Impact Assessment was prepared for the Development Plan Amendment and Environmental Impact Statement (EIS) of the Royal Kunia Phase II proposed by the Halekua Development Corporation. This report describes the social context in which the Royal Kunia Phase II is proposed, and identifies potential social impacts of the proposal, including community issues and concerns. Note that employment and housing impacts are addressed by other consultants on the project team.

2 Description of the Existing Community

2.1 Central Oahu and Ewa

The proposed project is situated in westernmost portion of the Central Oahu Development Plan Area and borders the Ewa Development Plan Area. In the 1970s, Central Oahu was the fastest growing area on the island. The nearby Ewa Development Plan Area also experienced much growth in the 1970s, but its population is still small compared to Central Oahu. Central Oahu continued to grow in the early 1980s.

The 1980 census shows that, when compared to the islandwide population, Central Oahu and Ewa had younger populations. Both regions tended to have higher percentages of people from "different state," and Central Oahu's had more people "different country." Less people completed a 4-year college. Both regions are more family-oriented. Central Oahu and Ewa had mean family incomes below Oahu's average; Central Oahu, in particular, had a relatively high percentage of people below poverty level.

While both regions had high unemployment rates, Ewa's was particularly high. Both regions had lower proportions of people in managerial and professional jobs. Ewa shared this latter characteristic, but also had more people in service, agriculture, and labor-related jobs.

2.2 Waipahu as a Whole

Of all the Neighborhood Board areas, Waipahu experienced the largest population increase between 1980 and 1985.

When compared to the islandwide community and the Central Oahu and Ewa regions, Waipahu was the "youngest" community. Residents were more mobile (in terms of "same house") than the larger Central Oahu, but less so when compared to the islandwide community. Waipahu had only seven percent of people completing 4 years of college. This is lower than Central Oahu, and Ewa, both of which were, in turn, lower than Oahu averages. Waipahu was even more family-oriented than the larger regions. The family median income was slightly lower than Oahu's median income, and

is thus similar to Central Oahu and Ewa. Like Central Oahu, Waipahu residents tended to be employed in jobs which were less-paying than managerial and professional jobs.

2.3 Waipahu Town and Mauka Communities

Waipahu has two fairly distinct areas -- the town below the freeway (called "Waipahu Town" in this report) and the mauka residential communities of Crestview/Seaview, Waipio-Gentry and Village Park. The town's population has been stabilizing over recent years; the mauka population has tripled in numbers in just the first five years of the 1980s.

Both the town and the mauka areas have young populations. Most of the mauka residents in the new developments were from another part of the island. Waipahu Town had higher proportions of people who lived in different countries, or different states.

Mauka residents tended to be have completed more formal education than Waipahu Town residents. Residents of both Waipahu Town and the mauka communities are relatively family-oriented. Waipahu Town had lower mean family incomes and a significantly high percentage of families below poverty. That area also had a high unemployment rate; the mauka communities had very low unemployment rates.

2.4 Current Waipahu Issues and Concerns

In a 1982 survey, Central Oahu and Waipahu Town residents identified the "need to keep Oahu Sugar Company" and the need for more "housing that families making less than \$40,000 can afford" as top priorities. There was a distinct lack of concern about more "high quality housing." Over three-quarters of the respondents felt that "Many of Waipahu's important problems can be solved by well-planned growth."

In a 1988 survey, Waipahu residents reacted to the increasing number of care homes in the area, and traffic was no longer "not a problem." Complaints about airplane noise were expressed. Two-thirds of the respondents favored rapid transit.

Waipahu community leaders believe that much of their current needs and problems are related to a perception that this is a relatively poor community. Waipahu community leaders want to change this identity. They feel that most of the mauka communities do not necessarily share the problems of Waipahu Town and, consequently, they support similar developments. Waipahu appears to welcome new developments because they feel this will create a more diverse community. An ongoing effort among Waipahu leaders is supporting General Plan amendments allowing further development, and thus more people.

On a day-to-day basis, many of Waipahu's needs and values are reflected in the workings of the Waipahu Neighborhood Board. Major topics addressed by the Board included:

- adding much-needed public facilities, including a civic center, library and a police sub-station;
- reducing the number of care homes and halfway houses, particularly those that are unlicensed;
- support for current public plans for fixed rail rapid transit, in the hopes that traffic problems will be alleviated;
- solving current parking- and pedestrian-related problems;
- beautification efforts; and
- increasing police protection services.

The Board supported virtually all of the public-sponsored proposals, except for Waiola Estates which is still being studied. Residential developments which were privately-sponsored were also supported.

2.5 Village Park -- The Nearby Neighborhood

Village Park comprises primarily single-family detached houses on an average lot of 4,000 square feet. The community has 1,806 housing units, 120 of which are townhouse units. The completion rate of Village Park's housing component accelerated over the last three years, mostly because of reductions in interest rates. Further, Village Park selling prices increased, as did the housing absorption rate. These price increases were due to larger units, upgraded products and design changes.

Village Park was designed for the first-time homebuyer. Most of the buyers prior to 1985 were married couples in their early thirties. Over three-quarters were renters before they bought in Village Park, which implies that this was their first home purchase.

As the selling price of Village Park units increased, Village Park began attracting slightly different homebuyers. In 1986 and 1987, buyers were slightly older. Significantly more buyers already owned homes when they bought into Village Park. The non-married buyer became a new addition to the Village Park community. The implied trend in Village Park homebuyers is towards more experienced homebuyers earning higher incomes.

Current Village Park needs and values have to do with protecting and improving their community. Those interviewed wanted to instill community pride and encourage more cohesion. Some of the

current needs of the Village Park community include (1) property maintenance and enforcement of homeowner covenants; (2) neighborhood security; and (3) parking and speeding.

3 Non-project Changes To The Community

3.1 Proposed Changes In Central Oahu And Ewa

Both the Central Oahu and Ewa Development Plan areas are eyed for major development proposals, and some of these proposals have progressed towards realization sooner than others. In general, those in the Ewa Development Plan area have been more successful in obtaining land use approvals, primarily because of public policy to establish Ewa as Oahu's secondary urban center. Projects nearest the project site include Kapolei Village, Soda Creek and West Loch.

In Waipahu, only Waikele is in pre-construction stages. The other projects are either currently seeking land use approvals or are in the planning stage. Waiawa Ridge is seeking Development Plan amendments; and Waiola Estates is again in the planning stage.

Non-residential public facilities will also contribute to the changes in the region. A Paiwa interchange has been proposed by Amfac to facilitate access between H-1, Waikele and Waipahu. The Leeward Civic Center is designed to serve Leeward residents and comprising offices of government agencies. A Waipahu police substation has been requested by the community, and possible sites in new developments are currently being explored.

3.2 Near The Village Park Neighborhood

With the residential component in Village Park is already completed, only the 4.5-acre commercial area needs to be developed, and this is estimated for completion in 1991. Hoaeae Elementary is scheduled to open in September 1989.

Royal Kunia Phase I includes 2,450 single family detached homes and townhouses, a golf course, recreation center, 20 acres for light industrial and/or commercial facilities, and three park facilities. Phase I covers a total 715 acres. The bulk of Phase I -- 645 acres and 2,000 units -- is currently seeking Development Plan amendments.

A portion of Phase I has already received Development Plan approvals. The City is allowing 70 acres for 150 low to moderately priced apartment units and 300 single family units. A 5-acre park site is also included.

The 150-unit project recently received Planned Development approval. The 300 single-family units comprise Increment 1 of Royal Kunia Phase 1 and this is currently in process for Final Subdivision Approval. All homes are expected to be completed on or before August 31, 1989.

Unlike the Village Park homes, Increment 1 homes will be sold in fee. Increment 1 lots range between 5,000 and 8,000 square feet, and are thus larger than the average 4,000-square-foot Village Park lots. These two factors contribute to relatively higher priced homes in Increment 1, where current prices range from \$166,000 to \$204,000.

4 Potential Social Impacts Of The Proposed Project

4.1 Population

During the 1970s, the Central Oahu DP Area was proportionately the fastest growing of Oahu's eight DP Areas. Its average annual population growth rate of 4.3 percent exceeded the 4.1 percent for the Ewa DP Area. The bulk of Central Oahu's growth in the 1970s was in new communities and subdivisions.

Since 1980, Central Oahu has continued to grow primarily in new communities and subdivisions. The estimated population for Central Oahu in 1985 is 114,611.

The General Plan for the City and County of Honolulu contain percentage guidelines for the distribution of Oahu's population for the eight Development Plan Areas (DP Areas) comprising the entire Island of Oahu.

Until these distribution policies were revised in early 1989, the 2005 population allocated to the Central Oahu Development Plan area was already "absorbed" by the existing 33,783 residential units and additional developable capacity of 8,390 units.

Two revisions to the General Plan have occurred, however, which increases the growth potential for Central Oahu. First, the 2010 population projections from the State Department of Business and Economic Development, which were issued on November 30, 1988, were incorporated as required. Second, the population distribution table was revised to reflect, among other items, an increase in Central Oahu's share of islandwide 2010 population -- from 12.8 - 14.2 percent, to 14.9 - 16.5 percent.

Given these two amendments, the Central Oahu Development Plan area could accommodate a population of 148,900 to 164,900 persons by the year 2010.

This time frame extension and increased population allocation provides for a greater development capacity in Central Oahu and, recently, three new development projects were approved. These included 3,500 units for Mililani Mauka, 2,000 units in Royal Kunia Phase I, and 1,375 units in Waiawa Gentry.

Collectively, these three projects will increase Central Oahu's housing supply to sufficiently meet the targeted 2010 population allocated by the General Plan.

Based on an estimated household size of 3.2, the 2,400 residential units of Royal Kunia Phase II is expected to house a population of 7,680. This is well within the State's population forecasts for Oahu share of the statewide population.

The proposed project's population will exceed the General Plan guidelines for Central Oahu's share of population.

4.2 Public Services

4.2.1 Schools and Parks

State Department of Education officials estimate that Royal Kunia Phase II will generate between 530 and 820 students. In addition to Hoaeae Elementary School, Royal Kunia Phase I has reserved a school site, as does the proposed project. Currently Waipahu Intermediate and High Schools are operating at capacity. Classroom expansions will probably be necessary at these latter schools.

The Waipahu Neighborhood Board area currently has nine parks, the largest of which is Waipahu Cultural Garden Park, a regional park. Waipahu Field is the area's district park. In addition, there are two community parks, four neighborhood parks and one mini park.

Hoaeae Park is within Village Park. Further, Royal Kunia Phase I includes 10.3 acres for a public park and 12.1 acres for a private recreation area. The proposed project includes 16 acres intended for park dedication. This meets the requirements and acceptance of the land by the City would commit public funds for site improvements and maintenance.

4.2.2 Police and Fire Protection

The Pearl City Police Station on Waimano Home Road currently serves Waipahu, Ewa and Waianae, the latter of which has a sub-station.

The increase in population and traffic -- when considered with other proposed developments in Waipahu and Ewa -- will require additional manpower to accommodate the new developments in the

area. Increased traffic on Kunia Road and the H-1 Freeway will further burden the roadways, which are already functioning at maximum capacity. From a long-range perspective, police officials indicate that surrounding communities have asked for a police facility in the Ewa Plain. Police officials have therefore asked that developers consider how a new police facility could be integrated into their plans.

Primary fire protection would be provided to Royal Kunia Phase II from the Waipahu Fire Station located in the Waipahu Industrial Park. Secondary service would be provided by the Pearl City, Waiiau and Makakilo Fire Stations.

Fire Department officials expressed their concern that existing fire protection is considered marginal and they are projecting the need for a new fire station to house an engine company in the Kunia area. They have also indicated that no new facilities are needed for Phase II, but development beyond that would probably require another fire station.

4.2.3 Other Facilities

In recognition of Central Oahu and Ewa population growth, medical service providers have already begun to move much of their services to these regions. Nearest the project site are Kahi Mohala, a psychiatric treatment facility, and St. Francis Medical Center - West. Near the Pearl Ridge Shopping Center, the Pali Momi Medical Center. In Moanalua, the Kaiser Foundation Health Plan has a central hospital. Kaiser subscribers in the Waipahu area can also use services at the Punawai Clinic.

The Waipahu Fire Station would respond to emergencies at the project site, and backup would be provided by the City ambulance at Aiea.

The City Office of Human Resources projects that some space will be needed for a Park-and-Ride facility, with an adjacent child care facility, based on the combined proposals of Phases I and II. Phase I currently is reserving 5.0 acres for a park-and-ride facility, and .07 acres (30,000 square feet) for a child care facility.

4.3 Neighborhood Population Impacts

The combined population of Village Park and Royal Kunia Phase I is estimated at 13,600 people. Phase II is estimated to add another 7,680 people, bringing the total population of the three developments to 21,200.

Half of the proposed residential units will be designed for people with incomes up to 140 percent of the islandwide median income. The other half will be sold at market prices.

Demographically, Royal Kunia residents -- of both Phases I and II -- will likely continue the slight trend towards more experienced purchasers with more buying power than the earlier Village Park homebuyers, since the new units will be higher-priced. This trend could be tempered by income increases in current Village Park homeowners due to increased earning power as the residents become older, and income increases due to appreciation of property values and consequent higher incomes of resale purchasers.

In increasing the population base, the proposed project will increase the community's need for public services, as well as provide justification for more services and facilities. While this will put a strain on current services, it will also create a larger political base which can then encourage funds for facilities, such as schools and parks.

4.4 Preliminary Community Issues

4.4.1 Process Of Identifying Issues

Earthplan conducted interviews with community residents and organization leaders in the course of this study. No attempt was made to assess the extent or "quantity" of project support or opposition. The selection of individuals was based on the following cross-section of potential interests. Those interviewed included leaders of regional Waipahu organizations, and residents in Village Park who are active in their community activities.

The issues identified in this report are preliminary in that they indicate what is important to the community in a specific point in time (November 1988). Changes in attitude and issues may occur in time, given possible project modifications and other events or influences in the community.

4.4.2 Regional Issues And Concerns

4.4.2.1 Efforts Toward A Mixed Community

Those interviewed stressed their desire for moving towards a socio-economically mixed population and they felt that Royal Kunia Phase II is another step in this direction. All of those interviewed favored the mix in housing prices and types. They expressed an appreciation for the moderately-priced units because they acknowledged a regional need for affordable housing. They especially liked the market units and the higher-priced golf course units because these units would attract more affluent homebuyers, and thus diversify the Waipahu population.

There was mixed reaction to the low-density apartment units. While most people felt that these units would help meet current housing needs, some felt that the 900-unit proposal was over-sized, and would create social conflicts because of economic disparity.

The census information indicates that the region -- particularly Waipahu Town -- is lower on the economic scale in the islandwide community. Community perception of socio-economic differences between Waipahu Town and the mauka communities is therefore accurate.

Support for Royal Kunia Phase II is a reflection of the community desire for upward mobility. Implied in their comments is a feeling that the current composition of the community is not conducive to immediate community change and improvement. The addition of new and socio-economically different residents to the community is expected to somehow provide the catalyst for improvement.

To a large extent, the effectiveness of this catalyst will depend on (1) the desire of new residents to integrate into Waipahu, and (2) the practical boundaries (such as distances between communities and the self-sufficiency of planned communities). Both of these aspects are discussed later in this report.

4.4.2.2 Community Improvement Efforts

Encouraging a mix of residents is not the sole solution towards community improvement. Informants also stressed the need to improve Waipahu Town and described current efforts of beautification and improving the delivery of public services. In this effort, Waipahu leaders often invite developers in the area to participate in community efforts either through on-site facilities or by contributing to off-site improvements.

When the "Village Park Expansion" was first presented to Waipahu community organizations, the developer committed to a number of off-site in-kind and off-site contributions. Since then, a number of these items have been completed.

At the time of this writing, no formal project presentation has been made to community groups. It is likely, however, that, as presentations are made, community representatives will suggest ways for developer involvement in community efforts. It is equally likely that the developer will participate, since many of the same individuals are in the current development team.

4.4.2.3 Integration Into Waipahu

Underlying the informants' support for the Royal Kunia Phase II is an assumption that the residents of this new project will consider themselves part of Waipahu, and thus contribute to a practical demographic mix and participate in community efforts.

The mauka communities have the potential to be full-service communities. Waipio-Gentry has neighborhood facilities, and Village Park is soon to have a shopping mall and school. Continuation of this could mean a lessening of interaction between mauka and makai residents. Such a mauka-makai separation would be inconsistent with current Waipahu goals, and some steps can be taken to mitigate this impact. First, regional Waipahu organizations, such as the Waipahu Community Association and the Waipahu Neighborhood Board, can actively solicit membership from the newer communities. This is already occurring with Village Park and Waipio-Gentry. Second, in marketing the project, the developer could emphasize a positive relationship to the Waipahu community.

4.4.2.4 Traffic And Infrastructure

Most of those interviewed believed that the transportation system was the source of traffic problems, and not development projects. Most felt that only major systemic changes -- such as mass transit -- can solve the problem at this time. Thus, most did not feel that the project should be denied because of traffic impacts. A few felt strongly, however, that allowing more development in Central Oahu and Ewa will exacerbate not just the roadway problems, but wastewater and utility systems as well, and they had strong reservations about proceeding with any development.

Traffic issues are predominant throughout the islandwide community. For the individual, traffic often translates into increasing commuting times to and from work. These times can be stressful, particularly if there appears to be no other solution. Further, as more and more time is spent in the car, leisure time decreases, thus giving the individual less personal and family time.

4.4.3 Neighborhood Issues And Concerns

4.4.3.1 Full-service, Mixed Community

Village Park informants expected the two phases of Royal Kunia to provide the neighborhood amenities of a full-service community for convenience purposes. They were also hopeful that Village Park residents could find employment at the industrial park and other facilities.

The informants were initially concerned about the nature of the industrial park, but appeared comfortable when it was explained that this is intended for "light industrial" facilities.

Royal Kunia Phase II will contribute to this full-service concept, particularly if the project will employ nearby Royal Kunia and Village Park residents. Further, the increase in the area's population will create a larger political base which can then lobby effectively for facilities, such as schools and parks.

4.4.3.2 Relationship To Village Park

Village Park informants were aware that, on the average, Royal Kunia homes would be sold at higher prices than their homes. They generally considered this a plus, because they saw a potential for increasing their property values.

They were also apprehensive, however, that the Village Park community might be considered economically inferior. They felt that, if more affluent people live in Royal Kunia, then Village Park might be considered "poor relations."

Village Park informants felt that this potentially negative impact could be avoided. Upgrading the existing Village Park homes was seen as a definite solution. In terms of developer responsibility, Village Park informants wanted to see design and operational efforts devised to encourage integration among Village Park and Royal Kunia.

Village Park and Royal Kunia have some built-in characteristics which can prevent that type of separation between the communities. Village Park already has a mechanism to speak with one voice. The community association would be a natural vehicle to initiate and maintain ties with Royal Kunia.

Further, Village Park residents can be members of the proposed private recreational facility in Phase I. There will also be internal linkages through the roadway system, as well as design compatibility among the three developments. Finally, the developer will be soliciting input from Village Park residents when formal presentations are made.

4.4.3.3 Traffic On Kunia Road

Village Park interviewees did not look forward to traffic increases. They were particularly concerned about the Kunia Road on-ramp to H-1 Freeway. None of the informants felt, however, that the project should not proceed because of traffic impacts.

