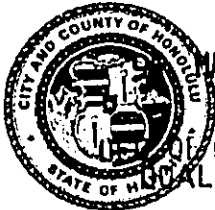


Royal Kunia Phase II Increment 3

PLANNING DEPARTMENT
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813

RECEIVED



MAY 28 P3:56

CHERYL D. SOON
CHIEF PLANNING OFFICER

CAROLL TAKAHASHI
DEPUTY CHIEF PLANNING OFFICER

JEREMY HARRIS
MAYOR

LW

May 28, 1996

Honorable Gary Gill, Director
Office of Environmental Quality Control
Central Pacific Plaza
220 South King Street, 4th Floor
Honolulu, Hawaii 96813

Dear Mr. Gill:

Notice of Determination for a
Finding of No Significant Impact Regarding the
Final Environmental Assessment (FEA) For
Royal Kunia, Phase II, Inc. 3, 96/CO-2, Central Oahu

The Planning Department has reviewed the Final Environmental Assessment (FEA) for the Royal Kunia, Phase II, Increment 3 project proposed by Halekua Development Corporation. The project description is contained in the summary section of the attached publication form.

We have determined that the subject proposal will not have significant impacts on the environment. Based on our analysis and determination, we are filing a Finding of No Significant Impact for the subject project. The reasons supporting our determination are found in Section 7.2 of the FEA.

This is to request publication of the subject FEA in the June 8, 1996 OEQC Environmental Notice. Enclosed are completed publication form for The Environmental Notice and four copies of the FEA.

Honorable Gary Gill, Director
Office of Environmental Quality Control
May 28, 1996
Page 2

Should you have any questions, please call Lin Wong of our staff
at 527-6044.

Sincerely,

Carol Takahashi

for

CHERYL D. SOON
Chief Planning Officer

CDS:ft

Enclosures

cc: Halekua Development Corporation
William E. Wanket, Inc.

1996-06-08-0A-*FEA-Royal Kunia Phase II* JUN 8 1996
INCREMENT 3

FILE COPY

DEVELOPMENT PLAN LAND USE
AMENDMENT APPLICATION
AND
FINAL ENVIRONMENTAL ASSESSMENT
FOR
ROYAL KUNIA, PHASE II
INCREMENT 3

Hoaeae and Waikele, Oahu

MAY 1996

**DEVELOPMENT PLAN LAND USE
AMENDMENT APPLICATION
AND
FINAL ENVIRONMENTAL ASSESSMENT**

**FOR
ROYAL KUNIA, PHASE II
INCREMENT 3**

Hoaeae and Waikele, Oahu

May 1996

Prepared For: Halekua Development Corporation
2024 North King Street
Honolulu, Hawaii 96819

Prepared By: William E. Wanket, Inc.
Kapolei Building, Suite 320
1001 Kamokila Boulevard
Kapolei, Hawaii 96707

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APPENDIX

- Appendix A Agency And Community Consultation**
A-1 Early Consultation Comment Letters And Responses
A-2 Draft EA Comment Letters And Responses
- Appendix B Market Study Of The Proposed Royal Kunia, Phase II Master
Plan Revision**
Prepared By: The Hallstrom Group, Inc.
- Appendix C Air Quality Study For The Proposed Royal Kunia, Phase II
Project (Increments 2 And 3)**
Prepared By: B. D. Neal & Associates
- Appendix D Environmental Noise Assessment, Royal Kunia, Phase II
Increment 3, Zone Change**
Prepared By: Darby & Associates
- Appendix E Traffic Impact Report, Royal Kunia Phase II, Increment 3**
Prepared By: Julian Ng, Inc.
- Appendix F Royal Kunia, Phase II: Impact On City And State Revenues
And Expenditures**
Prepared By: Decision Analysts Hawaii, Inc.
- Appendix G Royal Kunia Phase II - Increment III, Engineering Study**
Prepared By: ParkEn, Inc.

SECTION 1.0 INTRODUCTION

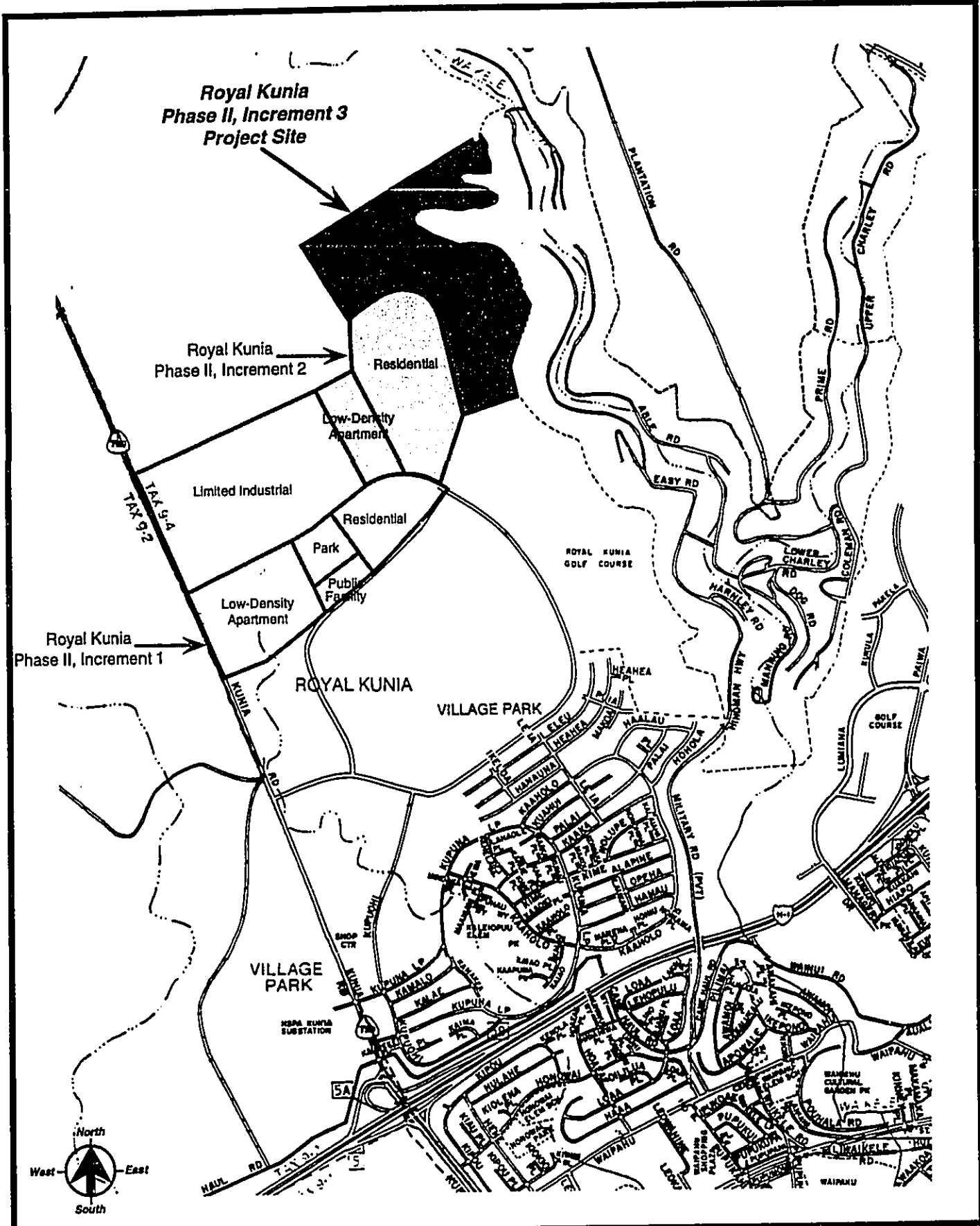
1.1 PURPOSE FOR AMENDMENT APPLICATION AND REPORT

This document was prepared for the Halekua Development Corporation (applicant) to serve as the Development Plan Land Use Amendment (DP Amendment) application and Final Environmental Assessment (Final EA) for the proposed Royal Kunia, Phase II, Increment 3 residential development in Hoaeae and Waikele, Oahu. The applicant is seeking a DP Amendment from Preservation to Residential for the Increment 3 project site. As a result, this application is being filed with the City and County of Honolulu (City) Planning Department for processing to implement the continuing development of Royal Kunia.

This Final EA was prepared under Chapter 343 of the Hawaii Revised Statutes, and in accordance with the content requirements of the State Department of Health's (DOH) Administrative Rules, Title 11, Chapter 200 Environmental Impact Statement Rules (referred to as EIS Rules). This document was also intended to satisfy the informational requirements for the City Planning Department's DP Amendment application. A Draft EA, dated January 1996, was previously prepared and first published in the February 23, 1996 issue of the Office of Environmental Quality Control's *Environmental Notice*. The 30-day comment period on this Draft EA ended March 26, 1996.