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1

INTRODUCTION AND BACKGROUND

1.1 Purpose and Content

Social impact assessments are conducted to provide information which:

informs decision-makers in land use planning, approvals, and permits, and

helps them develop management actions to deal with problematic social outcomes of a proposed project.

This Social Impact Assessment was prepared for the Development Plan Amendment and Environmental Impact Statement (EIS) of the Royal Kunia Phase II proposed by the Halekua Development Corporation. The next section describes this proposal.

This report is organized to, first, describe the social context in which the Royal Kunia Phase II is proposed. The second half of the report identifies potential social impacts of the proposal, including community issues and concerns. The following outlines the report's sections:

Section 2 describes the various levels of "community" in which this the Royal Kunia Phase II is proposed. This information indicates the communities' problems, strengths, values and aspirations -- all of which influences the effects of new developments. Information includes:

- general descriptions of Central Oahu and the neighboring Ewa
- population characteristics and an employment and economic profiles for the region (Waipahu) and the neighboring community (Village Park), and
- a discussion of community values and current issues.

Section 3 indicates the future course already set for the impacted community. It identifies potential changes to the community without the proposed Royal Kunia Phase II.

Section 4 identifies potential regional and neighborhood social impacts in the areas of population and public services and facilities. Preliminary community issues and concerns are subsequently discussed.

Note that employment and housing impacts, which are otherwise typical impacts covered in a social impact assessment, were addressed by other consultants on the project team.

1.2 Description of Royal Kunia Phase II

Halekua Development Corporation proposes develop Royal Kunia Phase II in Waipahu, Oahu. Encompassing 670 acres, the subject property is identified as Tax Map Keys 9-4-02: 1 and 9-4-02: 1 and 9.

The land is now in sugarcane production and all of its land use designations are consistent with this current activity. The property is designated Agriculture on the State Land Use Map and the Central Oahu Development Plan, and is zoned AG-1, Restricted Agriculture.

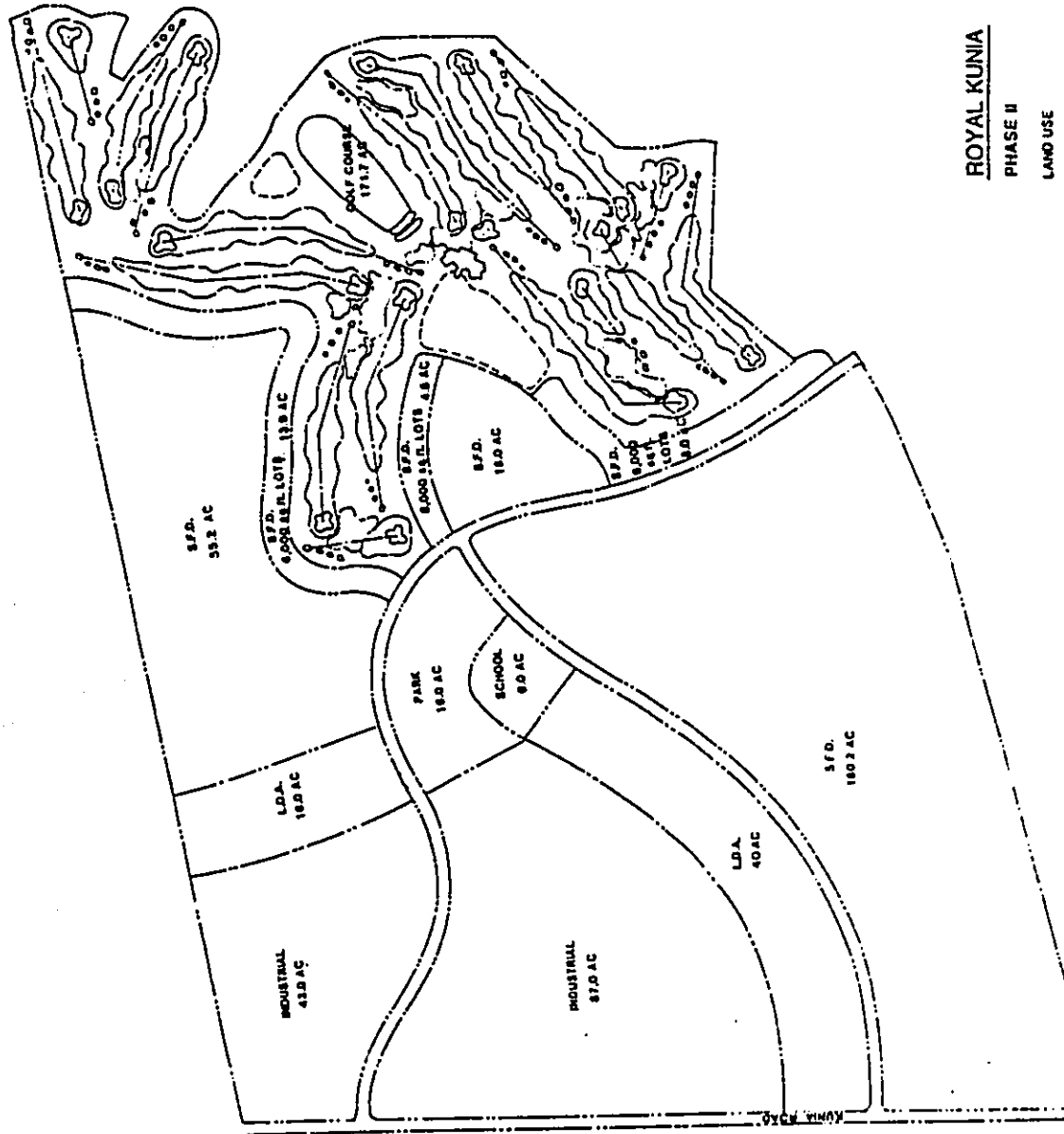
The western boundary of the subject property is Kunia Road; its eastern boundary is Waikele Gulch. North of the project site is land under sugarcane cultivation. Its southern side fronts Royal Kunia Phase I, which is currently under consideration by the City Council and is described in Section 3.2.

Royal Kunia Phase II is envisioned as a planned community which complements Royal Kunia Phase I. Some of the project's objectives include:

- to expand the opportunities for the first time buyers
- to provide business and employment opportunities
- to increase the recreational opportunities within the Waipahu region
- to continue, enhance and expand the existing symbiotic relationship between Waipahu Town and the existing Village Park community
- to continue the development of the area above Village Park into a viable community offering its residents all the services and amenities of a desirable living environment (Wanket, 1988).

The proposed project, the site plan of which is provided in Figure 1, would comprise the following land uses:

<u>Land Use</u>	<u>Number of Acres</u>
Single-family residential	278.8
Low-density apartment	56.0
Industrial	130.0
Golf course	171.7
Public park	16.0
Elementary School	6.0
Circulation	<u>17.4</u>
Total Number of acres	669.9



ROYAL KUNIA

PHASE II

LAND USE	ACRES	UNITS
S.F.D.	217.8	1300
LOW DENSITY APTEL.	88.0	800
INDUSTRIAL	130.0	
GOLF COURSE	171.7	
PUBLIC PARK	18.0	
SCHOOL	9.0	
CIRCULATION	17.5	
TOTAL	655.0	2100

**LAND USE MAP
 ROYAL KUNIA
 PHASE II**



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2

DESCRIPTION OF THE EXISTING COMMUNITY

2.1 Use of Census Information

In the approval process for Royal Kunia Phase I, an Environmental Impact Statement was prepared for that proposal. Included in that EIS was A Socio-Economic Assessment of the Proposed Village Park Expansion, prepared in 1985 by Community Resources, Inc. and revised in early 1986. Earthplan assisted in the preparation of that report.

Although that study was produced a few years prior to this report, the information base regarding population and the communities is generally the same as the community in which the Village Park Expansion would have been built, since the 1980 census continues to be a major information source.

2.2 Central Oahu and Ewa

The project area of the Royal Kunia II is located near the foot of the Waianae mountain range. Part of Oahu's central plain, the project site also overlooks the Ewa plain and the ocean.

The proposed project -- like the Village Park community and the Royal Kunia Phase I -- is situated in westernmost portion of the Central Oahu Development Plan Area and borders the Ewa Development Plan Area.

This location is unique among the existing Central Oahu communities. Royal Kunia Phase II is somewhat of a transition between the experienced growth of Central Oahu and the planned growth of Ewa, the "second city." As Ewa becomes more developed and occurs closer to the Waipahu boundary, the physical infrastructure and social interactions will likely supersede the existing community delineations. Both the Central Oahu and Ewa Development Plan Areas are therefore discussed to provide a full context of the today's "social fabric."

In the 1970s, Central Oahu was Oahu's fastest growing area. Its population grew by over 52 percent in that decade, from 66,228 people in 1970 to almost 101,000 in 1980. Annually, this growth translates into a 4.31 percent increase.

This growth occurred in Central Oahu's three major communities: Wahiawa, the northernmost community dominated by a combination of pineapple fields and military operations; Mililani Town, the newest community which is transforming from a predominantly bedroom community to a mixed use community offering substantial employment; and Waipahu, a former sugar plantation town which is turning more and more into a bedroom community.

Of the three, Waipahu had the largest share -- almost 30 percent -- of Central Oahu's 1980 population. Mililani followed with 21 percent, and Wahiawa had 17 percent of Central Oahu's population. The remaining population lived in areas outside of these major communities.

In 1980, Central Oahu contained 13 percent of the island's residents.

The nearby Ewa Development Plan Area also experienced much growth in the 1970s, but its population is still small compared to Central Oahu. A 50 percent increase during that decade raised the population from 24,087 in 1970 to 36,234 in 1980. During that time, the population grew an average of 4.17 percent each year.

The Ewa area has two major population centers: Ewa Beach, which fronts the ocean and is mostly military-oriented in its economy; and Makakilo, which is a residential development on the slopes of the Waianae mountain range. Campbell Industrial Park is a major employment generator in the area.

A more recent account of population and housing estimates is as follows:

	<u>1985 Estimates</u>	
	<u>Population</u>	<u>% Change from 1980</u>
City and County of Honolulu	811,096	+ 6.36%
Central Oahu Development Plan Area	114,600	+13.52%
Ewa Development Plan Area	36,700	+ 1.29%

(1985 estimates provided by Steve Young, Data Systems Branch, City Department of General Planning, November 22, 1988).

The following is a profile of the Central Oahu and Ewa communities in 1980:

Ethnicity -- Both Central Oahu (21.7 percent) and Ewa (24.8 percent) had proportionally more Filipino residents when compared to Oahu's 12.6 percent. Central Oahu had relatively small ratios of Hawaiian and Chinese people. Ewa had a slightly higher proportion of Caucasian people. Both Central Oahu and Ewa experienced over a ten-percent decrease in Caucasian residents in the 1970s.

Age -- The residents in both Central Oahu and Ewa are younger than the islandwide community. In 1980, 28 percent of Oahu's population was under 17 years of age. At the same time, about a third of Central Oahu's population and over 38 percent of Ewa's population fit this age category.

Mobility and Education -- On Oahu, 48.2 percent of the residents lived in the same house prior to the 1980 census. Both Central Oahu (34.7 percent) and Ewa (44 percent) had proportionally less people in this category. These areas instead had higher percentages of people from "different state," and Central Oahu's proportion of people from "different country."

Both Central Oahu and Ewa had proportionally much less people completing 4-year college.

Family and Income -- Ewa had 94 percent of its population in families. This is significantly high, compared to Central Oahu (88.3 percent), and Oahu (85.6 percent). Both Central Oahu and Ewa had mean family incomes below Oahu's average; Central Oahu, in particular, had a relatively high percentage of people below poverty level.

Labor Force -- Central Oahu and Ewa had high unemployment rates when compared to Oahu's 1980 4.6 percent. Central Oahu's six percent, however, was still much lower than Ewa's eight percent.

When compared to Oahu's occupation profile, Central Oahu was similar, except for a lower proportion of people in managerial and professional jobs. Ewa shared this latter characteristic, but also had more people in service, agriculture, and labor-related jobs.

2.3 Waipahu -- Regional Neighborhood

2.3.1 Waipahu as a Whole

Waipahu, one of Central Oahu's major communities, is often defined as the town itself -- this includes the area below the H-1 Freeway from the H-2 Freeway to Kunia Road. While this area is indeed an expansion of the original Waipahu, the community of Waipahu has been expanding as residential development above or mauka of the H-1 Freeway occurs. The boundaries of Waipahu Neighborhood Board No. 22 currently reflects this larger area which includes Waipahu Town, as well as the mauka area extending to, but not including, Mililani Town.

For the purposes of this report, references to Waipahu will therefore follow the boundaries of the Waipahu Neighborhood Board No. 22 which includes both the Town and the mauka communities. Waipahu will be considered the regional "neighborhood," and regional impacts will refer to this larger area.

Separate descriptions of Waipahu Town and the mauka communities are also included in this report to further explore Waipahu's "identity."

Of all the Neighborhood Board areas, Waipahu experienced the largest population increase between 1980 and 1985. The community grew from 33,927 people in 1970, to 43,420 people in 1980 (State Department of Business and Economic Development, 1987). This 28 percent increase is significant, especially when compared to Oahu's 6.7 percent increase and Ewa's 3.0 percent increase during that five-year period.

Statistics for the Waipahu Neighborhood Board area indicate the following characteristics:

Age -- The Waipahu Neighborhood Board area may very well be the "youngest" community in Central Oahu. In 1980, 39 percent of Waipahu's residents were under 17; this is a proportion was higher than the larger Central Oahu (34 percent) and Ewa (38 percent), both of which were already quite young when compared to Oahu (U. S. Bureau of the Census, 1983a).

Mobility and Education -- Waipahu's residents were more mobile than the larger Central Oahu, but less so when compared to the islandwide community. Approximately 45 percent of Waipahu's residents lived in the same house five years prior to the 1980 census, as compared to Oahu's 48.2 percent. Note, however, that this lower proportion of "same house" residents is largely related to the new housing units built in the mauka areas.

Many of Waipahu's residents lived elsewhere in Oahu (37 percent), and this area had similar proportions of people from "different state, " as Central Oahu.

Waipahu had only seven percent of people 25 years and older completing 4 years of college. This is lower than Central Oahu (17.2 percent) and Ewa (12.4 percent) -- which was, in turn, lower than Oahu averages (21.7 percent)(U. S. Bureau of the Census, 1983b).

Family and Income -- Approximately 92 percent of Waipahu's residents lived in families. This is significantly high, compared to Central Oahu (88.3 percent), and Oahu (85.6 percent).

Waipahu's family median income was slightly lower than Oahu's median income, and is thus similar to Central Oahu and Ewa. Like Central Oahu, Waipahu had a relatively high percentage of people below poverty level (U. S. Bureau of the Census, 1983c).

Labor Force -- Waipahu's unemployment rate of 5.9 percent was similar to that of Central Oahu (6.0 percent), and thus lower than Oahu's 1980 4.6 percent.

Like Central Oahu, Waipahu residents tended to be employed in jobs which were less-paying than managerial and professional jobs (U. S. Bureau of the Census, 1983d).

2.3.2 Waipahu Town and Mauka Communities

2.3.2.1 Waipahu Town

In the mid-1800s, three small parcels in this area were given the name "Waipahu." Prior to this, "Waipahu," which means gushing waters, was simply the name of a famous spring in the area.

Eventually, Waipahu was used to referred to the surrounding areas and, in the late 1800s, Waipahu was an agricultural community comprising mostly independent Hawaiian taro and Chinese rice farmers.

Three changes occurred around the turn of the century which altered the complexion of Waipahu. James Campbell purchased 40,000 acres in the Ewa plain and sugar cultivation commenced in Ewa and Waipahu. Benjamin Dillingham established a railroad from Honolulu to Leeward Oahu to transport agricultural products; he subsequently worked with Campbell to create the Oahu Sugar Company. Paul Isenberg provided much of the capital through H. Hackfield and Company (predecessor to Amfac) and he became the first president of Oahu Sugar Company.

Oahu Sugar Company's mill site and headquarters were called "Waipahu," and the town took form around the mill. Until World War II, Waipahu was almost exclusively a plantation town.

This identity was altered, however, as Hawaii experienced socio-economic changes in the mid 1900s. Labor unions became more influential. Property and home ownership were made possible for Oahu Sugar Company employees by the company. Publicly-sponsored and market housing subdivisions grew. And, in the 1970s, Oahu Sugar Company began cutting back on its workforce and production lands to cope with the economic difficulties of the sugar industry.

Today, Waipahu Town is no longer a plantation town. Many of the recent residents have no direct link with the sugar activities, and commercial activities, particularly around Farrington Highway, provide a substantial portion of Waipahu jobs.

While the community makeup has been changing over the years, however, there may have actually been a decrease in population. From a 1980 estimate of 29,139 people (State Department of Business and Economic Development, 1987), Waipahu Town (considered the "Waipahu Census Designated Place (CDP)" may have decreased to 28,950 people in 1985 (personal communication with Steve Young, Data Systems Branch, City Department of General Planning, November 22, 1988).

The following is based on census information and describes selected community characteristics of Waipahu Town.

Ethnicity -- Waipahu Town's Filipino plurality grew from 33 to 41 percent between 1970 and 1980 -- this means that Waipahu Town has a much larger proportion of Filipinos than the Central Oahu and Ewa Development Plan areas and Oahu. There were proportionally fewer Caucasians in Waipahu Town than in the aforementioned larger regions, and generally fewer Japanese as well.

Age -- Consistent with the Central Oahu and Ewa characteristics, Waipahu Town's population is young. Over 35 percent of the Town's population was under 17 years of age, as compared to Oahu's 28 percent.

Mobility and Education -- Although Waipahu Town had similar proportions of people living in the same house prior to the 1980 census as Central Oahu and Ewa, it also had relatively high proportions of people who lived in different countries, or different states.

Waipahu Town had proportionally much less people completing 4-year college than the larger Waipahu region.

Family and Income -- Waipahu Town is very family-oriented with over 93 percent living in families. Waipahu Town had mean family incomes below Oahu's average, and a significantly high percentage of families below poverty (14.4 percent as compared to 7.5 percent on Oahu).

Labor Force -- Waipahu Town had a high unemployment rate (6.4 percent) when compared to Oahu's 1980 4.6 percent. Waipahu Town's residents displayed similar labor force characteristics to the larger Central Oahu area, although the proportion of people in managerial jobs was even lower in Waipahu Town.

2.3.2.2 Mauka Communities

Waipahu is predominantly residential above H-1 Freeway. Three distinct residential communities currently exist. Two of these Crestview/Seaview and Waipio-Gentry are on the eastern end of Waipahu; Village Park is on the western side and is located just south of the project site.

Crestview/Seaview is the oldest of these communities. This area is generally referred to Crestview, which is the subdivision closest to the Waipio-Gentry planned community. Below Crestview is Seaview, an adjacent development which is

immediately above the freeway. This area was developed around 20 years ago and contains approximately 500 residential units (Community Resources, 1986).

Though physically separated from Waipahu Town by the H-1 Freeway, Crestview/Seaview is often considered part of Waipahu due to the sharing of social ties established over the years.

Waipio-Gentry is a planned community immediately above Crestview/Seaview. A newer community, Waipio-Gentry is currently in its final build-out of housing units. By early 1989, all of the planned 3,500 residential units will have been completed. The 14-acre neighborhood commercial area is approximately 50 percent developed, as is the 120-acre light industrial area. Development completion of these areas depends on market demand (personal communication with Tosh Hosoda, Vice President of Gentry Pacific, Ltd., November 23, 1988).

Many of Waipio-Gentry's homes are high-quality homes with very small yards. Residents tend to have higher incomes than those in Waipahu Town, and differ on other socio-economic characteristics as well. These differences, as well as the relatively shorter length of residence, contribute to this community being less identified with Waipahu than Crestview/Seaview.

Village Park is the planned community nearest the proposed project. Comprising slightly over 1,800 units, most of Village Park residential development is single-family houses. More information on Village Park is presented in the next section which discusses the nearby neighborhood.

In 1980, the combined population of these three communities was 4,280 people, with Crestview/Seaview and Waipio-Gentry accounting for 3,870 of that population estimate (Community Resources, Inc., 1986).

By 1985, housing construction in two of these three communities increased the area's housing stock and the combined population of the three communities grew to 13,580 people. While Crestview/Seaview's population remained stable, Waipio-Gentry's population grew to 7,830. Village Park's population grew from 418 people in 1980 to 3,650 in 1985 (personal communication with Steve Young, Data Systems Branch, City Department of General Planning, November 25, 1988).

Therefore, while the 1980 census provides an indication of the characteristics of these mauka residents, the sheer increase in numbers probably means a change in the demographic picture as well. Given the higher-priced newer residences in the mauka

developments, it is likely that the differences between the mauka residents and Waipahu Town residents may currently be slightly greater than the 1980 census information.

Ethnicity -- Crestview/Seaview and Waipio-Gentry tended to have proportionally less Filipinos and more Caucasians and Japanese than Waipahu Town. Village Park, on the other hand, tended to have less Caucasians and large segments of Filipinos and Japanese residents (over 34 percent).

Age -- Consistent with Central Oahu, Ewa and Waipahu Town's populations, all of the mauka communities have young populations, with more than a third of the population being under 17 years of age, as compared to Oahu's 28 percent.

Mobility and Education -- As can be expected, the mauka communities had smaller proportions of people living in the same house five years prior to the 1980 census than Waipahu Town (or the larger regional communities of Central Oahu and Ewa). The majority of the mauka residents lived elsewhere on Oahu previously, and almost no residents were recent residents of another country.

Mauka residents tended to have more formal education than Waipahu Town residents (and the larger regional communities of Central Oahu and Ewa), as indicated by the proportion of people completing a four-year college. In Crestview/Seaview and Waipio-Gentry, almost 24 percent of the population completed college; in Village Park, over 31 percent. By comparison, 8.7 percent of Waipahu Town's population fit in this category.

Family -- The mauka communities were even more family-oriented than Waipahu Town with over 99 percent of Village Park residents and 96 percent of the other two communities living in family situations. This is higher than Waipahu Town's 93 percent living in families.

Labor Force -- The mauka communities had very low unemployment rates of 1.6 percent (Village Park) and 3.4 percent (Crestview/Seaview and Waipio-Gentry), as compared to Waipahu Town's unemployment rate of 6.4 percent.)

2.3.3 Current Waipahu Issues and Concerns

This section discusses Waipahu's current needs, strengths and problems, as indicated in community surveys, as indicated in community reactions to other developments, as addressed by the Waipahu Neighborhood Board No. 22, and as perceived by those interviewed.

In the early 1980s, the Amfac Property Development Corporation commissioned a survey in its early planning of the Waikele development. Respondents included residents of both Waipahu Town and the greater Central Oahu. Major conclusions of this survey are:

Central Oahu and Waipahu Town residents identified the "need to keep Oahu Sugar Company" and the need for more "housing that families making less than \$40,000 can afford" as top priorities.

There was a distinct lack of concern about more "high quality housing."

Although some concern was expressed about population growth and traffic, large portions of both samples considered these "not a problem" in 1982. Over three-quarters of the respondents felt that "Many of Waipahu's important problems can be solved by well-planned growth." (Community Resources, Inc., 1986).

By 1988, community needs and values were again expressed -- this time through a survey initiated by the Waipahu Neighborhood Board. There was a noticeable shift in concerns. Waipahu residents reacted to the increasing number of care homes in the area, and traffic was no longer "not a problem." (Note, however, that this shift may be somewhat attributable to how questions to posed in the survey).

In general, the survey results indicated "overwhelming responses against special treatment and group living facilities." As will be explained further in this section, Waipahu residents have become increasingly concerned about the effects of a large number of such facilities in Waipahu.

Complaints about airplane noise were expressed.

Two-thirds of the respondents favored rapid transit. Four percent were against, and 29 percent were undecided. Of those favorable towards rapid transit, 90 percent indicated they would use the system (Note: selected survey results were discussed in the Neighborhood Board meetings and thus reflected in the minutes. The actual survey and detailed survey results were unavailable at the time of this writing.

The community's reaction to proposed development is another indicator of values and needs and, over the last few years, community values were indirectly tested as major proposals were reviewed in the public arena. Waipahu appears to welcome new developments because they feel this will create a more heterogeneous community, one which will have diverse resources to draw upon for community efforts.

In spring 1986, development proposals within Waipahu Neighborhood Board area included Village Park Expansion (currently Royal Kunia Phase I) and Waiawa Ridge were reviewed by the City Council. Several Waipahu organizations supported these changes, claiming that additional housing and a mix of housing types would contribute to the overall improvement of Waipahu.

By the summer of 1986, however, Waipahu qualified their pro-growth stance when faced with Waiola Estates, a controversial City-initiated residential proposal near Waipio-Gentry. Waipahu residents -- especially those living in Waipio-Gentry and Crestview/Seaview -- expressed strong concern over the siting of the project, the targeted homebuyer (the "gap group"), and the City's role in development. Residents questioned the effect of the project on regional traffic as well. An underlying apprehension was that Waiola Estates would not contribute to the betterment of the community because it would add more gap group families, rather than promote a mixed community (Earthplan, 1986).

In 1987, Waipahu leaders again took a supportive stance -- this time for another City project, the West Loch Estates. Waipahu leaders felt a need to express their support for this Ewa project located very near on Fort Weaver Road. Their support was based on reasons similar to those related to the private 1986 development proposals -- mixed development might improve Waipahu's business climate and overall population mix.

An ongoing effort among Waipahu leaders is supporting General Plan amendments which will allow further development, and thus more people, in the area -- again, in the hopes that this will revitalize Waipahu.

On a day-to-day basis, many of Waipahu's needs and values are reflected in the workings of the Waipahu Neighborhood Board.

In 1986 and 1987, the Waipahu Neighborhood Board focussed on community issues related to (1) a need for mixed housing to create a "balanced" community, (2) the adequacy of public services in general, (3) upgrading Waipahu's school system, (4) increasing police services, and (5) the effects of care homes and halfway houses on the larger community (Earthplan, 1986; Community Resources, Inc., 1987).

Many of these concerns were still being addressed. This study included a review of the minutes of the Waipahu Neighborhood Board for a 15-month period ending October 1988. The following were major topics addressed by the Board:

Public Facilities and Services -- The Neighborhood Board continued to strongly urge the establishment of a "Leeward Civic Center" and a full-service library in Waipahu. When informed that the State was considering scaling down of both projects, the Board protested because it felt that the current population already justified the original magnitude of these projects.

The Board also advocated the establishment of a police sub-station in the Waipahu vicinity -- again because of the needs of the current population.

The Board had no objections to new classroom facilities.

Special Treatment Centers -- The Neighborhood Board has repeatedly expressed concern that Waipahu has more than its share of care homes and halfway houses. While the Board acknowledges the social need for such facilities, it has received numerous complaints from constituents about illegal activities and operations, particularly in unlicensed facilities. The Board recommended denial of one proposed care home near August Ahrens Elementary School in Waipahu.

Transportation and Roadway Systems -- The Neighborhood Board supported current public plans for fixed rail rapid transit, in the hopes that traffic problems will be partially alleviated. The current proposal for a fixed rail system shows a terminal at Leeward Community College. Board members felt that, in addition to providing a convenience for Waipahu residents, the terminal location might encourage more people to visit Waipahu businesses and services. Board members applauded the new car pool lane on H-1 and continued to personally monitor this lane for violations.

Note that concerns about traffic impacts are increasing being expressed, both in terms of new developments and systemic improvements.

Parking and Pedestrians -- The Board brought a number of parking- and pedestrian-related problems to the police representatives. Sidewalk safety, speeding, and illegal parking comprised the bulk of these complaints.

Neighborhood Safety and Beautification Efforts -- The Board encouraged volunteers to set up Neighborhood Watch Programs in their respective communities. Village Park and Waipio-Gentry were particularly interested in establishing such programs in their community.

Beautification efforts were equally applauded. Community Workdays and the Mayor's Beautification Program were seen as ways to clean up the neighborhoods and instill community pride.

In a related matter, the Board decided to issue "Pride in Waipahu" buttons to people who perform outstanding community service.

Police Protection Services -- While day-to-day concerns regarding police protection were often addressed by the Board, an increasingly pressing problem was youth gangs.

Proposed Projects -- The Board supported virtually all of the public-sponsored proposals, such as a civic center, the library and school facilities. The Board supported West Loch for reasons stated earlier in this section, and has not yet taken a stand regarding the revised plans of the City-sponsored Waiola Estates.

Privately-sponsored projects reviewed by the Board included the low-income units in Royal Kunia Phase I, the Amfac Theme Park, and a proposed golf course on Kunia Road. The Board supported the former two, and is still studying the golf course. The Board is also currently working with Hawaiian Electric Company is the siting of a transmission line between the Waiiau Power Plant and Campbell Industrial Park.

In summary, the Waipahu community leaders believe that much of their current needs and problems are related to a perception that this is a relatively poor community. Waipahu community leaders want to change this identity. They feel that most of the mauka communities do not necessarily share the problems of Waipahu Town and, consequently, they support similar developments.

2.4 Village Park-- the Nearby Neighborhood

2.4.1 Description of the Community

Village Park was developed by Waitec Development Company. Originally conceived as a townhouse community, a shift in the development concept was necessary due to market conditions and internal business decisions.

Today, Village Park comprises primarily single-family detached houses on an average lot of 4,000 square feet. The community has 1,806 housing units, 120 of which are townhouse units.

Hoeaie Park is located in the western section of Village Park. Initially intended to be dedicated to and developed by the City, Waitec Development Company funded the facility construction, which included tennis, basketball, and volleyball courts, a children's playground, restrooms and a parking lot. In exchange, the City permitted Waitec to develop another 5.3 acres initially intended for a park, since the final Village Park density was lower than that of the original townhouse proposal.

The completion rate of Village Park's housing component accelerated over the last three years, mostly because of reductions in interest rates. In August 1985, only 836 units were constructed over a six-year period (construction commenced in 1979). In the subsequent three years, the remaining units were built, with completion of all 1,800 units this year.

The earlier units had an average selling price of \$133,200, which was lower than Waipio-Gentry and most other developments in the area. Village Park units are oriented to the lower-to-middle portions of the housing market, and initial buyers tended to be young local families, usually first-time buyers (Community Resources, Inc., 1986).

Between 1986 and 1988, however, the Village Park selling prices increased, as did the housing absorption rate.

From 1985 to 1986, 300 units were sold for prices between \$130,000 and \$141,000.

From 1986 to 1987, between \$136,00 and \$145,000 was received for the 360 units sold during that period.

From 1987 to 1988, the remaining 384 units sold for prices between \$140,000 and \$152,000.

These price increases were due to larger units, upgraded products and design changes (Memorandum from Ken Nakamura of Royal Kunia to consultant John Zapotocky, dated November 21, 1988).

Village Park units are originally leasehold properties. In 1986, negotiations with representatives of Robinson Estate began for lease - fee conversion. Today, approximately 100 properties have been converted to fee (personal communication with Clyde Yamada, Principal Broker, Dynamic Property, Inc. (property management), November 18, 1988).

2.4.2 Profile of Village Park Homebuyers

Village Park was designed for the first-time homebuyer. It was expected that many of the homebuyers would be young couples with new families. Families would probably have both spouses working and they would probably have been employed in jobs which have potential for upward mobility.

The buyer profiles provided by the Village Park sales office indicate whether these expectations have been realized. Some caution is advised in analyzing this information, however. The sales people changed the format for questioning potential buyers. Thus, you will note that categories of information differ from the 1985 report and recent 1986-1987 report. Locations of their previous residence, for example, are not comparable.

In the first few years, Village Park was indeed that type of community. As shown in Table 1:

Most of the buyers prior to 1985 were married couples in their early thirties.

Over three-quarters were renters before they bought in Village Park, which implies that this was their first home purchase.

They worked in a range of jobs. Clerical and trades jobs accounted for 44 percent; the military employed 22 percent of the Village Park labor force. Professional and managerial jobs were held by 28 percent of wage earners.

By last year, however, the selling price of Village Park units increased, due to improvements in materials and design. These higher-priced units attracted slightly different homebuyers.

In 1986 and 1987, buyers were slightly older.

Significantly more buyers already owned homes when they bought into Village Park.

The non-married buyer became a new addition to the Village Park community.

Although the proportion of military workers remained the same, more homebuyers had higher-paying jobs in professional and managerial fields.

As this latter information indicates, the trend in Village Park homebuyers is towards more experienced homebuyers earning higher incomes.

2.4.3 Current Neighborhood Issues

To better understand the Village Park community, minutes from the Waipahu Neighborhood Board were reviewed and interviews were held with Village Park residents who were active in community affairs. Section 4.4 provides more information on the rationale and approach used in community interviews.

In 1985, Village Park residents were interviewed during the social impact assessment for Royal Kunia Phase I (Earthplan conducted the interviews as a sub-consultant to Community Resources, Inc.).

At that time, the internal community needs and values of Village Park residents revolved around the newness of the community. Having to adjust to the community's growth and related problems,

TABLE 1
Profile of Village Park Homebuyers
(as of November 1989)

<u>Initial Classification-1</u>	<u>1985-</u>	<u>Revised Classification 2</u>	<u>1986 3</u>	<u>1987 4</u>
<u>Age</u>		<u>Age</u>		
Under 26	9.00%	Under 30	22.00%	21.00%
26 - 34	55.00%	30-39	32.00%	39.00%
35-45	27.00%	40-49	13.00%	25.00%
45-55	9.00%	Over 50	6.00%	14.00%
Over 55	.00%			
<u>Previous residence</u>		<u>Previous residence</u>		
Honolulu	40.00%	Honolulu	33.00%	64.00%
Airport	7.00%	Leeward	32.00%	25.00%
Pearl City	21.00%	Ewa Beach, Makakilo and Waianae	5.00%	.00%
Waipahu	20.00%	Hawaii Kai	.00%	7.00%
Central Oahu	10.00%	North Shore	2.00%	.00%
Windward	2.00%	Windward	2.00%	.00%
Waianae Coast	.00%	Out-of-State	4.00%	4.00%
Out-of-State	.00%			
<u>Residence at the Time of Purchase</u>		<u>Residence at the Time of Purchase</u>		
Rented	78.00%	Rented	46.00%	46.00%
Owned	12.00%	Owned	20.00%	54.00%
Other	10.00%	Other		
<u>Family Status</u>		<u>Family Status</u>		
Single	.00%	Single	11.00%	21.00%
Married	100.00%	Married	77.00%	79.00%
<u>Number of Family Incomes</u>		<u>Number of Family Incomes</u>		
One	10.00%	One	27.00%	25.00%
Two or more	90.00%	Two or more	73.00%	75.00%
<u>Occupation</u>		<u>Occupation</u>		
Professional/ managerial	28.00%	Professional/ managerial	34.00%	44.00%
Clerical	24.00%	Sales/clerical/ service	28.00%	23.00%
Trades	20.00%	Trades	5.00%	3.00%
Military	22.00%	Military/Govt	24.00%	23.00%
Other	6.00%	Other	9.00%	7.00%

1 Based on 145 first buyers of new units sold in 1984-1985
(Community Resources, 1986)

2 Provided by Guy Tamashiro, Sales Manager, Village Park,
November 29, 1988. He indicated that the format requesting
buyer information was changed in 1985.

3 Based on 171 units sold between December 1, 1985 and
October 14, 1986. Note that percentages do not total 100
because of inconsistent responses.

4 Based on 28 units sold in the last phases (12 and 13)

Village Park informants raised a few issues exclusive to their situation of being a relatively young and still-growing community. These 1985 issues included:

1. Provision and Timing of Amenities -- In 1985, housing development in Village Park was lagging, and the shopping area, parks and school were not built as expected. The Village Park residents wanted to see these facilities expedited.
2. Nature of Business Park Activities -- Village Park residents wanted to make sure that the proposed Royal Kunia business park would provide services they could use and would not adversely affect nearby residents.
3. Internal Administration -- The Board of Directors at that time and certain Village Park residents were involved in controversies concerning allegations of dishonest or illegal actions on both sides. Much of this involved personality conflicts, which provoked high emotions.
4. Property Value and Lease-Fee Conversion -- Though not a strong issue at the time, Village Park residents were hopeful that Royal Kunia Phase 1 would improve their own property values. The homeowners also began exploring possible fee ownership of their properties.

Village Park residents interviewed for this report did not express the same concerns. Most of the earlier community concerns had already been met. The elementary school was soon to be completed, and specific plans and a short-term schedule for the shopping area was already presented to the current Board of Directors. The park was developed, and about 100 homeowners converted their lease property to fee.

Current Village Park needs and values therefore have to do more with those of a community trying to protect and improve what is already there. Those interviewed wanted to instill community pride and encourage more cohesion. They felt that some Village Park residents are generally cooperative when it comes to social events, but less willing to clean up and maintain their own properties.

The following are some of current needs of the Village Park community:

1. Property Maintenance and Enforcement of Homeowner Covenants -- The Board of Directors, which was voted in at the time of these interviews, feels that one of its primary missions over the next twelve months is the improve the visual character of the Village Park neighborhood. Board members are citing violations to the covenants, and advising homeowners to correct the

problems. Typical violations include inadequate or improper landscaping; storage of cars, boats and large appliances; and non-permitted pets such as geese and ducks.

The Board is also planning to revise the covenants to clarify the rules. Collection of homeowners dues has also become a priority. In a related matter, a few Board individuals felt that a better new-home inspection program is needed.

2. Neighborhood Security -- Some Village Park homeowners, with the assistance and guidance of the Honolulu Police Department, have recently established Neighborhood Security Watch Programs because of increasing thefts. Those interviewed were concerned because many of the thefts reportedly occur during the day, and are committed by people outside the area (Police reports reflected in the Neighborhood Board minutes confirm this.)
3. Parking and Speeding -- Concern about speeding along major streets in Village Park has prompted residents to seek additional police surveillance. According to those interviewed and the Waipahu Neighborhood Board minutes, police officers have responded with ongoing monitoring and holiday roadblocks. On-street parking is also reportedly a problem, both from an appearance and a safety standpoint.

3

NON-PROJECT CHANGES TO THE COMMUNITY

3.1 Proposed Changes in Central Oahu and Ewa

Both the Central Oahu and Ewa Development Plan areas are eyed for major development proposals, and some of these proposals have progressed towards realization sooner than others.