The proposed Royal Kunia, Phase II, Increment 3 residential project would involve about 156.8± acres of land situated in Hoaeae and Waikele of Central Oahu. Figure 1.1 shows the project's location and surrounding vicinity. The purpose of this project and DP Amendment request is to allow the applicant to refine the residential portion of the Phase II master plan. Under this refinement, the unit mix associated with the 2,000 residential units already approved for the entire Phase II area will be changed to better meet changing market demands. As a result, a greater percentage of the 2,000 units would consist of single-family homes compared to multi-family townhomes previously planned, and would be spread over a larger area which includes the Increment 3 site.

Under this refinement to the Phase II master plan, about 1,250 single-family homes and 750 multi-family homes would be developed. The increased area provided for residential development by the Increment 3 site will allow for larger single-family lots (up to 6,000 square feet) to better meet consumer needs and create a unique and less dense residential community. This Increment 3 site is currently designated Preservation on the Central Oahu DP Land Use Map and was planned for a third golf course within the entire Royal Kunia development.



WILLIAM
E.
WANKET
INC.
Land Use Consultant

Project Location Map

Figure
1.1

Of the total 2,000 units approved under earlier DP Amendments for Phase II, only about 1,420 units would be constructed within the Increments 1 and 2 sites under the proposed project after completion of further detailed site planning and engineering. Consequently, the remaining approximately 580 units permitted under Phase II are proposed to be developed as single-family residential homes on the Increment 3 project site. Hence, this project entails spreading out already approved residential units over a larger area within Royal Kunia which would allow the applicant to better meet the changing market conditions and buyer preferences. Table 1.1 provides a summary of pertinent information associated with this project site.

1.2 BACKGROUND

This DP Amendment request for the proposed Royal Kunia Phase II, Increment 3 project represents the continuing phased development of Royal Kunia by the applicant. This section briefly discusses prior land use approvals which have been received.

1.2.1 Royal Kunia Phase I Development

The Phase I development of Royal Kunia received a Development Plan amendment in 1989 under Ordinance 89-18, and rezoning approval in 1991 under Ordinance 91-11 from the City Council. These approvals allowed for the development of various uses which include parks, golf course, commercial space, low-density apartments, and single-family residences.

Approvals for Phase I allowed for the development of a total of 2,000 residential units. Thus far, the Halekua Gardens I (152 units) and Halekua Gardens II (100 units) developments have been completed and occupied along with the 15.7-acre commercial area. Another 482 units consisting of both townhomes and single-family homes have also been completed and occupied as of May 1996 with a few remaining units projected to be closed by the end of this year.

Of the remaining 1,264 units, about 592 are scheduled to be completed between now and before the year 2000 while the remaining 672 units projected to be completed between the years 2000 and 2002. Required affordable housing units would be developed concurrently with this schedule. Infrastructure improvements for the area is about 90 percent complete. A 10.3-acre park site is projected to be completed sometime in 1997 and the 12.1-acre recreation center/park site completed in the year 2000.

Table 1.1 Summary Information

Project Name:	Royal Kunia Phase II, Increment 3
Applicant:	Halekua Development Corporation 2024 North King Street Honolulu, Hawaii 96819
Agent:	William E. Wanket, Inc. Kapolei Building, Suite 320 1001 Kamokila Boulevard Kapolei, Hawaii 96707
Accepting Agency:	Planning Department, City and County of Honolulu
Existing DP Land Use:	Preservation
Proposed DP Land Use:	To obtain an amendment to the City's Central Oahu Development Plan Land Use Map from Preservation to Residential.
Project Description:	The land use amendment is to permit the development of about 580 single-family residential units on the Royal Kunia, Phase II, Increment 3 project site. These units are part of the total 2,000 units previously approved for entire Phase II development. The remaining 1,420 units would be built on the Increments 1 and 2 sites after further detailed planning and engineering with the project. These 580 single-family units are proposed to be developed on the Increment 3 site which was previously planned for a golf course.
Land Area:	156.8± acres
Tax Map Key:	9-4-02: Portion of 1
Land Ownership:	Halekua Development Corporation
State Land Use:	Urban
City Zoning:	AG-1, Restricted Agricultural District
SMA District:	Not Within District
Existing Use:	Fallow agricultural land (sugar cane)
Neighborhood Board:	Waipahu Neighborhood Board, No. 22

1.2.2 Royal Kunia Phase II, Increment 1 Development

In 1989, a Final Environmental Impact Statement (FEIS) was completed which addressed the environmental impacts associated with the entire 655-acre Royal Kunia Phase II development (WEW 1989). This FEIS was prepared as part of processing requirements associated with the City's Development Plan Amendment process, and was accepted by the City Planning Department in September 1989.

Development Plan Amendment

Subsequently, the Honolulu City Council only amended portions of the entire 655-acre Phase II development. Under Ordinance 92-05, approximately 399 acres of land was amended on the Central Oahu Development Plan Land Use Map. This development was subsequently referred to as Phase II, Increment 1, and consisted of the following land use designations and acreage based upon existing zoning and Development Plan approvals.

Preservation	160	acres
Industrial	123	acres
Park	10	acres
Public Facility	6	acres
Residential	40	acres
Low Density Apartment	<u>60</u>	acres
Total Acreage	399	acres

Zone Change

A zone change application was prepared in 1993 for the Increment 1 development and involved of all the previously approved DP Amendment land uses except for the Preservation site (WEW 1993). This application incorporated study results from the 1989 FEIS for Phase II along with five updated technical reports which addressed noise, traffic, air quality, engineering, and economics. Subsequently, the rezoning was approved for approximately 240.8 acres in 1995 under Ordinance 95-08 which included a *Unilateral Agreement and Declaration for Conditional Zoning* (City 1995). The resulting zoning districts with acreage for Increment 1 are provided below.

I-1, Limited Industrial District	123.0	acres
P-2, General Preservation District (Park)	11.1	acres
R-5, Residential District	46.2	acres
A-1, Low Density Apartment District	<u>60.5</u>	acres
Total Acreage	240.8	acres

Under this unilateral agreement, 150 acres of the Phase II development was designated for use as an Agricultural Park under the direction of the State Department of Agriculture. This 150-acre site did not include areas associated with Increment 1. In addition, a land survey was conducted in 1995 for the entire Phase II development area as part of the Increment 1 zone change. Subsequently, the surveyed acreage for each of the Increment 1 sites are provided below and reflect minor changes to school and park acreages based upon ongoing coordination with agencies. In addition, the Increment 3 and agricultural park sites are included. Thus, the total acreage for these uses amounts to 548.7 with 106.3 acres remaining of the total 655 acres for Phase II.

<u>Land Use Description</u>	<u>DP Designation</u>	<u>Zoning District</u>	<u>Acreage</u>
Increment 1 Development			
1. Industrial	Industrial	I-1	123.7 acres
2. Park	Park	P-2	11.1 acres
3. School	Public Facility	R-5	8.0 acres
4. Single-Family	Residential	R-5	44.8 acres
5. Multi-Family	Low Density Apartment	A-1	<u>53.2</u> acres
Total Acreage			240.8 acres
Increment 3 Project Site			
1. Golf Course (Former Use)	Preservation	AG-1	156.8 acres
Agricultural Park Site			
1. Agricultural Park	Agriculture	AG-1	151.1 acres

The 123-acre parcel planned for an industrial park within Increment 1 has been sold to HRT, Inc. The Land Use Commission has been informed and approved the change in ownership interest by issuing an Order Granting Motion To Change Ownership Interest In The Petition Area on September 19, 1995. The development schedule for this parcel is not known, however, it is expected that all existing permit conditions applicable to the site would be met by the new owner.

1.2.3 State Land Use District Boundary Amendment

Upon acceptance of the FEIS for Phase II and Development Plan approval for Increment 1, a petition for a State Land Use District Boundary Amendment was filed with the State Land Use Commission in 1992 (Takeyama and Sullivan 1992). This petition included updated studies on agriculture impacts, market assessment, engineering, traffic, air quality, social impacts, and economic impacts in addition to incorporating technical studies conducted for the FEIS. Subsequently, 504.9 acres of the Royal Kunia Phase II development was reclassified from the Agricultural to Urban district by the Land Use Commission under Docket No. A92-683 (LUC 1993). This reclassification excludes the approximately 150-acre site in Phase II designated for the agricultural park.

1.2.4 Phase II, Increment 2 Development Plan Amendment

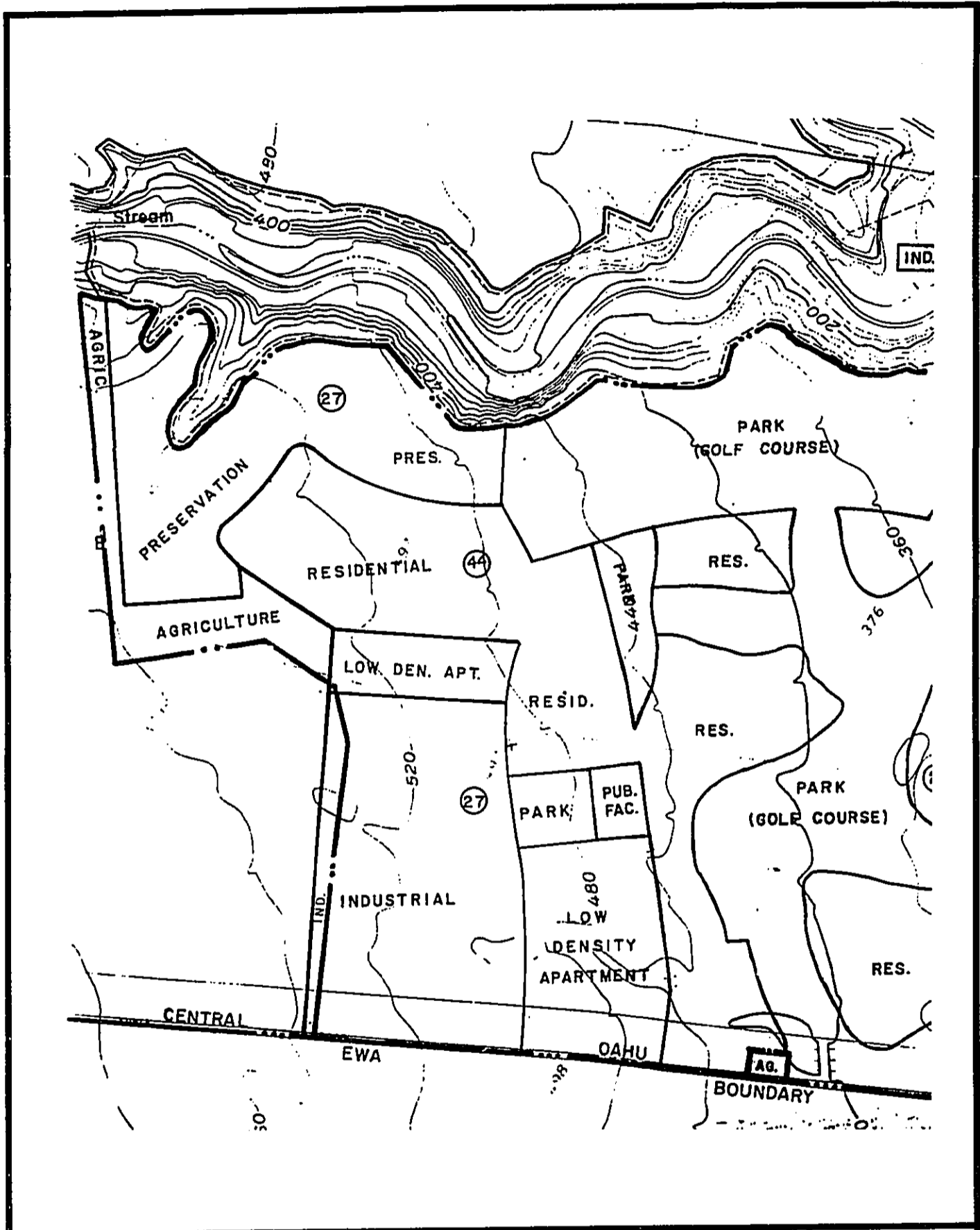
In 1993, an application for a DP Amendment for Phase II, Increment 2 was submitted to the Planning Department and approved by the City Council under Ordinance 94-71. This land use amendment involved a total of about 114 acres of land. Of this total, 89 acres were designated Residential, 23 acres Low-Density Apartment, and 2 acres Preservation. This amendment also included adjustments to the boundary of the Residential designated site which essentially reduced the Preservation site (Increment 1 amendment) from about 160 acres to about 154 acres. A total of 1,000 residential units were approved under this amendment consisting of 600 single-family homes and 400 multi-family townhomes.

It should be noted that although 23 acres were designated Low-Density Apartment, only 17 acres should have been available for redesignation. As previously discussed under Section 1.2.2, the entire Phase II development encompassed a total of 655 acres. Of this total, about 150 acres were designated for the Agricultural Park and 399 acres redesignated under the Increment 1 amendment (Ordinance 92-05). Therefore, only about 106 acres were available for redesignation under Increment 2.

Specific acreages for both Increments 1 and 2 were determined by a survey conducted as part of the Increment 1 zone change (Ordinance 95-08). Consequently, the correct acreage for this Increment 2 development should be as follows.

Residential	89	acres
Low Density Apartment	<u>17</u>	acres
Total Acreage	106	acres

Figure 1.2 shows the present Development Plan land use boundaries for the Royal Kunia Phase II property. It should be noted that the actual boundaries of parcels rezoned under Ordinance 95-08 are slightly different from that shown on this figure since they reflect the surveyed boundaries which have received rezoning from the City Council. The applicant is currently seeking rezoning for the 106-acre Increment 2 project to continue their phased development of Royal Kunia because the area is currently zoned AG-1, Restricted Agricultural District.



WILLIAM E. WANKET INC.
 Land Use Consultant
Source:
 Planning Department,
 Central Oahu Development
 Plan Land Use Map

Existing Development Plan Land Uses

Figure 1.2

SECTION 2.0 PROJECT DESCRIPTION

2.1 PROJECT LOCATION AND VICINITY

The project site is located in Kunia of the Ewa District on the island of Oahu. The Phase II, Increment 3 property represents a continuing phase of the entire Royal Kunia development which begins north of the Village Park subdivision and extends north inland. Figure 1.1 previously showed the general location of the site and the surrounding vicinity. As shown on that figure, the Waikele Stream and Navy property are generally located to the east. The western portion of the site is bounded by the planned Increment 2 residential site and a future agricultural park. North of the property is agricultural land while the Royal Kunia golf course is to the south.

The Increment 3 project site consists of approximately 156.8 acres which encompasses portions of both the Waikele and Hoaeae areas identified under Tax Map Key 9-4-02: portion of 1. The landowner of the Increment 3 project site is Halekua Development Corporation.

2.2 DESCRIPTION OF PROJECT AND MASTER PLAN REFINEMENT

Under the approved Development Plan amendment for Royal Kunia, Phase II, a total of 2,000 residential units is permitted which allows for both single-family and multi-family homes. Due to changing market conditions, discussed in greater detail under Section 2.3, the residential portion of the Phase II master plan is being refined to better meet consumer demands. The Increment 3 project would therefore allow for a refinement in the unit mix of these 2,000 residential units due to the additional acreage added for development.

Consequently, with the Increment 3 project site, a total of about 1,250 single-family home and 750 multi-family townhomes would now be constructed within the entire Phase II area. The Increment 3 site would allow for about 580 single-family residential homes to be constructed on the 156.8-acre parcel with the remaining 1,420 units (750 multi-family and 670 single-family) developed within the Increments 1 and 2 sites. This Increment 3 site is also planned to include a 10-acre park subject to the requirements of other agencies, a detention area to address surface runoff and serve as open space area, and open space buffers along portions of the Increment 3 site.

Figure 2.1 shows a preliminary conceptual plan for this Increment 3 project site as it relates to the entire Phase II development. Based upon this refinement to the Phase II master plan, the resulting acreage for each land use within Phase II is provided which includes major roads and open space buffers. It should be noted that a possible church site may be included within the a portion of the Increment 2 low density apartment site, however, no acreage is provided at this time.

Revised Phase II Master Plan Land Uses

<u>Land Use Description</u>	<u>Acreage</u>	<u>Units</u>
Agricultural Park	150 acres	
Light Industrial	123 acres	
Park / Open Space	40 acres	
School	8 acres	
Major Roads	10 acres	
Residential	257 acres	1,250
Low Density Apartment	<u>67</u> acres	<u>750</u>
Totals	655 acres	2,000

The follow information provides a breakdown of revised land uses for Phase II by increments along with existing DP designations and zoning districts. These refined acreage are based upon the land survey conducted for the Increment 1 zone change.

<u>Land Use Description</u>	<u>DP Designation</u>	<u>Zoning District</u>	<u>Acreage</u>
Increment 1 Development			
1. Industrial	Industrial	I-1	123.7 acres
2. Park	Park	P-2	11.1 acres
3. School	Public Facility	R-5	8.0 acres
4. Single-Family (219 units)	Residential	R-5	44.8 acres
5. Multi-Family (630 units)	Low Density Apartment	A-1	<u>53.2</u> acres
Total Acreage			240.8 acres
Increment 2 Development			
1. Single-Family (450 units)	Residential	R-5	89.2 acres
2. Multi-Family (120 units)	Low Density Apartment	A-1	<u>11.1</u> acres
Total Acreage			106.3 acres
Agricultural Park Site			
1. Agricultural Park	Agriculture	AG-1	151.1 acres
Increment 3 Project Site (With Proposed Land Use Designations)			
1. Single-Family (581 units)	Residential	R-5	156.8 acres
Total Acreage			655.0 acres