In general, those in the Ewa Development Plan area have been more successful in obtaining land use approvals, primarily because of public policy to establish Ewa as Oahu's secondary urban center. As the following project descriptions indicate, Ewa-based projects nearest to the project site are in construction or pre-construction stages.

Kapolei Village -- Encompassing 830 acres in the Ewa plains, Kapolei Village is envisioned as a mixed community of commercial and residential uses. The Kapolei Master Plan outlines a concept of eight distinct "villages," and the State Housing Finance and Development Corporation has issued a request for proposals from interested developers for the first phase. This first phase involves building 520 housing units on 71.3 acres, and its developer is expected to be chosen in mid-January 1988. Phase I is estimated for completion in early 1991 (Tune, 1988).

Soda Creek -- This project is located north of Ewa Beach and encompasses 1,000 acres. Approximately 300 acres received Urban designation by the State Land Use Commission and 225 acres of these urban lands are appropriately zoned for residential and park uses. The developer received approvals for a 413-unit single-family housing cluster, and 250 of these were built at the time of this writing (personal communication with Tosh Hosoda, Vice President of Gentry Pacific, Ltd. November 23, 1988).

West Loch -- This 500-acre residential community is the closest major change relative to the project site and Central Oahu. Proposed by the City and County of Honolulu, the most of the project area has received necessary approvals and model units were constructed earlier this year. The project includes 1,500 residential units, a golf course, a commercial area and public facilities.

In Waipahu, only Waikele is in pre-construction stages. The other projects are either currently seeking land use approvals or are in the planning stage.

Waikele -- The Waikele project area includes 577 acres. The overall plan calls for 2,700 residential units, a golf course and 56-acre commercial area. A six-acre area has been designated for an elementary school, and a 23-acre off-site parcel is intended to be dedicated for park-and-ride, child care and public facilities. With most

of the land use approvals granted, ground-breaking for the first phase is targeted for the first quarter of 1989. This first phase includes the proposed golf course and 700 residential units. Total build-out is expected within ten to twelve years (personal communication with Chris Kanazawa, Vice President for Amfac Property Development Corporation, November 28, 1988).

Waiawa -- This project covers 1,395 acres and proposes 7,900 residential units. The residential units include single family detached homes, low and medium density apartments and a retirement community, as well as a golf course and a commercial area. The project received an Urban designation from the State Land Use Commission earlier this year and the developer is currently seeking Development Plan amendments (personal communication with Tosh Hosoda, Vice President of Gentry Pacific, Ltd. November 23, 1988).

Waiola Estates -- The City is currently re-planning this project. Over 1,000 housing units will include single-family, townhouse, and apartment uses. A golf course is under consideration, as well as a park-and-ride facility, an elementary school, and a child care center. This project needs an Urban designation from the State Land Use Commission, amendments to the Central Oahu Development Plan, and subsequent zoning changes (City and County of Honolulu, Neighborhood Commission, minutes of Waipahu Neighborhood Board No. 22 from meeting on June 16, 1988).

Non-residential public facilities will also contribute to the changes in the region.

A Paiwa interchange has been proposed by Amfac to facilitate access between H-1, Waikele and Waipahu. Designs for this interchanges were submitted to the State Department of Transportation, and construction is estimated from mid-1989 to mid-1990 (personal communication with Chris Kanazawa, Vice President for Amfac Property Development Corporation, November 28, 1988).

The Leeward Civic Center is designed to serve Leeward residents and comprising offices of government agencies. Recently, the State Department of Accounting and General Services re-evaluated the facility to reduce the service area from all of Leeward Oahu to the residents between Pearl City and Waipahu. The ultimate scale of the project is still be studied (City and County of Honolulu, Neighborhood Commission. Minutes of Waipahu Neighborhood Board No. 22 from meeting on September 15, 1988).

A Waipahu police substation has been requested by the community, and possible sites in new developments are currently being explored.

3.2 Near the Village Park Neighborhood

The residential component in Village Park is already completed. Support facilities which are still to be developed are the following:

- The Blackfield Corporation is in the process of purchasing the 4.5 acre area reserved for commercial use. The company wants to develop a shopping center, and needs to obtain the appropriate zoning. The shopping center would offer 50,000 square feet of leasable area, and would contain neighborhood-oriented businesses including service-related offices, restaurants, fast-food establishments, and a convenience store with gasoline pumps. The shopping center is estimated for completion in 1991 (personal communication with John Frazier, Project Manager, Blackfield Hawaii Corporation, November 29, 1988).
- Six acres have been reserved for an elementary school, and the State Department of Education estimates that the school will open in September 1989 (Letter from Eugene Imai, Assistant Superintendent, State of Hawaii Department of Education, dated November 3, 1988).

As indicated in Section 1.2, Royal Kunia Phase II is planned to complement Royal Kunia Phase I. When initially proposed, Royal Kunia Phase I was conceived as the "Village Park Expansion." The residential component (originally 3,300 units) was reduced since then, and the site plan was altered to move one of the golf courses east. Royal Kunia Phase I currently includes:

- 2,450 single family detached homes and townhouses,
- a golf course, recreation center,
- 20 acres for light industrial and commercial facilities, and
- three park facilities.

Royal Kunia Phase I includes 2,450 single family detached homes and townhouses, a golf course, recreation center, 20 acres for light industrial and/or commercial facilities, and three park facilities. Phase I covers a total 715 acres.

Phase I requires (1) an Urban land use designation on the State Land Use Map and (2) amendments on the Central Oahu Development Plan. The bulk of Phase I -- 645 acres and 2,000 units -- is currently seeking Development Plan amendments. The State Land Use Commission re-designated the entire site Urban.

A portion of Phase I has already received Development Plan approvals. The City is allowing 70 acres for 150 low to moderately priced apartment units and 300 single family units. A 5-acre park site is also included.

The 150-unit project recently received Planned Development approval. The 300 single-family units comprise Increment 1 of Royal Kunia Phase 1 and this is currently in process for Final Subdivision Approval. All homes are expected to be completed on or before August 31, 1989.

The 300 single-family units comprise Increment 1 of Royal Kunia Phase 1. The following summarizes the anticipated schedule for Increment 1:

- Increment 1 is currently in process for Final Subdivision Approval.
- Lot selections and reservations for 150 units occurred in September of this year. All lots were selected within four days, and most of the potential buyers meet qualification requirements.
- Lot selections and reservations for the remaining 150 units will begin in February 1989.
- Site improvements for Increment 1 began in July 1988 and delivery of homes is expected to begin in March 1989, at the rate of 50 homes per month.
- All homes are expected to be completed on or before August 31, 1989 (Memorandum from Ken Nakamura of Royal Kunia to consultant John Zapotocky, dated November 21, 1988).

Unlike the Village Park homes, Increment 1 homes will be sold in fee. Increment 1 lots range between 5,000 and 8,000 square feet, and are thus larger than the average 4,000-square-foot Village Park lots. These two factors contribute to relatively higher priced homes in Increment 1, where current prices range from \$166,000 to \$204,000.

4 POTENTIAL SOCIAL IMPACTS OF THE PROPOSED PROJECT

4.1 Population

4.1.1 Islandwide Growth Trends

The growth rate for Oahu has been steadily declining over the past three and a half decades although absolute population continue to increase. Table 2 shows U.S. Census population figures and derived rates for the City and County of Honolulu and the Development Plan Areas of Central Oahu and Ewa.

From 1950 to 1960, the Oahu population grew at average annual rate of 3.5 percent; from 1960 to 1970, 2.3 percent; and from 1970 to 1980, 1.9 percent. The provisional estimate for the City and County of Honolulu -- as of July 1, 1986 -- was 816,700 (State Department of Business and Economic Development, 1988). This suggests an average annual growth rate of just 1.2 percent for first six years of this decade.

The Hawaii State Department of Business and Economic Development (DBED) forecasts the following population counts (Series M-K projections) for Oahu population:

<u>Year</u>	<u>State of Hawaii Population</u>	<u>Oahu Resident Population(% of State)</u>
1990	1,137,200	861,600 (76%)
1995	1,225,200	910,400 (74%)
2000	1,285,100	932,800 (73%)
2005	1,350,800	961,100 (71%)
2010	1,435,500	999,500 (70%)

(State Department of Business and Economic Development, 1988).

4.1.2 Central Oahu Development Area Trends

The proposed project is located in the Central Oahu DP Area. Central Oahu includes communities of Waipahu Town, Village Park, Seaview/Crestview, and Gentry-Waipio -- all of which fall in the Waipahu Neighborhood Board area -- as well as Mililani and Wahiawa.

During the 1970s, the Central Oahu DP Area was proportionally the fastest growing of Oahu's eight DP Areas. Its average annual population growth rate of 4.3 percent (see Table 2) slightly exceeded the 4.1 percent for the Ewa DP Area.

TABLE 2
Population Growth Trends for Oahu,
and the Development Plan Areas of Central Oahu and Ewa:
1970 to 1980

	<u>1970</u>	<u>1980</u>	<u>Growth</u> <u>1970-80</u>	<u>Avg. Annual</u> <u>Growth</u> <u>1970-80</u>
City and County of Honolulu	630,528	762,565	20.9%	1.92%
Central Oahu Development Plan Area	66,228	100,953	52.4%	4.30%
Ewa Development Plan Area	24,087	36,234	50.0%	4.17%

Most of the Central Oahu growth took place outside the long established population center of Waipahu, where the population actually declined slightly within the boundaries of the Waipahu CDP. Encompassing the portion of Waipahu below the H-1 freeway, the Waipahu CDP growth rate simply matched the islandwide rate.

The bulk of Central Oahu's growth in the 1970s was in new communities and subdivisions, such as Waipio-Gentry above Waipahu, Melemanu Woodlands, Waipio Acres and, particularly, Mililani Town.

Since 1980, Central Oahu has continued to grow primarily in new communities and subdivisions, including both the previously named ones and a few newer areas such as Village Park.

The most recent estimate of population in the Central Oahu area is for 1985. Compiled by the City and County Department of General Planning these estimates show there was a total population of 114,611 for the entire Central Oahu Development Plan area. Population within selected communities include Waipahu Town or Census Designated Place (28,950), Waipio-Gentry (7,830), Crestview/Seaview (2,100), and Village Park (3,650) (personal communication with Steve Young, Data Systems Branch, City Department of General Planning, November 22, 1988).

The General Plan for the City and County of Honolulu contain percentage guidelines for the distribution of Oahu's population for the eight Development Plan Areas (DP Areas) comprising the entire Island of Oahu.

Until these distribution policies were revised in early 1989, the 2005 population allocated to the Central Oahu Development Plan area was already "absorbed" by the existing residential units and additional developable capacity.

In 1987, Central Oahu had 33,783 residential units (personal communications with Randy Hara, City Department of General Planning, March 23, 1989).

This region also had a developable capacity of 8,390 units, in projects such as Waikele, Mililani and Melemanu (City and County of Honolulu, Department of General Planning, 1988a).

Two revisions to the General Plan have occurred, however, which increases the growth potential for Central Oahu.

The 2010 population projections from the State Department of Business and Economic Development, which were issued on November 30, 1988, were incorporated as required (City Council, 1989).

The population distribution table was revised to reflect, among other items, an increase in Central Oahu's share of islandwide 2010 population -- from 12.8 - 14.2 percent, to 14.9 - 16.5 percent (City Council, 1989).

These amendments were approved in City Council Resolution 88-404, CD-1, FD-1 on January 23, 1989.

Given these two amendments, the Central Oahu Development Plan area could accommodate a population of 148,900 to 164,900 persons by the year 2010, as shown on Table 3.

This time frame extension and increased population allocation provides for a greater development capacity in Central Oahu.

In Ordinance 89-18, three development projects were approved. Mililani Town, Inc. received approval for 3,500 units on the 7,230-acre Mililani Mauka community. Halekua Development, Inc. received approval for 2,000 units on 645 acres in Royal Kunia Phase I. The Gentry Company received approval for 1,375 units on 621 acres which is part of Waiawa Gentry.

Collectively, these three projects will increase Central Oahu's housing supply to sufficiently meet the targeted 2010 population allocated by the General Plan.

4.1.3 Change in Level of Population

Based on an estimated household size of 3.2, the 2,400 residential units of Royal Kunia Phase II is expected to house a population of 7,680. This is well within the State's population forecasts for Oahu share of the statewide population.

As discussed in the previous section, the 2010 population guideline can already be met by the existing housing supply and development capacity, as revised in the recent approval of housing units in three major residential communities. As such, the proposed project's population will exceed the General Plan guidelines for Central Oahu's share of population.

TABLE 3
 Development Plan Area Population Guidelines

DP Area	1985 Population ¹	Year 2010 General Plan % Pop. Guidelines ²	Target Population in Year 2010 ³
Primary Urban Center	439,841	45.1 - 49.8%	450,774 - 497,751
Ewa	36,738	12.0 - 13.3%	119,940 - 132,933
Central Oahu	114,611	14.9 - 16.5%	148,925 - 164,917
East Honolulu	45,029	5.3 - 5.8%	52,973 - 57,971
Koolaupoko	113,769	11.0 - 12.2%	109,945 - 121,939
Koolauloa	11,977	1.3 - 1.4%	12,993 - 13,993
North Shore	13,227	1.6 - 1.8%	15,992 - 17,991
Waianae	<u>34,903</u>	3.8 - 4.2%	37,981 - 41,979
	811,095		

1. City and County of Honolulu, 1988b.

2. City and County of Honolulu City Council, 1989.

3. Oahu population projection of 999,500 people in 2010 in the Series M-K projections, as provided in the State of Hawaii Data Book: 1988 (State of Hawaii, Department of Business and Economic Development, 1989).

4.2 Public Services

4.2.1 Schools

State Department of Education officials estimate that Royal Kunia Phase II will generate between 530 and 820 students. Schools which would be impacted by this increase in enrollment are the:

Hoaeae Elementary School, which is located in Village Park and is scheduled to open in fall 1989;

Waipahu Intermediate School, which is approximately in the middle of Waipahu Town and makai of Farrington Highway; and

Waipahu High School, located at the eastern end of Waipahu Town and makai of the main highway.

The following indicates the anticipated enrollment of Royal Kunia students at the above schools:

<u>School</u>	<u>Grade Level</u>	<u>Approximate Enrollment</u>
Hoaeae Elementary	K through 6	300 to 500 students
Waipahu Intermediate	7 and 8	80 to 120 students
Waipahu High	9 through 12	150 to 200 students

In addition to Hoaeae Elementary School, Royal Kunia Phase I has reserved a school site, as does the proposed project.

The Department of Education cannot assure the availability of classrooms and will require legislative appropriations to accommodate the anticipated enrollment increase. Currently Waipahu Intermediate and High Schools are operating at capacity (Letter from Eugene Imai, Assistant Superintendent, State Department of Education, dated November 3, 1988). Classroom expansions, particularly at the latter two schools will probably be necessary.

4.2.2 Parks

The Waipahu Neighborhood Board area currently has the following parks:

<u>Name</u>	<u>Type</u>	<u>Size</u>
Waipahu Cultural Garden Park	Regional	44.23 acres
Waipahu Field	District	13.82 acres
Crestview Community Park	Community	8.14 acres
Hoaeae Park	Community	6.02 acres
Hans L'Orange Park	Neighborhood	6.93 acres
Honowai Park	Neighborhood	6.31 acres
Waipahu-Uka Park	Neighborhood	4.00 acres
Waipio Neighborhood Park	Neighborhood	4.68 acres
Pupuole Street Mini Park	Mini Park	7.93 acres

(Source: City and County of Honolulu, Department of Parks and Recreation, Advanced Planning, June 1988.)

Village Park currently has the Hoaeae Park within its boundaries. Further, Royal Kunia Phase I includes 10.3 acres for a public park and 12.1 acres for a private recreation area.

The City Park Dedication Ordinance requires a dedication of 350 square feet per residential unit, and 150 square feet per apartment unit. These provisions are implemented through the subdivision approval process.

The proposed project includes 16 acres intended for park dedication. This meets the requirements and acceptance of the land by the City would commit public funds for site improvements and maintenance.

4.2.3 Police Protection

The Pearl City Police Station on Waimano Home Road currently serves Waipahu, Ewa and Waianae, the latter of which has a sub-station. In its review of the Preparation Notice for the EIS, police officials indicated that the increase in population and traffic -- when considered with other proposed developments in Waipahu and Ewa -- will definitely have an impact on their operations. They believe that additional manpower will be needed to accommodate the new developments in the area. Further they cautioned that increased traffic on Kunia Road and the H-1 Freeway will further burden the roadways, which are already functioning at maximum capacity (Letter from Ronald Souza, Assistant Chief of Police, Support Services Bureau, City and County of Honolulu Police Department, dated November 16, 1988).

From a long-range perspective, police officials indicate that surrounding communities have asked for a police facility in the Ewa Plain. In recent Waipahu Neighborhood Board minutes, Waipahu

leaders have also expressed a need for a police facility within Waipahu. Police officials have therefore asked that developers consider how a new police facility could be integrated into their plans.

On the short-term basis, it was recommended that adequate warning signs and safety barricades be installed to insure the safety of passing motorists. Also recommended was the hiring of special off duty officers to help guide traffic during the initial construction stages.

4.2.4 Fire Protection

Primary fire protection would be provided to Royal Kunia Phase II from the Waipahu Fire Station located in the Waipahu Industrial Park. This fire station has an engine and ladder companies with twelve on-duty personnel. Secondary service would be provided by the Pearl City, Waiiau and Makakilo Fire Stations (Letter from Frank K. Kahoochanohano, Fire Chief, City and County of Honolulu Fire Department, dated November 23, 1988).

Fire Department officials expressed their concern that existing fire protection is considered marginal and they are projecting the need for a new fire station to house an engine company in the Kunia area. A new fire station is currently planned in the Waikele area to service the future Waikele development. Fire Department officials have indicated that no new facilities are needed for Phase II, but development beyond that would probably require another fire station (personal communication between William Wanket, consultant, and Battalion Chief Kenneth Ward, Honolulu Fire Department, December 1, 1988).

4.2.5 Medical Services and Facilities

In recognition of Central Oahu and Ewa population growth, medical service providers have already begun to move much of their services to these regions.

Nearest the project site are Kahi Mohala, a psychiatric treatment facility, and St. Francis Medical Center - West. The latter is envisioned as a full-service medical center designed to serve West Oahu. Located adjacent to the intersection of Farrington Highway and Fort Weaver Road, this facility currently has a recently-completed medical office building. To be added is a five-story hospital with 12 intensive care beds, 28 obstetrics/gynecology beds and 96 medical-surgical beds. This hospital will offer 24-hour ambulatory services, cardiopulmonary and 24-hour emergency care.

Near the Pearl Ridge Shopping Center, the Pali Momi Medical Center houses 116 beds, an ambulatory services center and a medical office building. In Moanalua, the Kaiser Foundation Health Plan has a central hospital. Kaiser subscribers in the Waipahu area can also use services at the Punawai Clinic.

The Waipahu Fire Station would respond to emergencies at the project site, and backup would be provided by the City ambulance at Aiea.