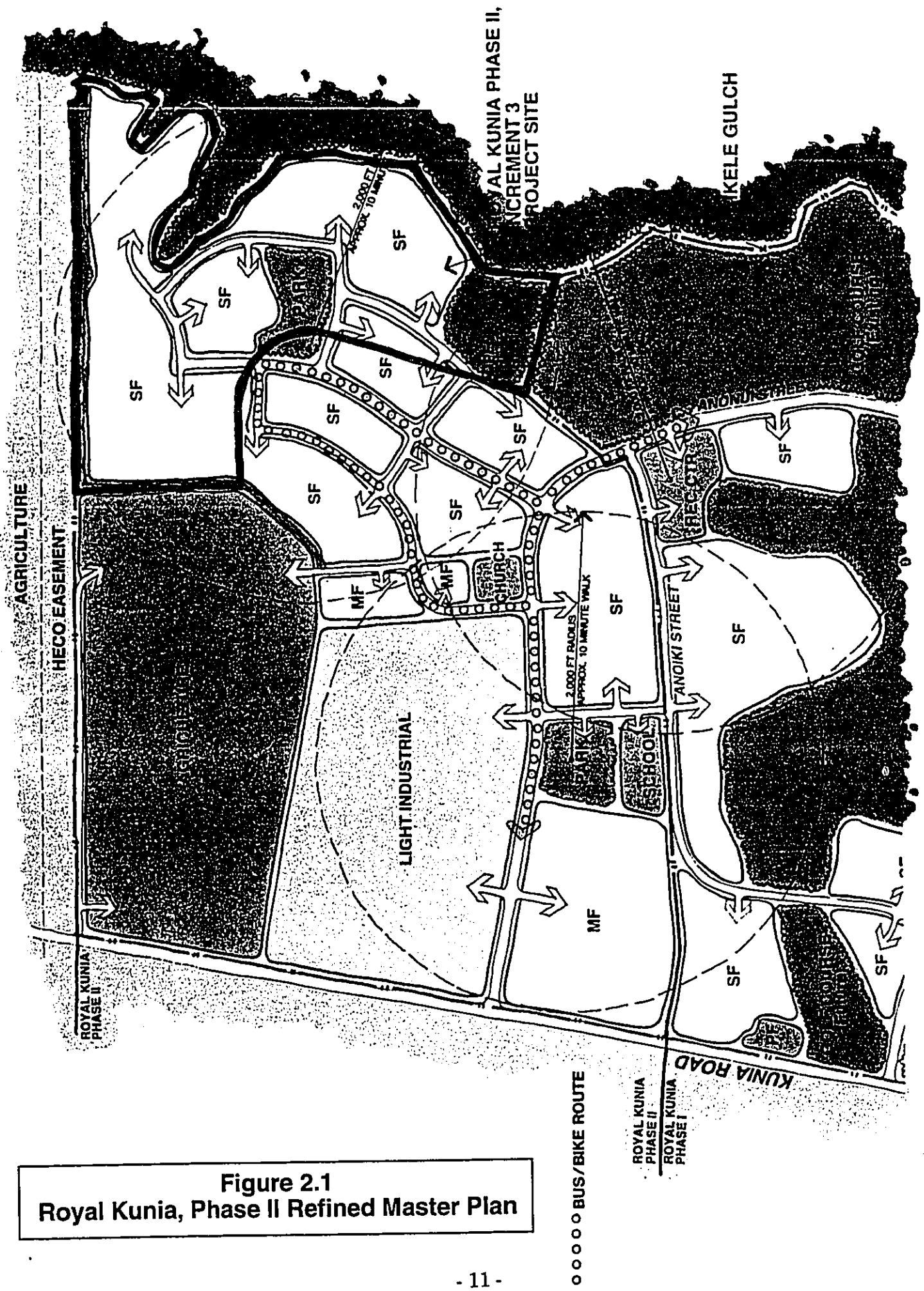


Figure 2.1
Royal Kunia, Phase II Refined Master Plan

As shown on Figure 2.1, the 10-acre park would actually involve portions of both Increment 3 and the Increment 2 single-family residential site. A retention basin of approximately 15 acres would be situated near the southeastern (makai) end of the Increment 3 site to address surface runoff and serve as open space. A buffer between the agricultural park and northwestern border of the Increment 3 site would be provided consisting of appropriate vegetative landscaping. In addition, a vegetative buffer from the Hawaiian Electric Company, Inc.'s transmission line easement would also be located along the northern boundary of this Increment 3 site.

2.2.1 Description Of Residential Units

Under this revised master plan for Phase II residential units, Increment 1 would develop about 849 units, Increment 2 would develop 570 units, and Increment 3 would develop 581 units. A more detailed breakdown of these units within each increment is provided below.

Increment 1 Development	849 units
1. Single-Family (Market)	219 units
2. Multi-Family	
a. Affordable	480 units
b. Market	150 units
Increment 2 Development	570 units
1. Single-Family (Market)	450 units
2. Multi-Family (Affordable)	120 units
Increment 3 Development	
1. Single-Family (Market)	581 units

Affordable housing requirements associated with the 2,000 unit Phase II development would be met as shown above in accordance with the City's affordable housing requirements. A total of 600 multi-family affordable housing units would be provided within the Increments 1 and 2 portions of the Phase II development. Of these affordable units, 200 would be provided for households earning 80 percent or less of the median income with the remaining 400 units available for households earning 81 to 120 percent of the median income. Estimated sales prices for these affordable units would range from \$95,000 to \$134,000 for households earning 80 percent or less of the median income, and \$100,000 to \$196,000 for the other category.

The additional acreage provided by Increment 3 would allow the single-family homes built within Phase II to be spread over a larger area creating an unique community. These single-family homes developed will thus have larger lot sizes to meet the growing market demand, and be sold as market-priced units. These residences would have minimum lot sizes of about 5,000 square feet to meet the

CORRECTION

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

As shown on Figure 2.1, the 10-acre park would actually involve portions of both Increment 3 and the Increment 2 single-family residential site. A retention basin of approximately 15 acres would be situated near the southeastern (makai) end of the Increment 3 site to address surface runoff and serve as open space. A buffer between the agricultural park and northwestern border of the Increment 3 site would be provided consisting of appropriate vegetative landscaping. In addition, a vegetative buffer from the Hawaiian Electric Company, Inc.'s transmission line easement would also be located along the northern boundary of this Increment 3 site.

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The additional acreage provided by Increment 3 would allow the single-family homes built within Phase II to be spread over a larger area creating an unique community. These single-family homes developed will thus have larger lot sizes to meet the growing market demand, and be sold as market-priced units. These residences would have minimum lot sizes of about 5,000 square feet to meet the

planned R-5 zoning requirements. However, many of these lots would be considerably larger than the 5,000 square feet minimum and may possibly encompass about 6,000 square feet. These larger lots are intended to provide the proposed Increment 3 development with a better marketing position and to take advantage of changing consumer demands.

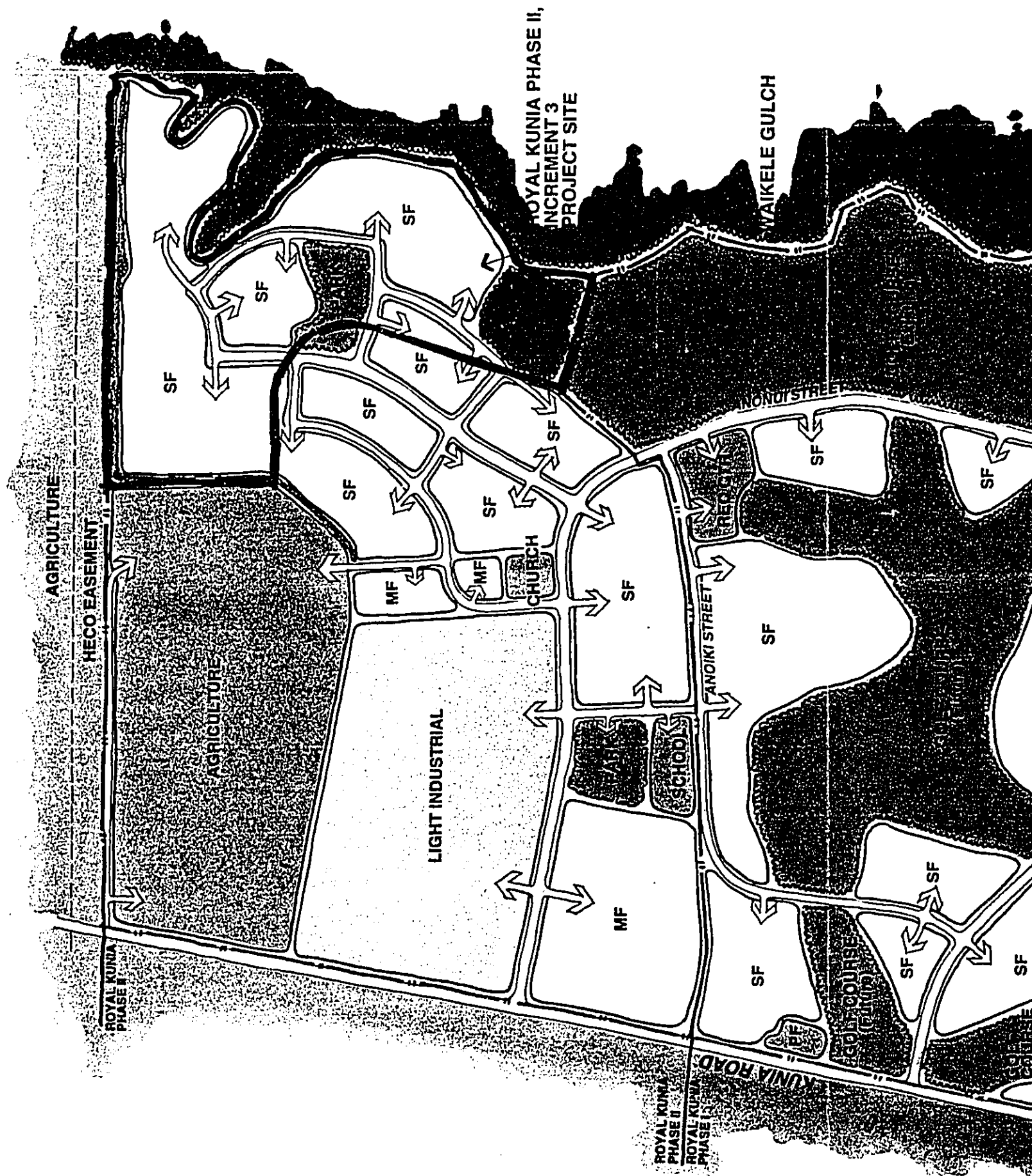
A variety of floor plans would be provided for residents to select from consisting of 3 bedroom/2 baths models to 4 bedroom/2.5 bath models. The sales price for market units would be dependent upon and reflect current market conditions at the time of sale which is estimated to range from anywhere between \$290,000 to \$350,000.

2.2.2 Increment 3 Project Relationship With Royal Kunia

In order to create a sense of place and neighborhood identity for the Increment 3 project, the Royal Kunia Master Plan is provided on Figure 2.2 to demonstrate how this master-planned community incorporates community planning principles suggested by the Planning Department. As shown, the physical definition of neighborhoods is established by clustering neighborhood facilities at centralized locations and by providing well-defined edges or boundaries at the perimeter of the community along Kunia Road and Waikele Gulch. The overall circulation network has been designed to provide for existing and future transit service, bike paths, and pedestrian walkways. The Increment 3 project represents one residential component of this master-planned community.

Royal Kunia has been designed to concentrate higher density uses (multi-family units) and public facilities (schools, parks, commercial, and industrial uses) together to create a focus for neighborhood activities, and to promote a sense of identity and physical definition for the community. As shown on Figure 2.2, these uses are strategically located to create a public focus or a mini-civic node for the various neighborhoods. The clustering of these uses also promote synergistic relationships between the civic activities, (church, park and ride, and parks), and helps to emphasize the use of alternative modes of transportation by providing a concentrated destination area.

Alternative transportation modes are promoted under this planned community by locating civic uses and parks within walking distance for most residents within the community. As shown on land uses proposed under Phase II in Figure 2.1, a 10 minute walking radius is shown from park sites which essentially encompasses all residential areas. In addition, the plan promotes an integrated pedestrian/bus/bike circulation system along major roadways which connect residential areas within the community to civic and park facilities.



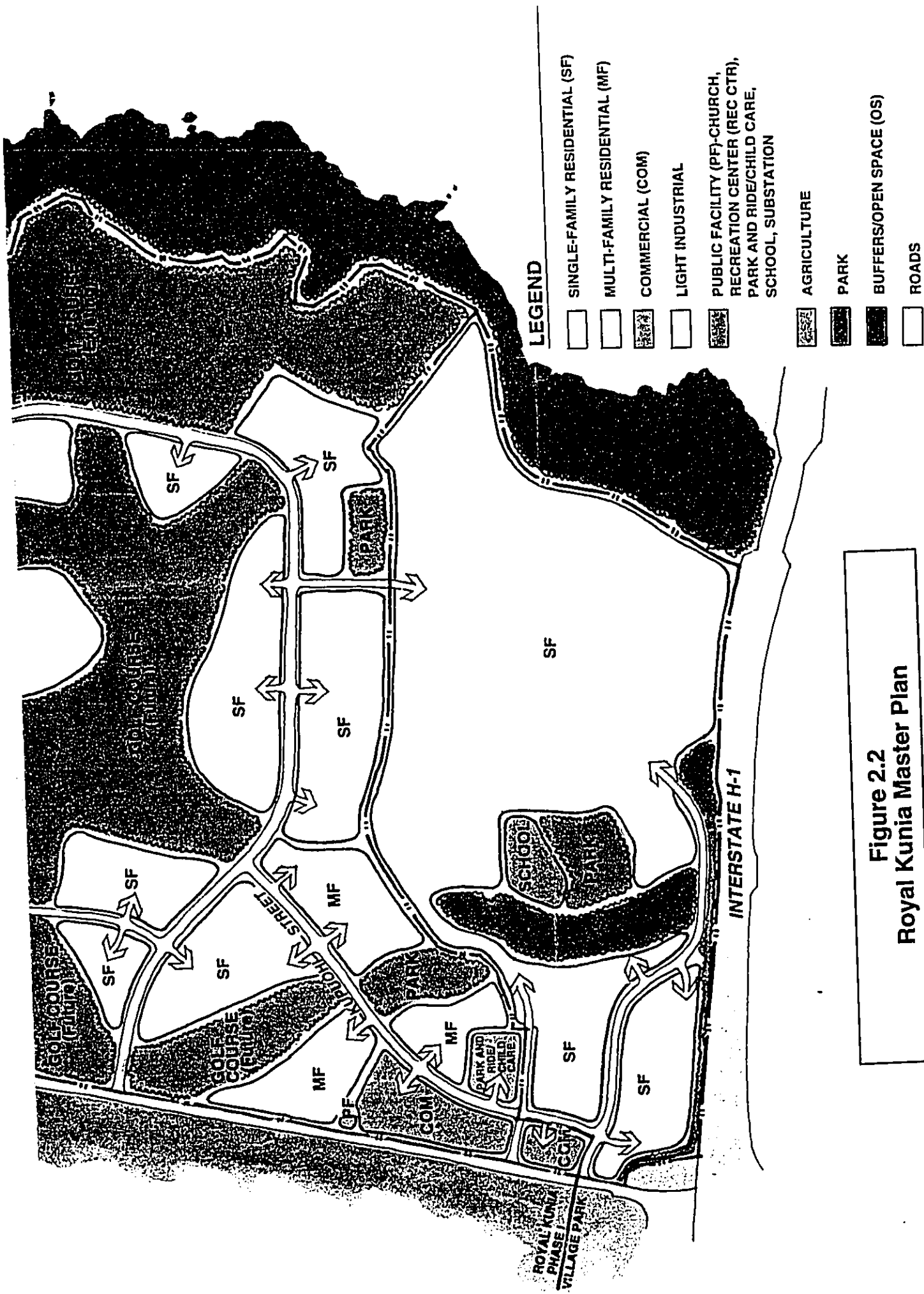


Figure 2.2
Royal Kunia Master Plan

Setbacks and open space buffers between the development's higher and lower intensity land uses are afforded by the golf courses existing and planned within Phase I. Other open space buffers are established in Phase II between the agricultural park, and the Waikele Gulch forms a natural buffer northeast of the development. This relationship will minimize the visual impacts across Waikele Gulch and potential conflicts between residential and agricultural uses. The use of landscaped setbacks will also be implemented to serve as a buffer between different uses, and serve as an edge defining the boundaries of the project.

With Increment 3, the project provides for a minimum 30-foot setback along the western portion of the property bordering the planned agricultural park. Similarly, a minimum 90-foot setback is provided along the northern boundary of the site bordering the Hawaiian Electric Company, Inc.'s transmission line easement. The topography, vegetation, and distance afforded by Waikele Gulch serves as a natural buffer between the Increment 3 residential project and the Waikele Branch Naval Magazine Lualualei property.

2.2.3 Internal Roadway Plan

Improvements to the project's internal roadways and intersections would be constructed to provide adequate capacity to handle traffic resulting from the project. All improvements would be designed in accordance with City standards along with necessary coordination with both City and State agencies.

Access to the Phase II development from Kunia Road would be from the Phase II Collector Road which generally runs in an east/west direction. As shown on the Figure 2.1, vehicular access into the project site would essentially be from a major collector road which extends from the Increment 2 development site. This primary collector road would have a right-of-way of about 90 feet. A series of collector streets with 80-foot right-of-way would then provide access to residential areas from this primary collector road.

2.3 PROJECT NEED AND OBJECTIVES

The proposed Increment 3 residential project is needed to allow the applicant to better meet the changing market conditions and buyer preferences. Due to changing market conditions, the residential portion of the Phase II master plan needs to be refined. The spreading out of already approved residential units over this larger area within the Royal Kunia, Phase II area would also allow single-family units to have larger lot areas than the minimum 5,000 square feet required under the expected R-5 zoning.

These larger lots allowed by the additional acreage associated with the Increment 3 site would thus provide the Phase II development with a better marketing position to take advantage of changing consumer demands. A market study was performed by The Hallstrom Group, Inc. to determine the marketability of Phase II single-family units having larger lot sizes created by the proposed Increment 3 project site. A copy of this market study is included in Appendix B of this Final EA.