4.2.6 Park-and-Ride and Child Care

The City Office of Human Resources projects that some space will be needed for a Park-and-Ride facility, with an adjacent child care facility, based on the combined proposals of Phases I and II. Phase I currently is reserving 5.0 acres for a park-and-ride facility, and .07 acres (30,000 square feet) for a child care facility.

4.3 Neighborhood Social Impacts

4.3.1 Population

Village Park is estimated to house a population of 5,760, based on an average household size of 3.2 persons. When fully developed, Royal Kunia Phase I -- including the already-approved Increment 1 -- could house approximately 7,840 people, based on a similar household size. Phase II is estimated to add another 7,680 people, bringing the total population of the three developments to 21,200.

Demographically, Royal Kunia residents -- of both Phases I and II -- will likely tend to be more affluent than the earlier Village Park homebuyers, since the new units will be higher-priced. As indicated in Section 2.4.2, the newer homebuyer in Village Park already tended towards higher incomes and higher-paying jobs than earlier buyers. This trend is likely to continue with Royal Kunia homebuyers.

This trend could be tempered by income increases in current Village Park homeowners due to increased earning power as the residents become older, and income increases due to appreciation of property values and consequent higher incomes of resale purchasers.

In increasing the population base, the proposed project will increase the community's need for public services, as well as provide justification for more services and facilities. While this will put a strain on current services, it will also create a larger political base which can then encourage funds for facilities, such as schools and parks.

4.4 Preliminary Community Issues

4.4.1 Process of Identifying Issues

Earthplan conducted interviews with community residents and organization leaders in the course of this study. These interviews were held to supplement information from printed sources of material regarding community needs and values, and, more importantly, to identify community issues and concerns relative to Royal Kunia Phase II. No attempt was made to assess the extent or "quantity" of project support or opposition.

The issues identified in this report are preliminary in that they indicate what is important to the community in a specific point in time (November 1988). Changes in attitude and issues may occur in time, given possible project modifications and other events or influences in the community.

The selection of individuals was based on the following cross-section of potential interests:

Leaders of regional Waipahu organizations, including the Neighborhood Board, business, community and neighborhood organizations

Residents in Village Park who are active in their community activities

Nineteen people were interviewed during this study and the list is presented in Table 4.

In general, the interviewer (Berna Cabacungan of Earthplan) asked people to provide input as individuals. In some cases, the interviewer asked the informants to further explain their organization's position, in addition to their own personal viewpoint. Informants were not asked to "take a position," nor were they asked to predict their organization's position if one were not yet taken.

Each person was informed that input would be summarized in the Social Impact Assessment and that individual conversations would remain confidential. The basic source of project information was the Central Oahu Development Plan Amendment and Environmental Assessment: Royal Kunia, Phase II, Hoaeae, Ewa, Oahu prepared by William E. Wanket, Inc. for Halekua Development Corporation and dated October 1988. Information on recent project changes and modifications was provided by the client.

TABLE 4

List of People Interviewed

(Note that those interviewed provided their comments as individuals and not as representatives of their organizations. Organizational affiliations are provided only to indicate some of the networks and interests of those interviewed.)

<u>Name</u>	<u>Organization/Affiliation</u>
C. O. "Andy" Anderson	Waipahu Neighborhood Board No. 22, Sub-district 1 (represents Village Park) and Chair of Planning Committee Waipahu Community Association, Director-at-large Waipahu Cultural Garden Park, Treasurer
Deanne Asato	Resident, Village Park President, Village Park Community Association
Paul Cathcart	President, Waipio-Gentry Community Association
Donald Deitz	Resident, Village Park
James Gee	Waipahu Neighborhood Board No. 22, Chair
Bob Heffernan	Waipahu Community Association, Treasurer Covenant manager and resident, Waipio-Gentry Community Association
Tosh Hosoda	Gentry Pacific Ltd., Vice President and Chief Planner
Ellie Kaanaana	Resident, Village Park Secretary, Village Park Community Association
Martha Kanaulu	Resident, Village Park
Chris Kanazawa	Vice President, Amfac Property Development Corporation

Dave Kaufman	Waipahu Neighborhood Board No. 22, Chair of Environmental Committee
Cal Kawamoto	Waipahu Neighborhood Board No. 22, Recent Chair and Chair of Capital Improvement Committee Waipahu Community Association, 3rd Vice President Waipahu Cultural Garden Park, Executive Director West Hawaii Rotary Club, President-Elect
John Kesterson	Resident, Village Park Vice President, Village Park Community Association
Kathryn Kesterson	Resident, Village Park
Greta Kilpenen	President, Waipahu Business Association
Alan McAngus	Resident, Village Park Chair of Board of Directors, Village Park Athletic Association
Clarence Nishihara	Waipahu Community Association, President Leeward Oahu Teachers Association, Past President
Kathy Watanabe	Resident, Village Park Neighborhood Security Watch Program, Coordinator for Honolulu Police Department, Pearl City and Waipahu Sub-district
Clyde Yamada	Dynamic Property, Inc. (property management for Village Park), Principal Broker

4.4.2 Regional Issues and Concerns

4.4.2.1 Efforts Toward A Mixed Community

Those interviewed stressed their desire for moving towards a socio-economically mixed population and they felt that Royal Kunia Phase II is another step in this direction:

All of those interviewed favored the mix in housing prices and types.

Those interviewed expressed an appreciation for the moderately-priced units because they acknowledged a regional need for affordable housing.

They especially liked the market units and the higher-priced golf course units because these units would attract more affluent homebuyers, and thus diversify the Waipahu population.

There was mixed reaction to the low-density apartment units. While most people felt that these units would help meet current housing needs, some felt that the 900-unit proposal was over-sized, and would create social conflicts because of economic disparity.

As discussed in Section 2.3.3, Waipahu community leaders believe that much of their current needs and problems are related to a perception that this is a relatively poor community. Those interviewed shared these views.

They felt that this position within the islandwide community puts Waipahu at a disadvantage when it comes to instilling community pride and getting more and better public services.

They often compared the Waipahu community to Hawaii Kai and Kahala (less so to Mililani) and cited instances (better schools, more public facilities) in which the latter communities were more successful in improving their community.

Community informants felt that Waipahu's lack of success in community improvement worked two ways. On one hand, they inferred that public officials did not respond to their requests because the community is secondary to more affluent communities.

Most of those interviewed also acknowledged, however, the difficulty in soliciting community resources to advocate solutions to community need. They cited instances in which many Waipahu residents would complain about something, but few took the time to write letters or testify before public officials.

In an effort to change this identity, those interviewed generally tended to look favorably upon proposed developments, in the hope that these developments will bring in people with higher incomes and earning capability. They felt that such residents would presumably have more leisure time, thus enabling them to contribute to community efforts.

Community informants often used the newer mauka communities as examples of the kinds of change they would like to see. They felt that most of the mauka communities do not necessarily share the problems of Waipahu Town. To them, mauka residents were more affluent and had fewer social problems. Further, these neighborhoods are planned communities recently built; they are therefore generally more attractive and better maintained than Waipahu Town's neighborhoods.

Comment: The census information indicates that the region -- particularly Waipahu Town -- is lower on the economic scale in the islandwide community. Waipahu has proportionally more families below poverty level, less people in managerial/professional occupations, more in-migrants and lower educational levels. Further, the census information indicates that the mauka residents tend to have higher incomes, better-paying jobs, and a lower unemployment rate. Community perception of socio-economic differences between Waipahu Town and the mauka communities is therefore accurate.

Support for Royal Kunia Phase II is a reflection of the community desire for upward mobility. Implied in their comments is a feeling that the current composition of the community is not conducive to immediate community change and improvement. The addition of new and socio-economically different residents to the community is expected to somehow provide the catalyst for improvement.

To a large extent, the effectiveness of this catalyst will depend on (1) the desire of new residents to integrate into Waipahu, and (2) the practical boundaries (such as distances between communities and the self-sufficiency of planned communities). Both of these aspects are discussed later in this report.

4.4.2.2 Community Improvement Efforts

Encouraging a mix of residents is not the sole solution towards community improvement. Informants also stressed the need to improve Waipahu Town and described current efforts of beautification and improving the delivery of public services.

Some of the informants stressed the need to improve the business climate in Waipahu. They felt Waipahu businesses needed to act quickly, particularly in light of the progress being made in the

Ewa developments. They feared that, if businesses did not improve the level of service and general environment, Waipahu would be by-passed by residents travelling between Ewa and Honolulu.

In this effort, Waipahu leaders often invite developers in the area to participate in community efforts either through on-site facilities or by contributing to off-site improvements. They expressed appreciation for the willingness expressed and assistance provided by Central Oahu's developers, and asked that the Royal Kunia developer continue its efforts in this area.

Comment: When the "Village Park Expansion" was first presented to Waipahu community organizations, community representatives strongly urged that the developer (Waitec Development Company) participate in community efforts -- if it really wants to be part of the community. After meetings with an ad hoc group of community leaders, the developer committed to the following items in writing:

Fund a WELCOME TO WAIPAHU sign at the Kunia Road end of Farrington Highway,

Prepare a master plan for Kunia Road beautification,

Provide in-kind support to the efforts of Waipahu Cultural Garden Park and the Waipahu 2000 Community Council, and

Participate in a number of other community projects as a team member (Community Resources, Inc., 1986).

Since then, the developer has completed the first item, and has provided in-kind services to the Waipahu Cultural Garden Park and other community organizations when asked.

The 1986 social impact assessment was conducted over five months, and the "give-back" discussions with community leaders occurred during that time. This report is being prepared in a shorter period of time, and no formal project presentation has been made to community groups.

It is likely, however, that, as presentations are made, community representatives will suggest ways for developer involvement in community efforts. It is equally likely that the developer will participate, since many of the same individuals are in the current development team.

4.4.2.3 Integration into Waipahu

Community informants were hopeful that Royal Kunia residents would share the developer's willingness to be part of Waipahu. Underlying the informants' support for the Royal Kunia Phase II

is an assumption that the residents of this new project will consider themselves part of Waipahu, and thus contribute to a practical demographic mix and participate in community efforts.

Some of the Waipahu Town informants suspected that current mauka residents already do not identify with Waipahu. This suspicion was somewhat confirmed by Village Park and Waipio-Gentry informants; many of them saw themselves as residents of their own planned communities and did not extend their neighborhood below the H-1 Freeway.

Comment: As the mauka communities develop, more services and facilities are added to their neighborhood. Eventually neighborhood children go to nearby schools, rather than those across the freeway. More children in the area means that individual communities can have separate sports leagues and activities. Convenience shopping facilities make it possible to by-pass Waipahu for many household needs. What develops is a full-service, fairly self-sufficient community across the freeway from an older already-established community.

This is already occurring in Waipio-Gentry, as indicated by community informants. It is slowly occurring in Village Park, which now has its own neighborhood park, its own athletic league, and will soon have an elementary school and shopping mall. In the case of Village Park, more self-sufficiency is likely if Royal Kunia is built, since more community facilities will be available.

Nevertheless, both communities have members who are very active in Waipahu organizations.

A mauka-makai separation would be inconsistent with current Waipahu goals, and some steps can be taken to mitigate this impact.

First, regional Waipahu organizations, such as the Waipahu Community Association and the Waipahu Neighborhood Board, can actively solicit membership from the newer communities. This is already occurring with Village Park and Waipio-Gentry. Likewise, these organizations can also help these newer communities solve its internal problems.

Second, in marketing the project, the developer could emphasize a positive relationship to the Waipahu community.

4.4.2.4 Traffic and Infrastructure

Waipahu Neighborhood Board minutes and community survey point to a growing awareness of traffic problems. This concern was expressed in the community interviews, slightly more than it was raised in the 1985 - 1986 interviews. There were numerous personal experiences recounted to the interviewer indicating that commuting into Honolulu required increasingly earlier departure times, such as 5:30 and 6:00 A.M.

The basic feeling about the traffic problem was that it requires immediate and major attention. Most of those interviewed, however, believed that the transportation system was the problem, and not development projects. Most felt that only major systemic changes -- such as mass transit -- can solve the problem at this time.

Thus, most did not feel that the project should be denied because of traffic impacts.

A few felt strongly, however, that allowing more development in Central Oahu and Ewa will exacerbate not just the roadway problems, but wastewater and utility systems as well. They recommended against any further development until there are at least some definite plans to improve these infrastructure systems.

Comment: Traffic issues are predominant throughout the islandwide community. Except for very small development projects, public and private proposals in urban and rural areas are often criticized because of the number of cars they will bring into an area.

For the individual, traffic often translates into increasing commuting times to and from work. These times can be stressful, particularly if there appears to be no other solution. Further, as more and more time is spent in the car, leisure time decreases, thus giving the individual less personal and family time.

4.4.3 Neighborhood Issues and Concerns

4.4.3.1 Full-Service, Mixed Community

Village Park informants had expectations of Royal Kunia which were in direct contrast to those of Waipahu Town and Waipio-Gentry informants.

These informants expected the two phases of Royal Kunia to provide the neighborhood amenities of a full-service community which would then lessen their need to visit Waipahu establishments. Note that informants did not criticize current Waipahu Town facilities -- they just wanted the convenience of

nearby facilities. They were also hopeful that Village Park residents could find employment at the industrial park and other facilities.

The informants were concerned about the nature of the industrial park; they appeared comfortable with that component when it was explained that this is intended for "light industrial" facilities.

Specific facilities which were suggested by Village Park informants -- for either Phase I or II -- included a medical office building, shopping mall, storage facilities.

Comment: Royal Kunia Phase II will contribute to this full-service concept, particularly if the project will employ nearby Royal Kunia and Village Park residents.

As discussed in Section 4.4.1, the increase in the area's population will create a larger political base which can then lobby effectively for facilities, such as schools and parks.

4.4.3.2 Relationship to Village Park

Village Park informants were aware that, on the average, Royal Kunia homes would be sold at higher prices than their homes. They knew that the lots would be larger than theirs and that the new homes would be sold in fee (currently, about 100 lots in Village Park have been converted to fee).

The Village Park informants generally considered this a plus, because they saw a potential for increasing their property values.

They were also apprehensive, however, that the Village Park community might be considered economically inferior. They felt that, if more affluent people live in Royal Kunia, then Village Park might be considered "poor relations."

Village Park informants felt that this potentially negative impact could be mitigated by both the current Village Park residents and the Royal Kunia developer as follows:

Upgrading the existing Village Park homes was seen as a definite solution. Part of the Board's commitment to enforce the homeowner's covenants stems from their anticipation of Royal Kunia Phase I being built. They want Village Park to be more attractive -- so that the residents themselves are proud of their homes and the community as a whole. Further, Board members are contemplating amending the covenants to be more specific in the time frame and maintenance requirements.

In terms of developer responsibility, Village Park informants wanted to see design and operational efforts devised to encourage integration among Village Park and Royal Kunia. Village Park informants wanted access to Royal Kunia's recreational facilities, including the golf courses. They warned that, if Village Park residents feel excluded from these newer communities, the separation would result in social conflicts.

Those interviewed from Village Park stressed the need to create one large community, rather than three separate developments. In addition to benefiting the Village Park residents, this cohesiveness, they felt, would also provide a more effective political base when it comes to lobbying for community services and facilities.

Note that in discussing this item, informants made little distinction between the two Royal Kunia phases.

Comment: The relationship between Waipio-Gentry and Seaview/Crestview may shed some light on the potential relationship between Village Park and Royal Kunia residents. Waipio-Gentry is a planned community in its completion stages. Seaview/Crestview is a 20-year old subdivision comprising residents who are slightly less affluent and more "local."

In conducting a social impact for another project, Earthplan interviewed Waipio-Gentry and Seaview/Crestview residents. At that time, a few Waipio-Gentry residents alluded to conflicts (particularly crime-related) between the two communities. When pressed further, however, they indicated that these were infrequent and the source of the problem was not always clear. The Seaview/Crestview informants did not feel there were conflicts between the two communities.

The relationship between these two communities seems to have improved, or at least stabilized. In the interviews for this report, Waipio-Gentry informants indicated that, no formal ties exist between the two communities, but the social interactions are positive. The communities share some public facilities, and the youth athletic league comprise children from both communities.

It is highly unlikely that Waipio-Gentry and Seaview/Crestview will consider themselves as one community. The former will always be legally a separate entity; the latter has no community organization, thus making it difficult to maintain an ongoing relationship with the former.

Village Park and Royal Kunia have some built-in characteristics which can prevent that type of separation between the communities.

Village Park already has a mechanism to speak with one voice. The community association would be a natural vehicle to initiate and maintain ties with Royal Kunia.

Further, the Village Park and Royal Kunia have some of the same people involved in planning and developing the communities. An objective of Phase II is to "continue, enhance and expand the existing symbiotic relationship between Waipahu Town and the existing Village Park community."

Village Park residents can be members of the proposed private recreational facility in Phase I. Village Park residents can pay a fee to join; Royal Kunia residents will have mandatory membership.

There will also be internal linkages through the roadway system, as well as design compatibility among the three developments.

Finally, the developer will be soliciting input from Village Park residents when formal presentations are made. This will help Village Park be part of the planning process and retain an ongoing relationship with the developer.

4.4.3.3 Traffic on Kunia Road

As with the regional community informants, Village Park interviewees did not look forward to traffic increases. They were particularly concerned about the Kunia Road on-ramp to H-1 Freeway. They feel that traffic is already backed up in that area, and that this condition will worsen as West Loch and Soda Creek are built out. Very simply, another project means more people and more cars.

None of the informants felt, however, that the project should not proceed because of traffic impacts.

4.4.3.4 Other issues

Village Park informants urged strict measures to control the dust, dirt and noise of construction. They had some experience with these short-term impacts as portions of Village Park was being built. They felt generally positive, however, about the developer's responses to the their complaints at the time.

Royal Kunia II
Social Impact Assessment
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APPENDIX K

TRAFFIC ASSESSMENT REPORT

PARSONS BRINCKERHOFF QUADE AND DOUGLAS, INC.

K

ROYAL KUNIA - PHASE II

TRAFFIC IMPACT ASSESSMENT REPORT

Prepared For:

Halekua Development Corporation

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December 1988

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TRAFFIC IMPACT ASSESSMENT REPORT
ROYAL KUNIA-PHASE II

INTRODUCTION

Halekua Development Corporation has proposed to develop a mixed use project in Leeward Oahu, north of the existing Village Park residential subdivision (Figure 1). The proposed Royal Kunia-Phase II project would consist of 2,400 dwelling units, an elementary school site, a 16-acre public park, a 130-acre industrial area, and an 18-hole golf course.

Access to the Royal Kunia-Phase II project is proposed through two new intersections with Kunia Road and an internal roadway connecting to Royal Kunia-Phase I and Village Park. A traffic impact assessment was performed to identify the improvements needed along Kunia Road and to address the regional traffic impacts of the proposed project.

The Royal Kunia-Phase II project would be a continuation of the previously considered expansion of Village Park, now designated as Royal Kunia-Phase I. While earlier studies for the Village Park expansion were based on the addition of 3,480 dwelling units to the 1,740-unit Village Park project, present plans for Royal Kunia-Phase I show only 2,450 dwelling units.