2.3.1 Project Need

The need for the change toward larger single-family lot sizes is discussed below. The primary areas creating this need concern housing demand in the area, economic factors, increasing density trend, and growing demand for larger lots.

Housing Demand In Region

The study region consisting of the Central Oahu and Ewa districts of Oahu have the fastest growing populations on the island and comprise the primary and secondary market sectors for the Royal Kunia project. Between 1980 and 1995, the number of residents in these regions increased by nearly 40 percent to a total of 191,900 whereas the entire county population grew by only 15 percent. An estimated 27,837 housing units have been constructed over the past two decades in these areas, and have been well-received by the Oahu residential market with more than 98 percent sold to date. The favored product has been detached single-family homes which comprise more than 60 percent of the sector.

The westerly urbanization trend away from the Honolulu corridor is anticipated to continue over several decades. Mid-point extrapolation using population estimates made by the City Planning Department indicate that up to 54,000 new housing units will be required in Central Oahu (19,000 units) and in Ewa/Kapolei (35,000) by the year 2010 if the Ewa/Central regional market is to be adequately serviced. A similar level of growth is projected for the decade thereafter as well. Approximately 75 percent of this demand would be oriented towards units having a current price of about \$350,000 or less.

About 19,620 additional units in Central Oahu and 14,830 units in Ewa/Kapolei have been approved for construction over the next 20-plus years in order to meet the housing demands of island residents. This represents upwards of 70 percent of the housing inventory to be built by 2020. An additional 20,000-plus units have been preliminarily discussed by landowners. Virtually all are to be within master planned developments, such as Royal Kunia, which offer a range of land uses intended to promote integrated lifestyle opportunities.

Economic Factors Supporting Housing Market Demand

The land use transition toward the Ewa region has been a manufactured response by private interests and public agencies to relieve Oahu's chronic housing shortage, create additional quality homeownership options, and move the focus of residential development beyond the central core of Honolulu. Consequently, the Ewa region has evolved into a major economic force on Oahu over the years. An estimated 11,200 persons are presently employed in the region with many at the James Campbell Industrial Park and the emerging retail and commercial industries. Although the demise of cane production will affect near-term employment in the agricultural sector, this job loss will be replaced by general business growth in the region and City of Kapolei. Most importantly, extensive economic infrastructure improvements such as the Barbers Point Deep Draft Harbor, creation of the destination resort at Ko Olina, and arterial upgrades have been undertaken to support future economic development.

A wide diversity of commercial real estate is also proposed for the study region. An estimated 1,482 acres in business park and industrial lands have been approved, and demand for up to 2 million square feet of commercial floor area has been projected. A proposed University of Hawaii campus in Kapolei would further enhance real estate demand. These uses could cumulatively create 25,000 to 30,000 total new jobs in the region by 2020. Thus, more than 60 percent of all new employment positions and 75 percent of new business ventures created on Oahu by 2020 could be located in the study area. These new employment opportunities will more than offset the loss of direct and indirect regional employment due to the demise of the sugar industry. They will also be higher paying, more stable, and of greater diversity than the agricultural positions. These future employees therefore represent the prime purchase demographics for the proposed Phase II housing units.

The near-term slump in Hawaii's economy, while showing private construction activity and business growth statewide and in the study area, has affected Central Oahu and Ewa/Kapolei to a lesser degree than many other areas of the islands. Several commercial tenants have relocated to the area in recent years, and there continues to be confidence in long-term demand forecasts despite cyclical impacts.

Increasing Densities In Housing Developments

Central Oahu and Ewa have been planned for moderately priced, low to moderate density housing development. However, land and infrastructure economics, coupled with developer goals, have resulted in steadily increasing densities throughout the region resulting in a greater building "weight" on the underlying land base than originally intended for the area.

Comprehensive surveys of home construction in the study area since 1978 showed that 16,981 single-family residences were built on lots averaging 4,862 square feet. Over the study period, average lot sizes have decreased in 12 of the 16 years stabilizing recently at about 4,600 square feet. About 82 percent of the homes built since 1978 were on lots averaging 5,000 square feet or less. The trend toward lots smaller than 6,000 square feet (outside of selected Makakilo projects) is continuing unabated in almost every community in an effort to cut cost and maximize returns. During this decade, only 5.3 percent (249) of the 4,699 single-family homes completed in Central Oahu and Ewa/Kapolei were within subdivisions having average lot sizes of 6,000 square feet or larger. While recognizing the economics of smaller lot sizes, the number one purchaser complaint in the study area was the increasing density of the region.

The movement towards greater planning densities is evident in multi-family projects as well. Units have decreased in average sizes from about 1,150 square feet in the early 1980's to 650 to 1,000 square feet per unit in more recent projects. Construction density has similarly increased from about 12 units per acre a decade ago to nearly 16 units per acre today.

The overall effect of this has created a relatively standardized density format throughout the competitive market area with each project offering an exceptionally homogeneous "narrow band" of inventory. For the most part, the market is dominated by competitive products featuring similar-sized units on similar-sized lots. While this allows for maximum pricing efficiencies, developer returns, and fits a wide portion of the buyer demographic pyramid, it does not provide potential purchasers with a meaningful diversity of choice. Further, it has begun to degrade the long-term land use goals for the master planned communities of Central Oahu and Ewa which were intended to provide a low density suburban lifestyle.

Our analysis indicates this generally limited choice of inventory diversity could pose a major market acceptance concern over the long term unless aggressive steps to provide a larger spectrum of product are implemented. The integrated success of the Central Oahu and Ewa/Kapolei regional plans are dependent upon attracting the majority of Oahu home purchasers over the next two decades. Therefore, enhancing market appeal by lowering residential densities would be a prudent response.

Increased Demand For Larger Lots

Several communities, notably at Makakilo and Mililani, stress the availability of larger lot sizes (6,000 to 7,500 square feet) in promotional materials, and discussions with these project agents indicate it to be a highly successful approach. Surveys have demonstrated a significant number of potential home buyers prefer larger lot sizes for single-family homes, lessened densities for all residential product types, and less intense developments.

Greater levels of household privacy, space to support future additions to the home, and areas for family recreational pursuits were the reasons most often cited for desiring a larger houselot. There is also a general perception that many of the projects in Central Oahu and Ewa have become "cookie-cutter" developments, with the increasing intensities eliminating the low density lifestyle which had been one of the region's primary selling points.

Surveys of Royal Kunia purchasers and strongly interested parties showed the majority are young (with an average age of about 33), relocating from elsewhere in Central Oahu (79 percent), and currently renting or living with extended families (93 percent). The critical indicator was that 80 percent of the respondents were married with children, or part of an extended family residing in a single home. Such large and growing households are distinctly attracted to residential projects having expansion capabilities which contrasts with more intense developments inherently limited by smaller lots (less than 5,000 square feet).

The desire among purchasers for larger lots in less dense communities is not surprising, nor is the reluctance on the part of buyers to pay a premium for such benefits. Most prospective purchasers have indicated they would be willing to absorb the nominal per unit cost associated with a larger lot to the extent they are able, but would not be willing to pay an exorbitant premium for an additional 1,000-plus square feet of land area.

Those projects offering larger lot sizes (greater than 5,500 square feet) have experienced absorption rates 15 to 40 percent faster than otherwise competitive inventory cited on smaller parcels even though their prices are 5 to 12 percent higher. Given the subdued status of the residential real estate market on Oahu, this acceleration of sales represents a highly notable indicator. Consequently, the market study concluded that the larger lot single-family units offered resulting from the Increment 3 project at the reasonable price currently envisioned would prove highly competitive with other regional existing and proposed inventory, and achieve a faster rate of sales than would otherwise be experienced.

Royal Kunia Phase I has been able to "capture" approximately 11.17 percent of the overall Central Oahu new unit residential sector since 1989. This is about average for most of the other regional developments, and a statistic that is anticipated to increase as the community becomes more established while construction progresses. Without the proposed Increment 3 project, the Royal Kunia Phase II development is anticipated to achieve stabilized market capture rates of 12 to 14 percent of total demand.

With the Increment 3 project allowing for larger single-family lot sizes within Phase II, the capture, or market penetration, rate will increase by several points thereby speeding product absorption. With these large lot sizes, the Phase II development is anticipated to achieve capturing rates of 15 to 18 percent of the total Central Oahu residential demand making it competitive with other major projects (notably Mililani) which also offers a diversity of inventory densities. This would lead to sell-out of the Phase II units 2 to 5 years faster than under the existing Phase II land use design.

2.3.2 Project Objectives

The market study concluded that the proposed changes to the Royal Kunia Phase II master plan resulting from the Increment 3 proposal to be reasonable, market-supported, and a quality response in an effort to maximize land use efficiencies and competitiveness. Master plans are, by nature, living designs which must be allowed to evolve in order to achieve success in a market environment typified by cyclical movement and continuously changing demographics. Therefore, the Increment 3 project proposed would help achieve the applicant's objectives discussed below.