This traffic assessment, therefore, uses a total of 4,190 dwelling units for Village Park and Royal Kunia-Phase I and addresses the impact of the proposed Royal Kunia-Phase II project. Estimates from the earlier studies, factored to reflect present unit counts for Village Park and Royal Kunia-Phase I, were added to the traffic generation estimate for the proposed Royal Kunia-Phase II project to forecast future conditions. This report summarizes the assessment and provides recommendations for improvements to the roadway system.

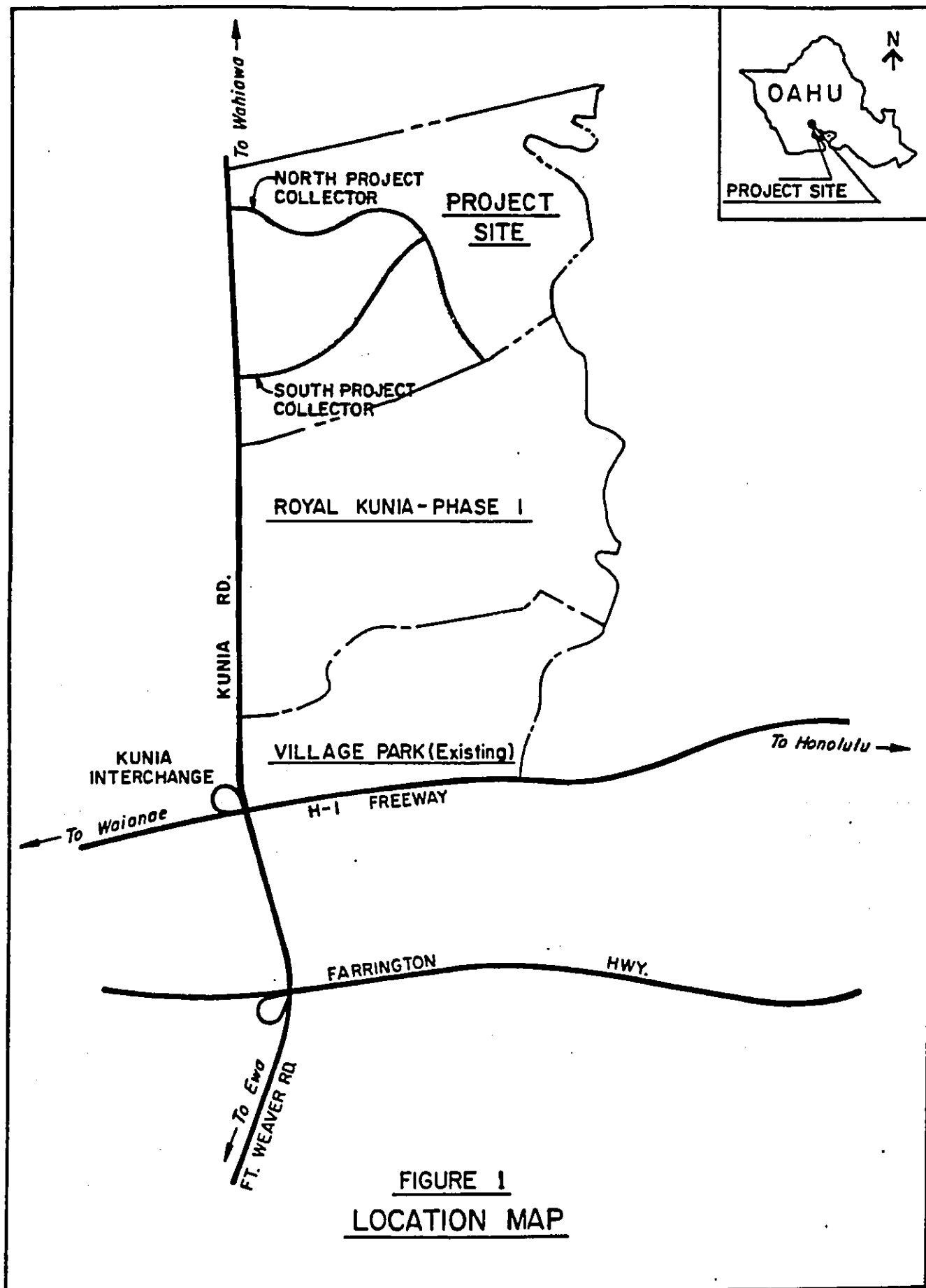


FIGURE 1
LOCATION MAP

EXISTING CONDITIONS

The Village Park subdivision is served by Kupuna Loop, which connects to Kunia Road at two signalized intersections near the Kunia Interchange of the H-1 Freeway. Village Park is a residential project, and many of its residents commute to work or other activities in the primary urban center of Honolulu (between Pearl City and Kaimuki) to the east, at military bases in Leeward Oahu (east, north, or west), in nearby Waipahu (south), or at Campbell Industrial Park (west).

Kupuna Loop, a collector road providing two lanes of traffic in each direction along the southern portion of Village Park, presently operates at good levels of service at the south signalized intersection with Kunia Road. Two left turn lanes and a separate lane for right turns onto Kunia Road are available; separate left and right turn lanes into South Kupuna Loop are provided on Kunia Road.

Kupuna Loop continues around Village Park, returning to connect again to Kunia Road to the north; here it has a single lane for left turns onto, and through movements to a driveway across of, Kunia Road; channelization at the intersection provides for a separate westbound lane for right turns from North Kupuna Loop. Separate lanes on Kunia Road are provided for turns into North Kupuna Loop. Existing traffic, even during peak hours, is served well by the signalized intersection, at little or no delay.

Widening and other improvements have been provided as part of the Village Park development along the front of the subdivision and at the Kunia Interchange. South of the H-1 freeway, the roadway continues as the four-lane Fort Weaver Road. Field observations indicate that existing traffic volumes, even during peak hours, are adequately served at the interchange and along Fort Weaver Road. North of Village Park, Kunia Road is a two-lane rural highway passing sugar and pineapple fields, a golf course, a pineapple transfer station, and military bases before entering the Wahiawa area. Existing peak hour volumes are less than half of the capacity of the two-lane highway.

On the H-1 Freeway, existing peak hour traffic conditions in the vicinity of Kunia Interchange do not create significant problems, with volumes approximately equal in the eastbound and westbound directions; peak hour traffic volumes are less than seventy percent of capacities. Because existing land use on Oahu places the major employment areas in the primary urban center to the east, traffic volumes increase rapidly as the H-1 Freeway and other highways approach downtown Honolulu. The highway corridors between the Waiawa and Halawa Interchanges, including H-1 Freeway, Kamehameha Highway, and Moanalua Road, presently operate near capacities during peak hours.

FUTURE CONDITIONS WITHOUT THE PROPOSED PROJECT

The proposed Royal Kunia-Phase II project is expected to be completed in 1999. Future traffic volumes were forecasted for year 1999 conditions. Without the proposed project, traffic demands in the area will be due to traffic generated by the Village Park and Royal Kunia-Phase I projects, both of which are expected to be completed and fully occupied, and through traffic.

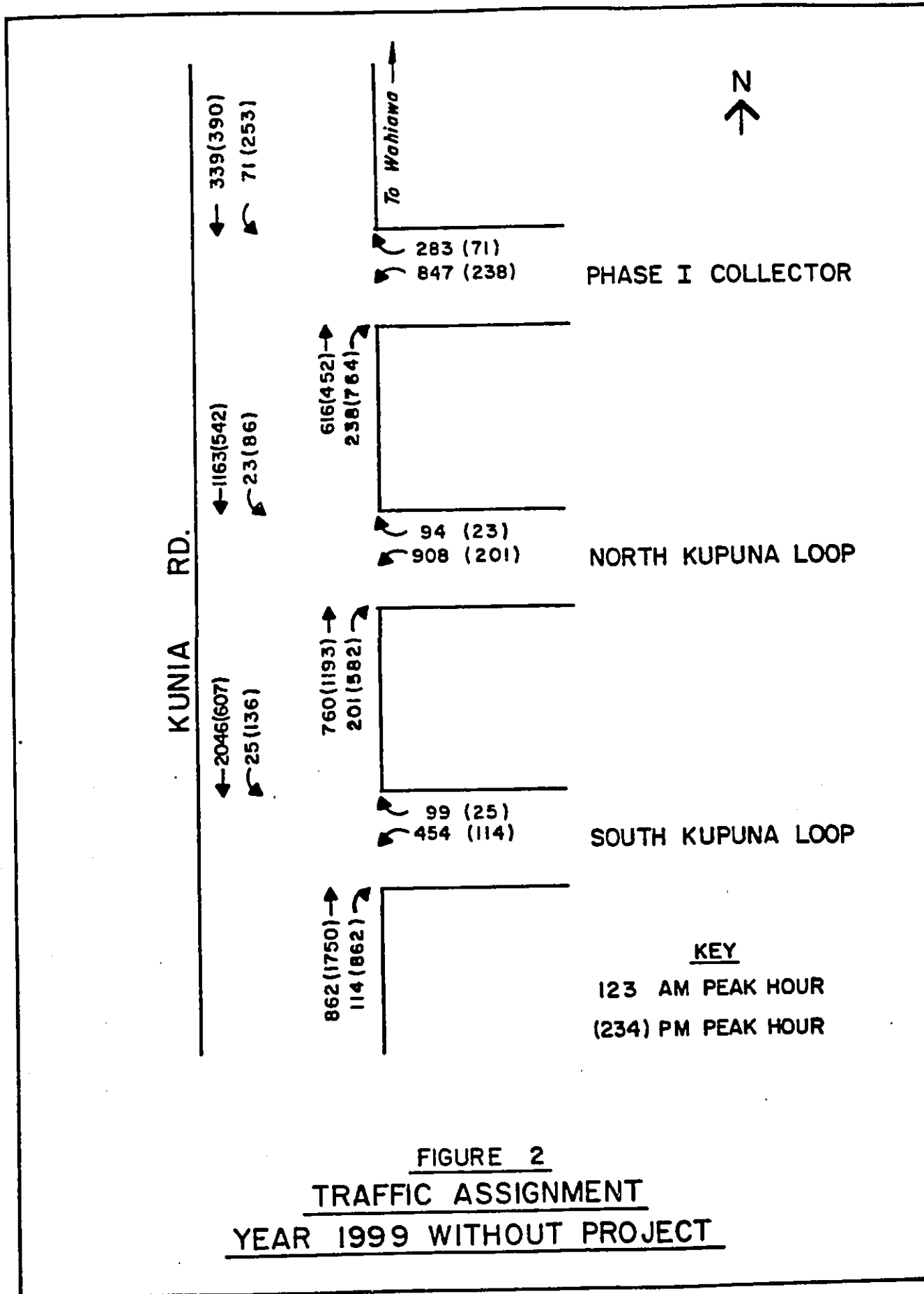
Traffic volumes on Kunia Road north of Village Park were estimated by reviewing traffic counts taken by the State Highways Division from 1980 to 1987. A growth rate of four percent was derived from the count data and applied to recent traffic counts (1985 for AM Peak Hour¹ and 1988 for PM Peak Hour²) to estimate future traffic on Kunia Road. Traffic volumes on the H-1 freeway west of Kunia Interchange and on Fort Weaver Road south of H-1 are expected to increase due to other development proposed in the Ewa area. For future year conditions, an annual rate of increase of seven percent was used for each direction to reflect these various projects. The increase was applied to the latest available traffic counts³ which did not appear to have significant errors. These estimates would represent future traffic with or without the project, since the total number of origins and destinations in each of these directions is assumed to be unaffected by the proposed Royal Kunia Phase II project.

The traffic due to Royal Kunia-Phase I was determined by factoring the projections made in the Village Park expansion traffic report⁴ for the currently proposed Phase I project. Total traffic generated by Village Park and Royal Kunia-Phase I is estimated to be approximately 80 percent of that calculated earlier, reflecting the decrease in total units from 5,220 to 4,190. Trip distribution and traffic assignment were done in a manner similar to the earlier study. This future traffic estimate is shown in Figure 2.

The Royal Kunia-Phase I project would construct a new collector road intersecting with Kunia Road north of North Kupuna Loop. The traffic report for the Village Park expansion recommended that the westbound approach of this roadway to the Kunia Road intersection be wide enough to accommodate two left turn lanes onto southbound Kunia Road and a separate right turn lane. A separate southbound left turn lane on Kunia Road, two lanes for northbound traffic on Kunia Road, and a separate northbound right turn lane were also recommended; the intersection would be controlled by a traffic signal system.

A reevaluation of this intersection, accounting for the reduction in the number of units in the Village Park expansion project, indicates that a single northbound through lane would provide adequate capacity at full development of Royal Kunia-Phase I. The second northbound lane would be a right turn only lane for traffic entering the Phase I Collector Street.

The report also recommended that the existing right turn only lane on the North Kupuna Loop westbound approach to Kunia Road be converted to serve left turns as well as right turns. The existing northbound right turn only lane would serve both right turns and through traffic, with Kunia Road widened to provide two northbound lanes from North Kupuna Loop to north of the new collector street. Southbound traffic would be served with an additional lane which begins at the new collector street and continues beyond South Kupuna Loop, becoming a right turn only lane to the westbound on-ramp to the H-1 Freeway.



PROPOSED PROJECT

The proposed project includes 1,500 single family dwellings, 900 low-density apartments, a 130-acre industrial area, an 18-hole golf course on a site of 171.7 acres, a 16-acre park, and an elementary school site. Estimated completion of the project is the year 1999.

Traffic Generation

The traffic generated by the proposed project was estimated using trip rates for various uses compiled by the Institute of Transportation Engineers and reported in Trip Generation⁵ (Fourth Edition). Where rates were not available for the proposed use, estimates were based on observations of similar uses; the trip rates used are shown in Table 1.

These rates were applied to the number of units or the acreage proposed for the project. In the case of the elementary school, an average size of 700 students for these schools was used. The project traffic onto Kunia Road during peak hours was estimated by accounting for internal trips which could be made between the various uses, such as by residents employed in the industrial area or parents dropping students off at the school. Table 2 presents the trip generation.

Table 1
TRIP GENERATION RATES

	Trip Parameter	Average Weekday	AM Peak Hour Trip rate	%In	PM Peak Hour Trip rate	%In
Single family dwellings	d.u.	10.062	0.754	27%	1.005	63%
Low Density Apartments	d.u.	6.103	0.532	18%	0.673	68%
Industrial Park	acres	62.904	10.161	82%	10.654	21%
Golf Course	acres	8.325	0.266	80%	0.386	8%
Public Park	acres	65.000	1.000	60%	6.500	40%
Elementary School	students	1.032	0.230	60%	0.015	10%

Table 2
TRIP GENERATION

	Average Weekday	AM Peak Hour		PM Peak Hour	
		Inbound	Outbound	Inbound	Outbound
Single family dwellings	15,090	305	826	950	558
Low Density Apartments	5,490	86	393	412	194
Industrial Park	8,180	1,083	238	291	1,094
Golf Course	1,430	37	9	5	61
Public Park	1,040	10	6	42	62
Elementary School	720	97	64	1	9
Total Vehicle Trip Ends	31,950	1,618	1,536	1,701	1,978
Internal trips		275	275	288	288
Net Trip Ends		1,343	1,261	1,413	1,690

Trip Distribution

The net traffic generated by the project would travel to or from other parts of the island of Oahu; distribution factors were developed for traffic generated by the residential and industrial uses and are shown in Table 3.

Table 3
TRIP DISTRIBUTION

	<u>Residential Traffic</u>	<u>Industrial Traffic</u>
North on Kunia Road	10%	5%
South on Kunia Road		
West on H-1	25%	30%
South on Fort Weaver Road	15%	25%
East on H-1	50%	40%
subtotal	90%	95%

Traffic Assignment

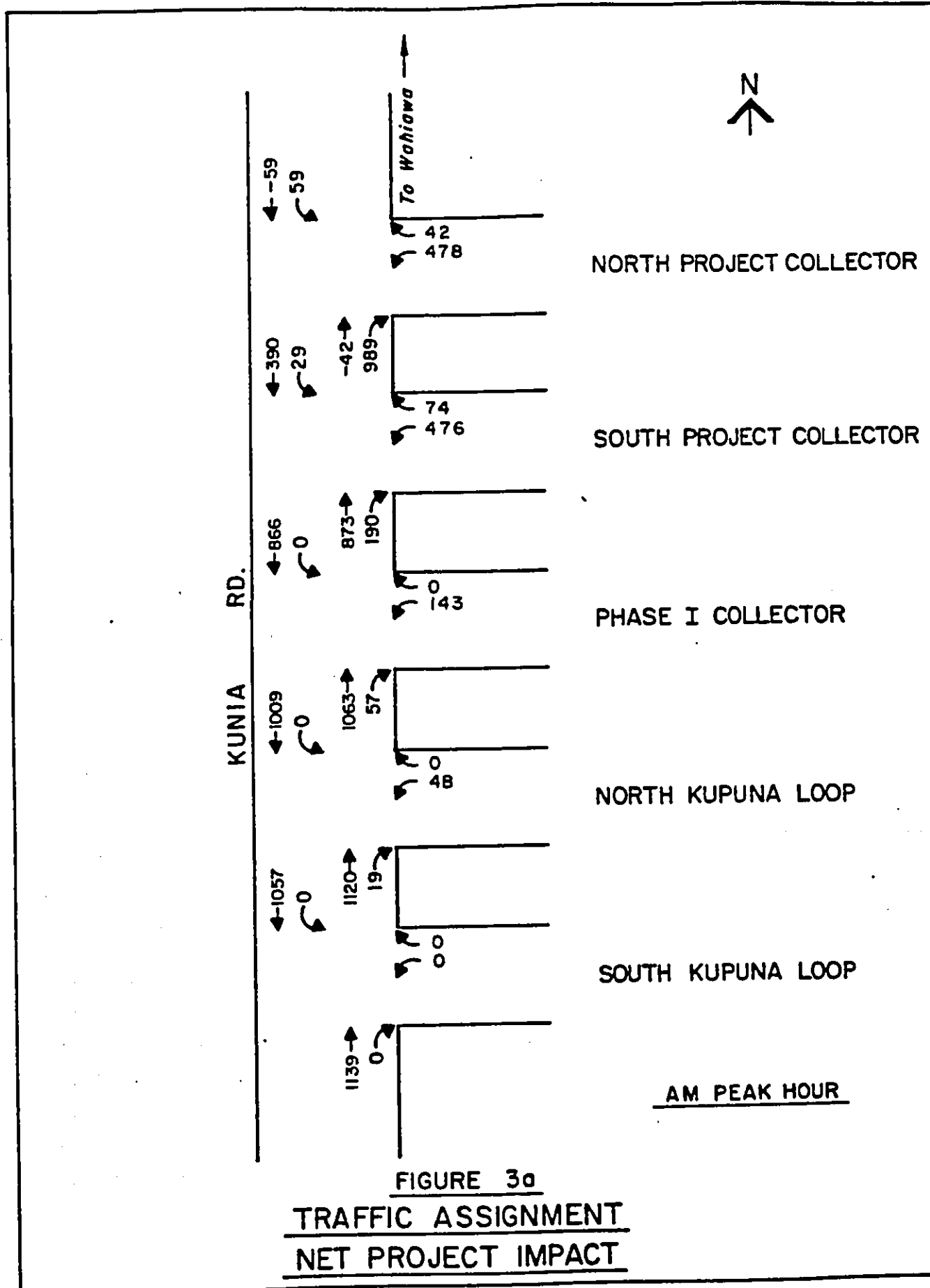
Project traffic was assigned onto the proposed roadway system using the preliminary land use plan to locate the project trip end within the site and to determine the most likely routing of the trips. Table 4 summarizes the proportions used in the traffic assignment. The proposed project would also affect other traffic in the area, by providing employment, residential, or other opportunities. Figure 3 shows the project's impact to traffic volumes and Figure 4 presents the traffic assignments for future conditions with Phase II.