1. Lessened densities and larger lot sizes will provide both a diversity within the Royal Kunia development and offer a product-type currently highly successful, though generally undersupplied, in the regional marketplace.
2. By providing additional space for future home expansion, enhanced privacy, and room for more at-home activities, the inventory will directly appeal to the primary demographic group attracted to the subject project and area.
3. The home-buying public will benefit in several ways.
 - a. First, the average price of finished homes in Phase II will decrease by about 2 percent overall due to elimination of the previously planned premium-priced golf course-fronting lots in Increment 2.
 - b. Secondly, the additional lot area will enhance the value of the home at resale and make it more competitive in the open market.
 - c. Thirdly, larger lots in combination with expandable basic floor plans will allow homeowners to make incremental expansions or upgrades that will further increase the value of the residence upon resale.
4. Regional buyer surveys for moderate housing strongly indicate the vast majority of the Central Oahu and Ewa purchasers would rather spend limited housing dollars for larger homes and larger lots, than golf course fronting properties as would be provided under the present land use designations.

5. As the approvals are already in place for the 2,000 Phase II units, the master plan revision resulting from the Increment 3 proposal will not affect the balanced level of housing supply proposed for Central Oahu and Ewa, but is merely considered a response intended to increase competitiveness by harnessing evolving market forces.
6. The relatively more spread-out design for single-family lots will allow for greater levels of open space and wider roadways allowing on-street parking which were two buyer preferences repeatedly cited in surveys.

2.4 PROJECT PHASING AND IMPLEMENTATION

Upon receiving Development Plan approval from the City Council sometime in late 1996 or early 1997, rezoning for the project would be pursued. Upon receiving rezoning for this project, the property would then be pursued for development consisting of the following phases: 1) applying for subdivision approval of the land, 2) completing engineering and design work, 3) obtaining necessary non-discretionary permits, and 4) constructing subdivision improvements.

The construction completion date with full occupancy for the entire Phase II residential project is estimated occur sometime in the year 2008. The estimated costs for the project is about \$20 million.

SECTION 3.0 EXISTING CONDITIONS

3.1 CLIMATE

The climate of the State of Hawaii is relatively moderate throughout the island chain, although, significant differences in these conditions may occur from one location to another due to the mountainous topography. On Oahu, the Koolau and Waianae mountain ranges are oriented almost perpendicular to the trade winds which account for much of the variation in local climatology. The Increment 3 project site is located in a transition zone between the broad Ewa Plain to the south, the Schofield Saddle to the north, and the eastern slope of the Waianae Mountains to the west.

Winds are predominantly trade winds from the east northeast except for occasional periods when "Kona" storms may generate strong winds from the south or when the trade winds are weak and land breeze to sea breeze circulations develop. The nearest long-term wind data available for the project site are collected at Barbers Point Naval Air Station. Wind speeds typically vary between about 5 and 15 miles per hour providing relatively good ventilation much of the time.

In Hawaii, the annual and daily variation of temperature depend to a large degree on elevation above sea level, distance inland, and exposure to the trade winds. Temperatures in the leeward Oahu area are generally very moderate with average daily temperatures ranging from about 65 degrees to 84 degrees Fahrenheit. Temperatures at the project site are similar but likely show slightly larger daily and annual variations due to its location further inland.

Rainfall on Oahu is highly variable depending upon elevation and location with respect to the trade winds. This area of Oahu is one of the drier locations in the State with rainfall often highly variable from one year to the next. The Ewa Plain has average annual rainfall of about 21 inches while monthly rainfall may vary from as little as a trace to as much as 15 inches or more. Rainfall at the project site are probably similar as these conditions but slightly higher.

3.2 TOPOGRAPHY AND SOILS

The topography of the Increment 3 site is fairly uniform with slopes in the southeasterly direction a gradient of about 2 to 6 percent. Ground elevations range from approximately 450 to 575 feet mean sea level. In addition, there are two drainageways traversing through the entire Phase II development area.

Soils located on the property are identified using three common reference sources which are: 1) *Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii* (SCS 1972), 2) *Detailed Land Classification - Island of Oahu* (LSB 1972), and 3) *Agricultural Lands of Importance to the State of Hawaii* (ALISH) maps (DOA 1977).

Soil Survey

A review of applicable soil maps from the *Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii* shows that the project site encompasses four different types of Lahaina silty clay which are: 1) LaA, 0 to 3 percent slope, 2) LaB, 3 to 7 percent slope, 3) LaC, 7 to 15 percent slope, and 4) LaC3, 7 to 15 percent slope, severely eroded.

These soil types are of the Lahaina Series which consist of well-drained soils located on uplands on Oahu (SCS 1972). Soils of LaB type have a surface layer of dark reddish-brown silty clay about 15 inches thick with a subsoil about 45 inches thick consisting of dusky-red and dark reddish-brown blocky silty clay and silty clay loam. Permeability is moderate, runoff is slow, and the erosion hazard is slight. Soils of LaA type are similar to LaB except that the erosion hazard is no more than slight. Soils of LaC type have medium runoff and moderate erosion hazard. Soils of LaC3 type are similar to LaB except that most of the surface layer and part of the subsoil have been removed from erosion, thus, runoff is medium and erosion hazard is severe. All of these soil types are used for sugar cane and pineapple production.

Land Study Bureau Classification

A review of the Land Study Bureau's map for the site shows that the soils within the property have land classification symbols of A49i, A121i, and B50i (LSB 1972). These classifications indicate that the site has two of the highest Overall Productivity Rating which are Class "A" and "B". The Land Type ratings of 49i and 121i correspond to a Selected Crop Productivity Rating of "a" for all selected crops which is the highest. The 50i rating has crop rating varying from "a" to "d" with "b" having the majority.

ALISH Maps

A review of the ALISH map (O-5 Schofield Barracks) for the area shows that the project site is predominantly situated within land designated Prime Agricultural Land along with some areas of Other Important Agricultural Land near the Waikele Stream.

3.3 EXISTING USES

The Increment 3 project site is presently occupied by fallow sugar cane fields. The Oahu Sugar Company, Ltd. previously announced that it will cease operations resulting in the termination of sugar cane production on this site (LUC 1993). Surrounding areas also consist predominantly of cultivated sugar cane fields. Agricultural lands located some distance northwest of the project site would be used for a 150-acre agricultural park development in accordance with prior conditions of approval with the State Land Use Commission and City (Ordinance 95-08).

The site is currently designated Preservation on the Central Oahu Development Plan Land Use Map, and was redesignated in 1992 to allow for the development of a then planned golf course. Consequently, although designated Preservation, this property does not really satisfy the Development Plan Common Provisions defining Preservation lands (City 1994). Being fallow sugar cane land, this site generally does not meet the characteristics of normal preservation lands under this definition which include: 1) lands necessary for protecting watersheds or water resources, 2) conserving scenic and historic sites, 3) preserving wilderness, natural ecosystems, and sensitive wildlife, 4) being within areas subject to wave action, marine waters, flooding, and severe erosion, and 5) having slopes of 20 percent or more.

SECTION 4.0

SUMMARY OF AFFECTED ENVIRONMENT AND IMPACTS

This section describes the affected environment and discusses the probable impacts resulting from the proposed project. This section is divided into five major headings which are: 1) physical and natural resources, 2) biological and hydrological resources, 3) social and economic factors, and 4) infrastructure, and 5) public facilities. If necessary, appropriate mitigative measures proposed to minimize the impacts are discussed.

As discussed under Section 1.2, several environmental studies have already been conducted for the entire 655-acre Royal Kunia, Phase II development (Wanket 1989) which includes the proposed Increment 3 project site. This FEIS addressed impacts for a total of 2,400 residential units then planned for Phase II. Presently, only 2,000 residential units are planned for the entire Phase II development which includes the Increment 3 project. In addition, these 2,000 units were addressed and approved under Development Plan amendments for both Increment 1 and 2. Consequently, the project would not increase the total approved unit count and corresponding resident population. The pertinent results from these studies have been incorporated into this document to address probable impacts.

4.1 PHYSICAL AND NATURAL RESOURCES

This section describes the project's probable effect on the physical environment which include: 1) topography, soils, and agricultural production 2) natural hazards, 3) historic and archaeological resources, 4) visual resources, 5) air quality, and 6) noise.

4.1.1 Topography, Soils, And Agricultural Production

4.1.1.1 Topography And Soils

The project would inevitably have some impact on the existing topography due to site preparation activities such as grading and infrastructure improvements. However, the impact should not be significant since the project site is already fairly level and altered having been used previously for agricultural activities. Grading activities would be performed in accordance with the City's applicable regulations associated with soil erosion and sediment control. These measures would consist of compliance with the City's *Soil Erosion Standards And Guidelines* (DPW 1992), development of an erosion control plan, and other measures required when necessary permits are obtained. In addition, a soil reconnaissance report would be performed to assist in the design and construction of the project.