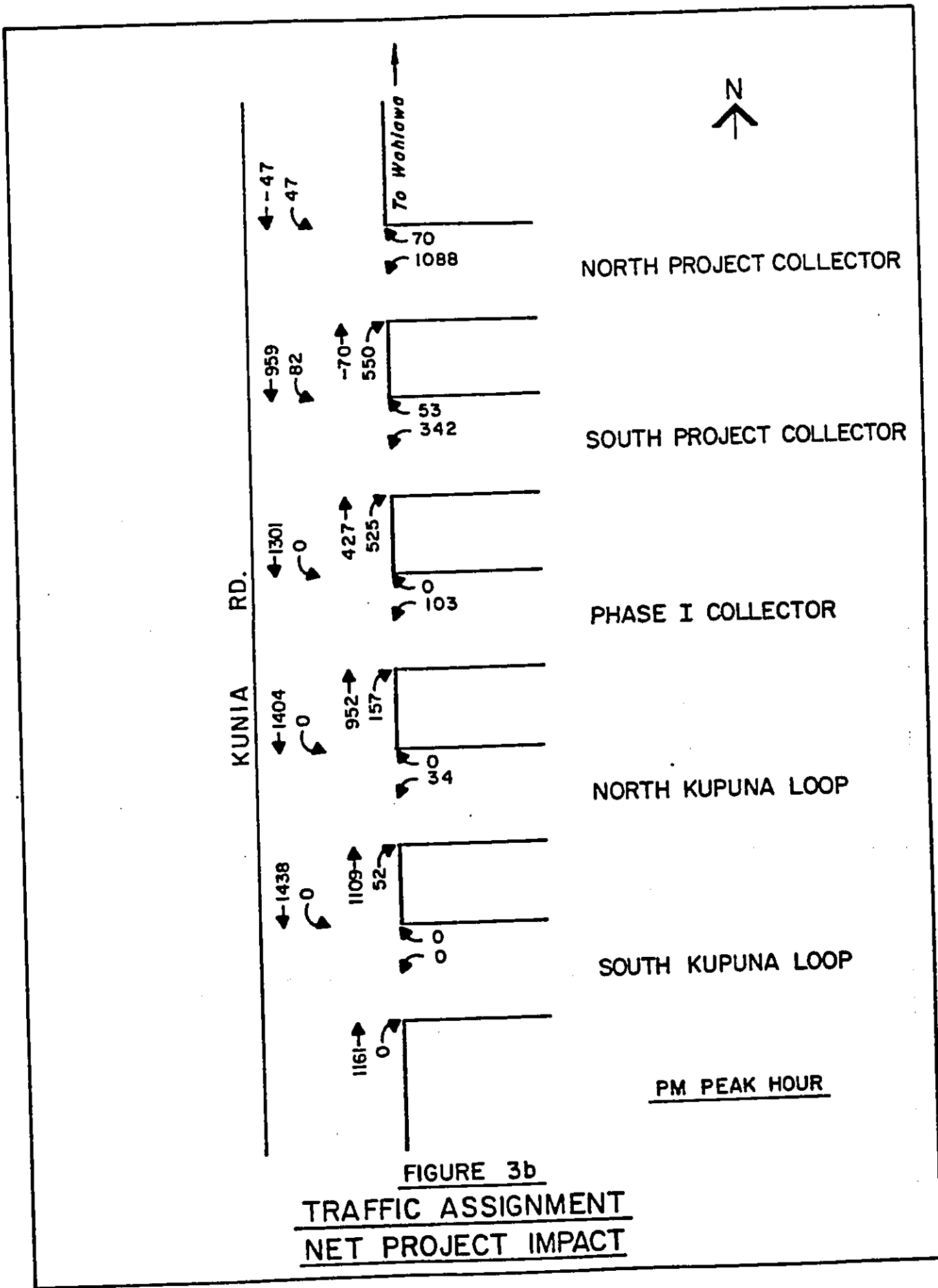
Table 4
TRAFFIC ASSIGNMENT

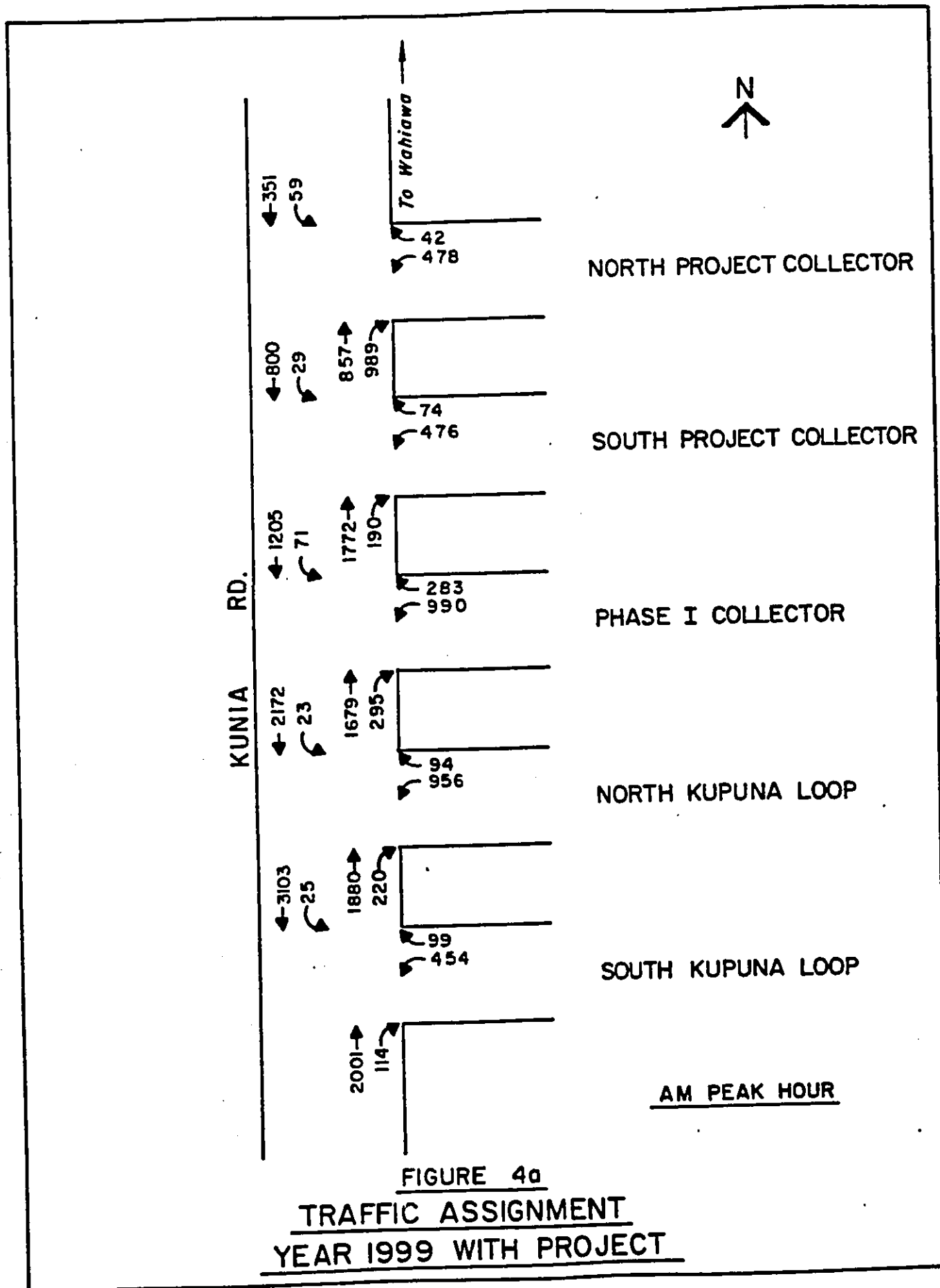
	<u>Residential Traffic</u>		<u>Industrial Traffic</u>	
	<u>North</u>	<u>South</u>	<u>North</u>	<u>South</u>
North Project Collector	30%	30%	100%	100%
South Project Collector	70%	50%	0%	0%
Phase I Collector	0%	15%	0%	0%
North Kupuna Loop	0%	5%	0%	0%
South Kupuna Loop	0%	0%	0%	0%

RECOMMENDED ROADWAY IMPROVEMENTS

The increased traffic volumes will affect traffic conditions on Kunia Road; additional lanes on Kunia Road will be necessary to serve these volumes. Critical movement analyses of the intersections formed by Kunia Road and the project's two collectors, the Phase I collector, North Kupuna Loop, and South Kupuna Loop were conducted using the traffic assignments for full development to determine the number of lanes needed. Figure 5 presents a schematic of the laneage recommended for Phase I and for Phase II.







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

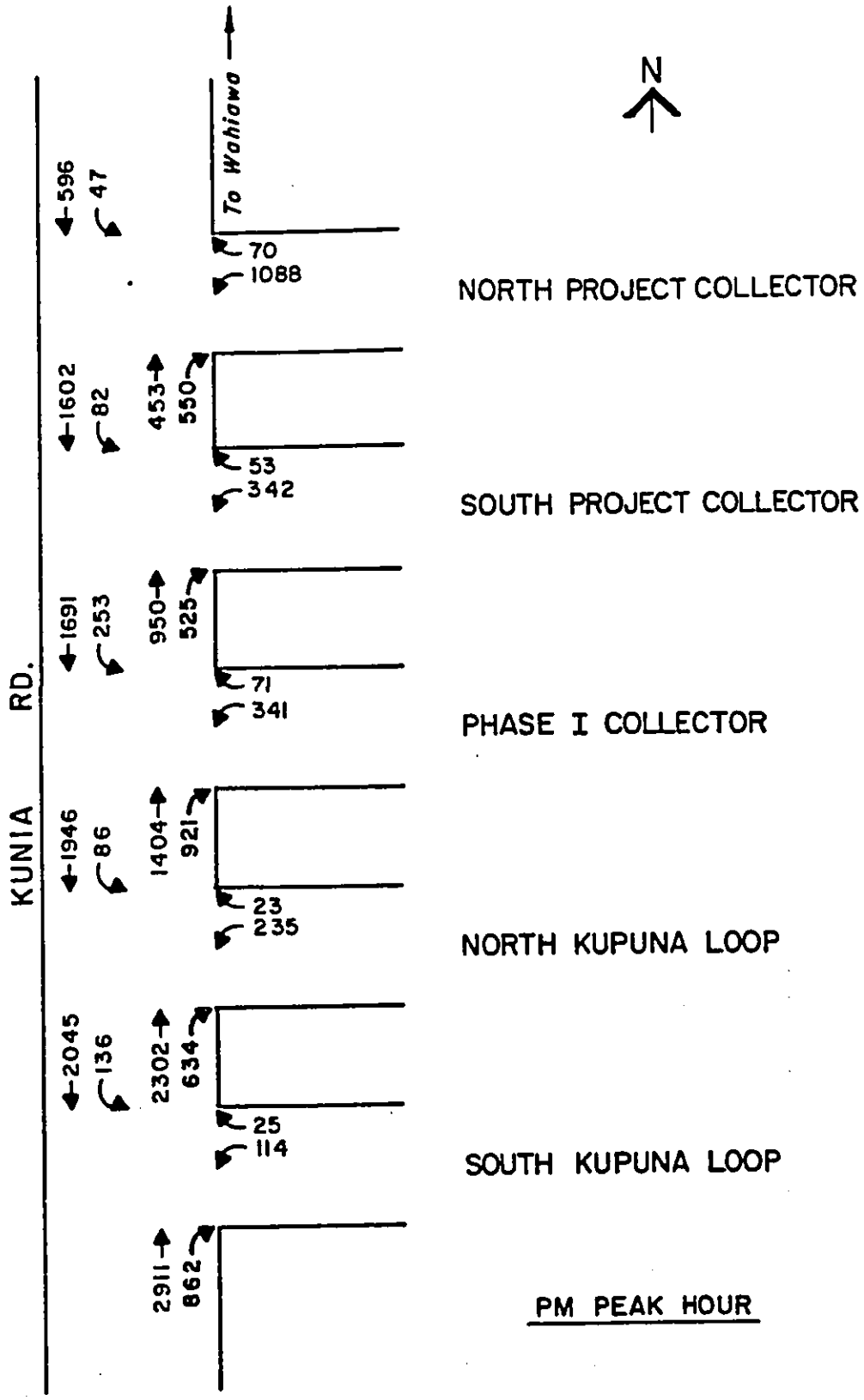
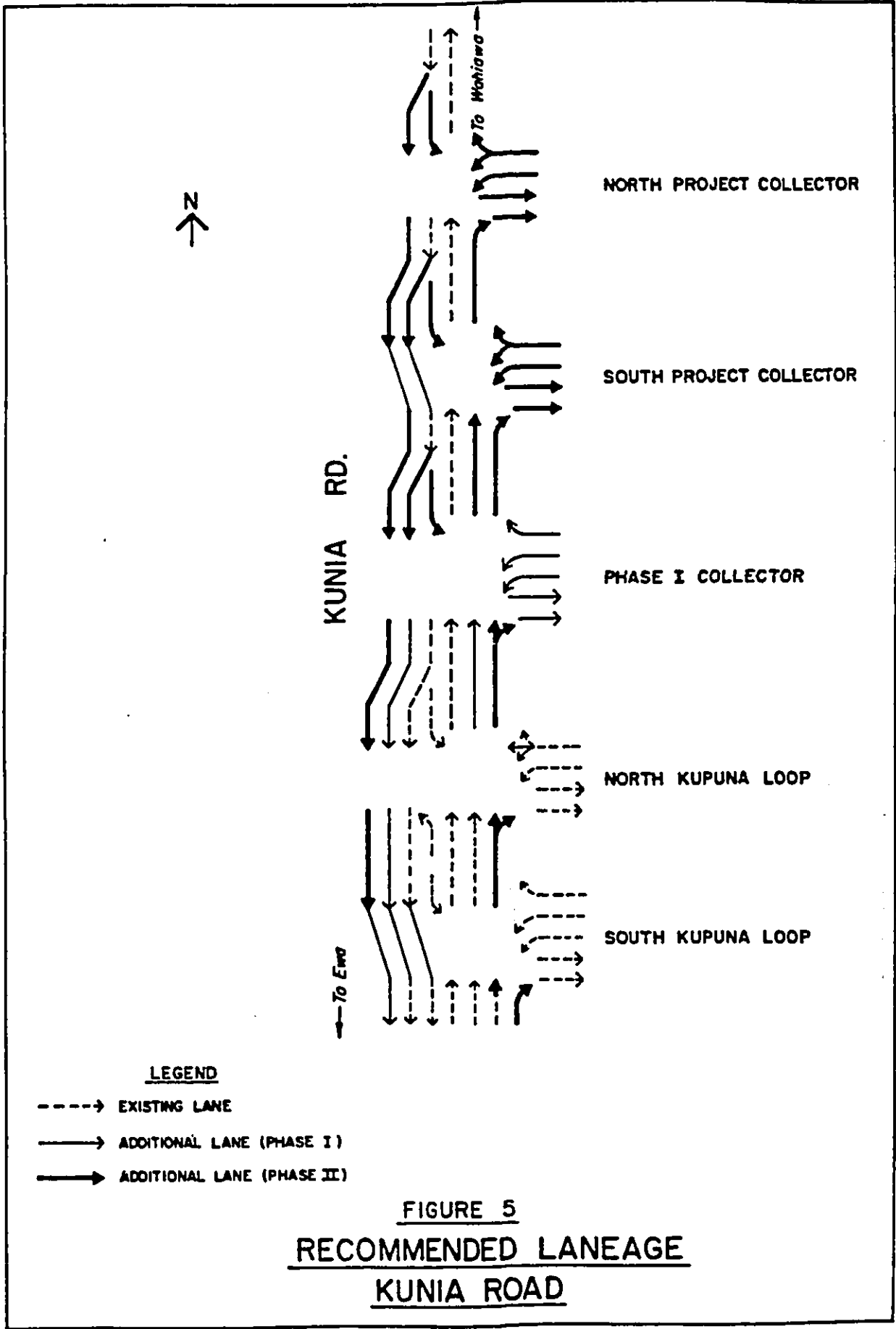


FIGURE 4b
TRAFFIC ASSIGNMENT
YEAR 1999 WITH PROJECT



Kunia Road

The proposed project is expected to increase traffic demands on Kunia Road, exceeding available capacities at the existing signalized intersections with Kupuna Loop and at the proposed intersection into Royal Kunia-Phase I; widening of the existing two-lane Kunia Road (one in each direction) will be necessary to increase capacities. A second lane in each direction on Kunia Road should be added between the North Project Collector and the South Project Collector. Between the South Project Collector and the Phase I Collector, a second southbound and two additional northbound lanes should be constructed. The third northbound lane would become a right turn only lane into the South Project Collector.

A third lane in each direction should be provided between the Phase I Collector and South Kupuna Loop. Through movements should be allowed from each northbound lane in order to provide sufficient capacities during the morning peak hour; the high right turn volume at the Phase I Collector in the PM peak hour, however, may require that the right lane be designated for right turns only during the afternoon peak period.

Project Collector Street Intersections

The proposed project collectors will each connect to Kunia Road in a T-intersection north of the existing Village Park subdivision. The peak hour traffic demands will require that each project collector be four lanes wide at the intersection, with two eastbound lanes departing the intersection and two westbound lanes approaching it. The left approaching lane would be designated for left turns only and the right lane for left or right turns.

The southbound approaches to the project collectors should be widened to permit a separate southbound left turn lane at each intersection. At the North Collector Street intersection, a second southbound lane leaving the intersection would be added in a manner

similar to the existing South Kupuna Loop intersection. The second northbound lane would become a right turn only lane into the collector street, as is presently done at the North Kupuna Loop intersection; a single lane leaving the intersection to the north would suffice. These new intersections with Kunia Road should each be controlled by a three-phase signal providing for protected southbound left turns.

Other Intersections

The increased traffic from the Phase II project will require that additional lanes be placed on Kunia Road at its intersection with the Phase I Collector Street. An additional lane will be needed for northbound through traffic at the intersection. The right turn only lane provided in Phase I should be converted to a through/right turn option lane. An additional southbound lane would also be needed. The additional lanes in each direction should be continued across both the North Kupuna Loop and South Kupuna Loop intersections. The northbound approach to South Kupuna Loop should be widened to permit a third lane for through movements while maintaining a separate lane for northbound right turns.

PROJECT IMPACTS

The proposed project will impact conditions on Kunia Road, at the Kunia Interchange, and on the regional highway system. The assessment includes the capacity analyses of future conditions at the signalized intersections with Kunia Road, an identification of improvements needed at Kunia Interchange, and a discussion of regional impacts.

Traffic Analyses

The traffic analyses were conducted using the Operational Analysis for signalized intersections from the Highway Capacity Manual⁶ (HCM). The HCM includes methods to estimate capacities and describes "levels of service" (LOS) for signalized intersections from estimated delays

based on traffic demand volumes. Descriptions of the LOS have been appended to this report. Table 5 shows findings of the intersection analyses findings for future (year 1999) conditions with the project.

Table 5
SIGNALIZED INTERSECTION ANALYSES

	AM Peak Hour			PM Peak Hour		
	Delay	LOS	v/c ratio	Delay	LOS	v/c ratio
Kunia Road and:						
North Project Collector	23.3	C	0.94	23.4	C	0.54
South Project Collector	25.0	C	0.88	19.2	C	0.71
Phase I Collector	32.6	D	0.96	20.2	C	0.96
North Kupuna Loop	30.0	D	0.97	17.0	C	0.96
South Kupuna Loop	24.9	C	0.93	15.4	C	0.90

Regional Traffic Impact

The traffic assignments for without and with project conditions were compared to determine the proposed project's impact on regional travel demands. These assignments, developed assuming that total traffic volumes to the north, west, and south were unaffected by the proposed project, reflect the project's industrial area; employment and commercial opportunities for residents of Leeward Oahu would allow for the satisfaction of many trip purposes within the area and could divert much of the residential-based traffic generated by the other projects in Ewa which would otherwise be destined toward the primary urban center. Table 6 shows the traffic assignments and the net project impact at Kunia Interchange.

As indicated in the analyses and in Table 6, the project's major traffic impact is expected to be along Kunia Road between the project and Kunia Interchange, partly because of the employment opportunities in the industrial area. Traffic generated by the residential portion

Table 6

TRAFFIC ASSIGNMENTS
Kunia Interchange

from: \ to:	AM Peak Hour				PM Peak Hour					
	North	West	South	East	North	West	South	East	TOTAL	
Without Project:										
North (Kunia Road)	0	896	325	1279	2500	0	237	161	323	721
West (H-1 freeway)	283	0	616	3238	4137	950	0	1066	2092	4108
South (Port Weaver Road)	343	1099	0	2854	4396	334	622	0	2156	3112
East (H-1 freeway)	350	2230	2138	0	4718	1328	3391	3035	0	7754
TOTAL	976	4225	3079	7471	15751	2612	4250	4262	4571	15695
With Royal Kunia II:										
North (Kunia Road)	0	1179	502	1876	3557	0	669	426	1064	2159
West (H-1 freeway)	639	0	576	2922	4137	1257	0	997	1854	4108
South (Port Weaver Road)	557	1041	0	2798	4396	534	577	0	2001	3112
East (H-1 freeway)	919	2005	2001	0	4925	1982	3004	2839	0	7825
TOTAL	2115	4225	3079	7596	17015	3773	4250	4262	4919	17204
Net Project Impact:										
North (Kunia Road)	0	283	177	597	1057	0	432	265	741	1438
West (H-1 freeway)	356	0	-40	-316	0	307	0	-69	-238	0
South (Port Weaver Road)	214	-58	0	-156	0	200	-45	0	-155	0
East (H-1 freeway)	569	-225	-137	0	207	654	-387	-196	0	71
TOTAL	1139	0	0	125	1264	1161	0	0	348	1509

of the proposed project will be offset by the changes in traffic patterns caused by the industrial area, as traffic originating in other residential developments in Leeward Oahu could find trip destinations within the proposed project.

Regional traffic impacts were also evaluated by comparing the project's traffic generation with the total future traffic forecasted for major roads in the area. The comparison indicates that the traffic generated within the proposed project will constitute minor portions of the future traffic on the major highway segments near the project. Table 7 summarizes the comparisons of the forecasted volumes.

Table 7
REGIONAL IMPACTS

	Project Traffic		Total Traffic		Project as % of Total	
	AM	PM	AM	PM	AM	PM
North on Kunia Road	204	252	1,309	1,166	16	22
West on H-1: WB	326	469	4,225	4,250	8	11
EB	382	366	4,137	4,108	9	9
South on Fort Weaver Road: SB	210	347	3,079	4,262	7	8
NB	293	237	4,396	3,112	7	8
East on H-1: WB	580	681	4,925	7,825	12	9
EB	609	751	7,596	4,919	8	15

Kunia Interchange

The 1999 traffic assignments for the Kunia Interchange indicate that the existing interchange will not be able to handle the expected traffic volumes. While the earlier traffic report had identified improvements at the interchange which would provide sufficient capacity for the 3,480-unit expansion, other proposed development to the south,

such as the West Loch, Ewa By Gentry, and Ewa Marina projects, will add traffic demands to the ramps and the signalized intersections serving the interchange.

The determination of the specific improvements at the interchange will require additional studies, including traffic estimates, and should be coordinated with other improvements in the freeway system in view of the existing conditions closer to the primary urban center, which indicate that the freeway system may not be able to accommodate the increased traffic forecasted at Kunia Interchange.

Other Traffic Mitigation

The analyses conducted above were based on the highway system being able to accommodate the traffic demand of the proposed project, in order to identify roadway improvements which would be necessary in the immediate vicinity of the project. Existing regional constraints, however, indicate that other measures to satisfy travel demands will also be necessary. The implementation of a ridesharing program, along with incentives such as the designation of and encouragement to use high occupancy vehicle (HOV) lanes on the freeway, could help to minimize the adverse traffic impacts of any proposed development.

Goals for a ridesharing program should be established for the reduction of traffic generated by the proposed project. Because the vehicular trip generation rates are based on suburban developments with little or no transit service, the estimates of the traffic generated by the proposed project could be reduced to reflect expected transit and rideshare use. For example, traffic exiting the project toward the south could be reduced by twenty percent by diverting fifteen percent of the automobile users to buses and ten percent into carpools, as illustrated in Table 8.

Table 8
TRAFFIC DEMAND REDUCTION

Projected exiting traffic southbound on Kunia Road (AM Peak Hour)	1,135 vehicles
Persons at 1.3 persons/vehicle	1,475 person-trips
If 15% were diverted into buses at 45/bus	5 vehicles
and 10% formed carpools at 3/car	50 vehicles
Remainder (75%) unchanged at 1.3/car	<u>852 vehicles</u>
Total vehicles exiting	907 vehicles
or 907/1,135 = 80 percent	

If these goals are achieved, traffic conditions at the signalized intersections along Kunia Road would be better than identified above in Table 5, as traffic volumes would be less than those shown in the assignments. Application of the operational analyses for signalized intersections, with reduced AM peak hour volumes only for southbound exiting traffic produce the changes indicated in Table 9. Similar improvements can be expected for the PM peak hour.

Table 9
INTERSECTION ANALYSES - WITH RIDESHARING
AM Peak Hour

	Traffic Assignment			With Ridesharing		
	Delay	LOS	v/c ratio	Delay	LOS	v/c ratio
Kunia Road and:						
North Project Collector	23.3	C	0.94	21.4	C	0.94
South Project Collector	25.0	C	0.88	20.4	C	0.85
Phase I Collector	32.6	D	0.96	24.9	C	0.88
North Kupuna Loop	30.0	D	0.97	22.1	C	0.90
South Kupuna Loop	24.9	C	0.93	19.4	C	0.75

CONCLUSIONS AND RECOMMENDATIONS

Access to the proposed project will be through two new collector streets and other streets in the area. The widening of Kunia Road will provide sufficient capacities at five signalized intersections serving Village Park and Royal Kunia. Level of Service D or better conditions were found from the analyses of both morning and afternoon peak hour traffic assignments.

The traffic assignments also indicate that the capacity of the H-1 freeway near Kunia Interchange may be approached. The implementation of a high occupancy vehicle lane on the freeway and the development of a successful ridesharing program could contribute toward the reduction of peak hour traffic demands.

In any case, major improvements at Kunia Interchange may be needed because of the cumulative impact of all development being proposed in the Ewa area; these improvements should be coordinated with systemwide improvements in order to properly allocate the limited resources that are available for highway improvements. The proposed project, which provides employment and economic opportunities away from the primary urban center of Honolulu, is expected to have minimal impact to the existing congested highway corridors between the Waiawa Interchange and downtown Honolulu.

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APPENDIX

LEVELS OF SERVICE

APPENDIX - LEVELS OF SERVICE

The Highway Capacity Manual defines six Levels of Service; labelled A through F, from best to worst conditions. Levels of Service for signalized and unsignalized intersections are defined in terms of average user delays. Delay is a measure of driver discomfort, frustration, fuel consumption, and lost travel time.

Signalized Intersections

For signalized intersections, the Operational Analysis measures signal operations by two separate indicators, volume-to-capacity (v/c) ratios and Level of Service. The v/c ratios provide a comparison of the traffic demands to the theoretical capacity of the intersection while levels of service are determined from the estimated delay. These two indications do not necessarily correlate to each other.

LEVEL OF SERVICE A: This level describes operation with very low delay, i.e., less than 5.0 seconds per vehicle. This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.

LEVEL OF SERVICE B: This level describes operation with delays in the range of 5.1 to 15.0 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher average delays.

LEVEL OF SERVICE C: This level describes operations with delays in the range of 15.1 to 25.0 seconds per vehicle. These higher delays may result from fair progression and/or cycle lengths. Individual cycle failures may begin to appear as the number of vehicles stopping is significant; many vehicles, however still pass through the intersection without stopping.

LEVEL OF SERVICE D: This level describes operations with delays in the range of 25.1 to 40.0 seconds per vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from a combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failure are noticeable.

LEVEL OF SERVICE E: This level describes operation with delays in the range of 40.1 to 60.0 seconds per vehicle. this is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failure (queued vehicles do not clear in one cycle) are frequent occurrences.

LEVEL OF SERVICE F: This level describes operation with delay in excess of 60.0 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with oversaturation, i.e., when arrival flow rates exceed the capacity of the intersection. It may also occur at high v/c ratios below 1.00 with many individual cycle failures. Poor progression and long cycle length may also be major contributing causes to such delay levels.

APPENDIX L

**POTENTIAL FOR CHEMICAL DRIFT FROM
SUGARCANE OPERATIONS IN THE VICINITY OF
ROYAL KUNIA PHASE II PROJECT**

RICHARD E. GREEN AND CHARLES L. MURDOCH

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**POTENTIAL FOR CHEMICAL DRIFT
FROM SUGARCANE OPERATIONS IN
THE VICINITY OF ROYAL KUNIA PHASE II PROJECT**

A Report to

William E. Wanket Inc., Land Use Consultant

by

Richard E. Green and Charles L. Murdoch

May 29, 1989

The objective of this brief report is to assess the potential for adverse impact of agricultural chemicals used in sugarcane culture in the vicinity of the Royal Kunia Phase II Project on the environment of the development area. The environmental impact of chemicals to be used on the golf course in the planned development was addressed in an earlier report (Murdoch and Green, February, 1989).

A number of relevant factors are considered in the following analysis.

1. Agricultural Chemicals Subject to Drift

The principal chemicals used in sugarcane production are fertilizers (for plant nutrition), herbicides (to control weeds), fungicides (to prevent fungal damage to seed pieces), and growth regulators (to control flowering or ripening). In the Kunia area, Oahu Sugar Company applies all herbicides by ground sprayers, which minimize drift off the field. Fertilizers are applied to the soil at planting or through the drip irrigation system, so that drift of fertilizers is not a factor. Treatment of seed pieces with fungicide is done prior to planting with no associated drift problem.

Chemicals which are applied by aircraft will have the greatest potential for drift from the area to which they are being applied. The two chemicals used in sugarcane production which must be applied from aircraft are the growth regulator, Ethephon, which is required in some areas to regulate flowering, and Polado®, which encourages ripening of the crop prior to harvest. Ethephon is not generally required in the Kunia area. Thus, the only chemical which must be applied by aircraft in this area is Polado®. This will require only one application per 2-year crop, shortly before harvest of the crop. The active ingredient in Polado®, N-(phosphonomethyl) glycine, or glyphosate, is essentially the same as in the postemergence herbicide Roundup®. However, for cane ripening, Polado® is applied at only 3/4 pound active ingredient per acre, about half the amount generally used when Roundup® is applied for weed control.

2. Location of Development Relative to Cane Fields

The location of the Royal Kunia Phase II development area in relation to surrounding sugarcane fields of Oahu Sugar Company is shown in the attached map. The numbered areas correspond to separate cane fields which are generally managed as independent management units. Thus the cane is usually at a different stage of growth in each unit, and chemical applications would be timed according to the stage of growth or management phase (such as harvest, field preparation, planting, etc.) in a given field. Thus, chemical applications will be made to different fields at different times in a 2-year crop cycle, so that the potential for drift from sugarcane areas to the proposed

development area is much less than if all cane areas were to be sprayed at the same time.

3. Direction of the Prevailing Winds

The Kunia Road, which borders the proposed development on the south-west side, is oriented generally in a north-west direction as one proceeds from Waipahu towards Waialua. The prevailing trade winds are from the north east, so that the sugarcane field which would have the greatest potential to contribute spray drift to the development area is field 230 and possibly 231 if the wind were to shift more to the south. If spraying were done during "Kona weather", fields to the south and west of the development could contribute drift to the development area. However, it is standard practice on the plantations to limit aerial spraying to the early morning or other periods when wind velocities are low.

4. Potential for Polado® Drift and Damage to Non-Target Plants in the Development Area

There are no definitive published reports on drift of Polado® from aerial spraying of sugarcane in Hawaii. A recent report, "Risk to Non-target Tomatoes from Ethephon Aerial Spray Drift" (DeFrank, Osgood and Whalen, 1988), provides some useful information from a study on Maui, but care must be exercised in applying these results directly to Polado® drift from aerial applications in the Kunia area. The study was conducted in the afternoon with wind speeds of 10-12 mph and occasional gusts to 15 mph. The results from tomato plant response and chemical analysis of filter paper disks positioned at nine distances (up to 3200 feet) from the spray edge were not definitive, but the authors concluded that "aerial spraying of ethephon at rates required for control of flower initiation in sugarcane (0.56 kg/ha) will not adversely affect tomato further than 244 m (800 ft.) from the spray edge." In applying these results to the present analysis for the Kunia area, one must keep in mind that the Maui study assessed the impact of ethephon, not glyphosate, and that the study was conducted under wind conditions that would not normally be considered appropriate for aerial spraying.

A study on the mainland by Romanowski (1980) indicates that sub-lethal applications of glyphosate damaged yields when plants received 0.089 pounds per acre early in the season. This amount is about 12% of that applied to cane for ripening. Thus, some plants are quite sensitive to glyphosate and could show growth abnormalities if they intercepted glyphosate spray drift.

CONCLUSION

The lack of adequate data and dependence of the outcome on management of sugarcane operations precludes a definitive conclusion. The fact that only

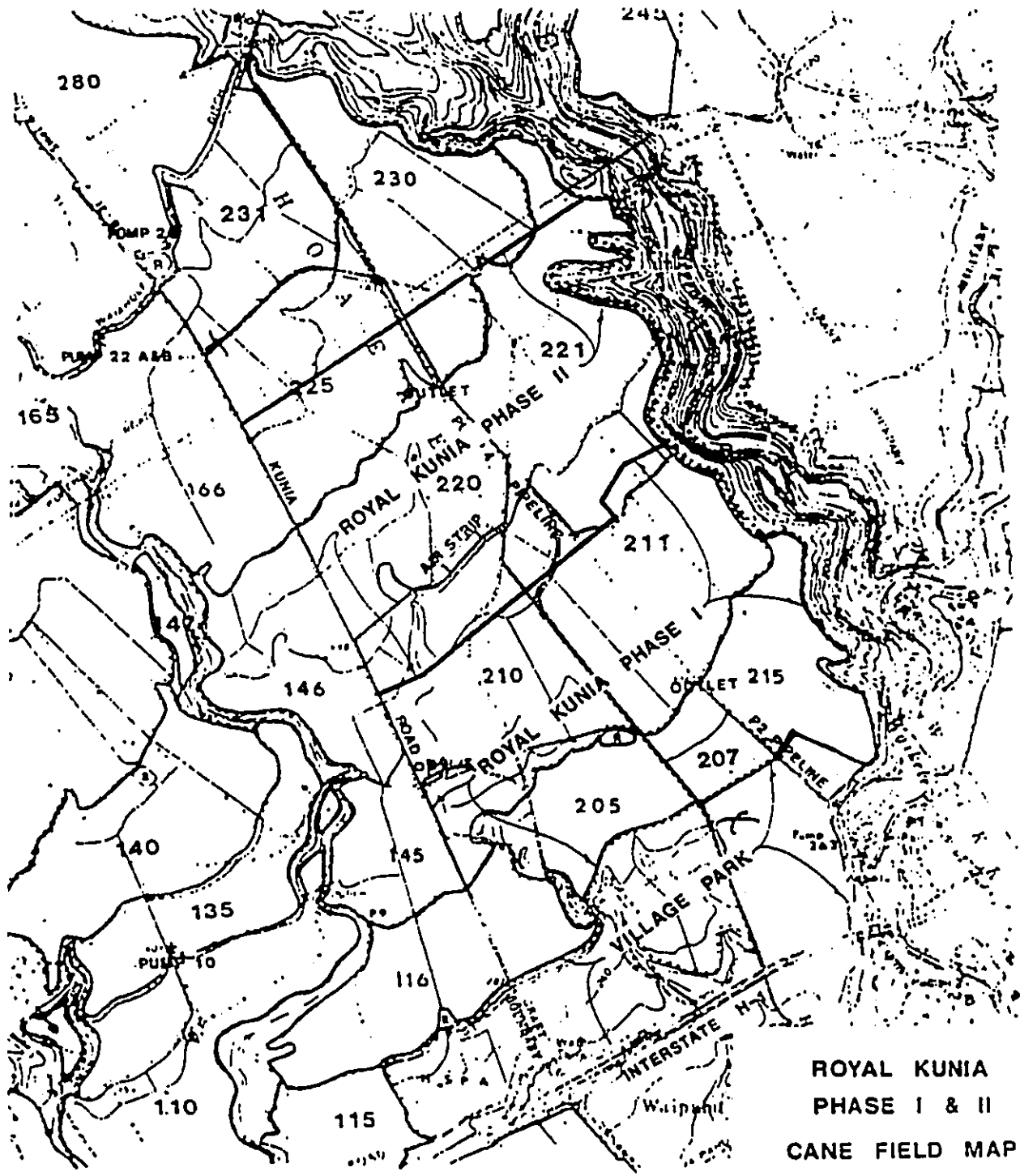
Polado® (glyphosate) is applied by air in sugarcane production in the Kunia area limits the potential impact to this one chemical. Glyphosate has a low mammalian toxicity (acute oral LD50 = 4300 mg/kg; acute dermal LD50 (rabbit) = 7940 mg/kg) so should be of no danger to humans or animals at rates used for sugarcane ripening. Any negative impact of drift, thus, would be upon sensitive plants receiving spray drift. While the application rate is relatively low, applications to cane windward of the development area under adverse wind conditions could possibly result in drift of droplets a few hundred to several hundred feet downwind. The fact that Polado® is applied only once during a crop cycle and to only one field at a time reduces the likelihood of perceptible drift. Standard plantation practice is to spray only when wind velocity is low. This practice will further reduce the potential for significant drift of spray droplets.

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ROYAL KUNIA
 PHASE I & II
 CANE FIELD MAP