In addition, applicable National Pollutant Discharge Elimination System permits would be obtained from the State Department of Health. Plans would include Best Management Practices to help control and reduce the amount of pollutant discharged into regulatory waters. Some of these measures would include: 1) structural measures such as earth dikes, drainage swales, sediment traps, or interceptor ditches, and 2) non-structural measures such as mulching, temporary wind barriers, or mulching.

4.1.1.2 Agricultural Production

A study addressing the entire Royal Kunia, Phase II impact on agriculture was performed by Decision Analysts Hawaii, Inc. (DAHI) in 1988 as part of the technical studies for the FEIS (WEW 1989). This study was subsequently updated in 1992 as part of the State Land Use District Boundary Amendment for Phase II (Takeyama and Sullivan 1992). Impacts of the proposed Increment 3 project on Oahu Sugar Company, Ltd. (OSC) would result in the removal of about 157 acres from sugar cane production. The loss of this acreage would reduce OSC's annual production of sugar, molasses, and kilowatt-hours of electricity.

However, since DAHI's updated 1992 report, Oahu Sugar Company, Ltd. (OSC) has announced that it will cease operations (LUC 1993). As a result, these agricultural (sugar and molasses) and electrical decreases would occur even without the Increment 3 project. The continued operations by OSC was dependent upon the renegotiating of land leases scheduled to expire in 1995 and 1996 with The Estate of James Campbell, Robinson Estate, the State of Hawaii, and the U.S. Navy. Sugar prices and Federal price supports have also played major roles affecting the continued viability of operations. In addition, the marketing success of alternative sweeteners and sugar sources have further exerted downward pressures on sugar prices.

Proposed Mitigative Measures

To mitigate the loss of agricultural lands resulting from the proposed project, a Memorandum of Understanding has been developed between the applicant and the State Department of Agriculture (DOA) in compliance with the LUC's Decision and Order for the Royal Kunia Phase II development. Under this agreement, the applicant would convey 150 acres of land located along Kunia Road to the State of Hawaii for the establishment of a State agricultural park.

Consequently, this park would contribute to the growth of diversified agriculture on Oahu by increasing the supply of high quality and well-located agricultural land available to small farmers. Furthermore, the land will be offered at attractive lease rents, and is expected to support about 30 farm jobs. In addition, the Hawaii Farm Bureau Federation supports the entire Royal Kunia Phase II development of which Increment 3 is a part of (LUC 1993).

4.1.2 Natural And Other Hazards

4.1.2.1 Earthquake Hazards

Although difficult to predict, an earthquake of sufficient magnitude causing damage to the residential development may occur in the future. However, except for the island of Hawaii, the Hawaiian islands are not situated in a highly seismic area subject to numerous earthquakes (Macdonald 1983). Most of the earthquakes that have occurred were volcanic earthquakes causing little or no damage. Moreover, the seismic risk classification of the island of Oahu is generally low with a rating of Zone 2a. To further minimize damages to residential structures, the project would be constructed in accordance with City building codes and standards.

4.1.2.2 Hurricane Hazards, Tsunami Inundation, And Flooding

Based upon a review of the Flood Insurance Rate Map (Community Panel Number 150001 0000) for the area, the Increment 3 project site is located in Zone D which represents areas in which flood hazards are undetermined. Consequently, the project site is not situated in an area which has been subject to inundation by a 100-year flood, nor would it likely be subject to the effects of a tsunami. Thus, the project should not be adversely effected by these hazards, and is not subject to City requirements under the LUO's Flood Hazard Districts.

As with other developments in the region, the project could receive some damage from high winds caused by a hurricane of sufficient strength. Hurricanes occurring near Hawaii have been relatively frequent events with a total of nine hurricanes having approached within 300 nautical miles from the islands between 1970 and 1992 (FEMA 1992). Major hurricanes affecting the State have been Dot (1959), Iwa (1982), and Iniki (1992) which was the most devastating.

Of the major hazards associated with hurricanes, high winds would be the primary hazard having the greatest potential to damage the project. High winds from a hurricane may inevitably cause some damage to residential structures, trees, and other vegetation used for landscaping in accordance with the LUO. However, the project would be constructed in conformance with the City's *Uniform Building Code* to minimize damages.

4.1.2.3 Other Hazards

Other hazards which may affect the residential project include those associated with agricultural operations and the Navy's Waikele Branch Naval Magazine munitions storage facilities located in Waikele Gulch. The residential project should not be affected by the Navy's facility since all ordnance have been removed from this facility, and it is no longer used for ordnance storage. Furthermore, all explosive safety

quantity distance arcs associated with the facility have been disestablished. The Increment 3 project site should also not be prone to fire hazards associated with sugar cane burning activities due to the OSC's cease of operations. Further, the OSC complies with the State Department of Health's regulations on sugar cane burning which require operations be undertaken during favorable wind conditions.

4.1.3 Historic And Archaeological Resources

An archaeological reconnaissance survey of the entire Royal Kunia, Phase II development was conducted in 1988 as part of technical studies prepared for the development's FEIS (WEW 1989). Consequently, the survey findings are applicable to the Increment 3 project site, and are incorporated in this application.

The residential project should not have an effect on historic or archaeological sites since the entire property was previously used for sugarcane production. The study determined that the project site contains no remaining above-ground archaeological features and offers little opportunity for subsurface recovery. Information to support this conclusion include the survey results, lack of indicator data of past use from the literature and map sources, and an environmental setting that does not lend itself to permanent habitation. In addition, an August 14, 1989 letter from the State Department of Land and Natural Resources determined that the entire Royal Kunia, Phase II project would have "no effect" on historic sites. In the event archaeological or historic remains resources are uncovered during construction activities, the State Historic Preservation Division would be immediately notified and work stopped.

4.1.4 Visual Resources

The impact on visual resources from the entire Royal Kunia, Phase II development was addressed in the FEIS prepared (WEW 1989). In addition, the City's *Coastal View Study* (Chu 1987) determined that there were no significant public viewing points nor visual landmarks associated with the project site. The Development Plan Special Provisions for Central Oahu pertinent to the project identified panoramic views of the Waianae mountains and the ocean from Kunia Road as important public views (City 1994a). Hence, the views of these mauka (mountain) and makai (ocean) visual resources were used in the assessment.

4.1.4.1 Impact On Mauka Views

In the general area of the project site, views from Kunia Road are flanked on both sides of this road with sugar cane fields and pineapple fields. These agricultural fields thus provide a rural view and sense of openness while public views to the west capture the steep slopes of the Waianae mountains in the background. The Increment 3 residential project would inevitably change the existing view of agricultural fields to a more suburban one within the development area. However, the present and planned

development of surrounding land uses associated with Increments 1 and 2 are changing the character of this view. This project would thus extend the urban character already established through the Village Park and Royal Kunia Phase I developments.

The project is not expected to be visible from the Waipahu town area due to the site's location a considerable distance inland and mauka of the H-1 Freeway. Likewise, the project would not impact mauka views of the Waianae mountains from Kunia Road since the site is located a considerable distance east of this road. However, the project would create the opportunity for new views of this mountain range from the newly created public access onto the site. If portions of the site are visible from Kunia Road, these views should generally be consistent with the character and setting of those of Village Park and Royal Kunia Phase I.

Therefore, the project should not have a significant visual impact on mauka views since the residential development would not disrupt views of the Waianae mountains, affect scenic landmarks, or adversely impact the rural character of the surrounding area. The single-family residential units would be designed and constructed in accordance with applicable City regulations which include the Development Plan Special Provisions for Central Oahu (City 1994a) and *Land Use Ordinance* (DLU 1994) which have applicable height and setback controls. Open space, landscaping and street tree plantings, and other building designs incorporated into the project should provide further mitigation to minimize the overall visual impact of the development.

4.1.4.2 Impact On Makai Views

Near the project site, views from Kunia Road in the makai (south) direction provide distant views of the urbanized Waipahu and West Loch areas along with the southern coastline of Oahu. These coastline views from Kunia Road are predominantly urban in character due to the H-1 Freeway, commercial and industrial area in Waipahu town, and growing development of Ewa. Along Kunia Road, these makai views have an urbanized low-rise residential character associated with the Royal Kunia Phase I and Village Park developments.

The Increment 3 project would not disrupt nor impact any coastline views from Kunia Road since the site is situated well east of this road. However, the project would create the opportunity for new coastline views from the newly constructed homes and public roadways leading onto the site. Due to the site location a considerable distance east of this road, the residential development would also not disrupt nor impact present views along Kunia Road. The future State agricultural park along with the industrial and residential developments associated with Increments 1 and 2 should block views of the project along Kunia Road.

4.1.5 Air Quality

An air quality study was performed by B.D. Neal and Associates for the project and is included in Appendix C. Air quality standards have been established by both Federal and State governments which limit ambient concentrations of particulate matter, sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone and lead. In addition, a state standard has been established for hydrogen sulfide. State Ambient Air Quality Standards (AAQS) are more stringent than the comparable national limits except for the standards for sulfur dioxide, particulate matter and lead, which are set at the same levels.

4.1.5.1 Present Air Quality

Present air quality in the project area is primarily affected by air pollutants from industrial, agricultural, or vehicular sources. Several sources of industrial air pollution are located in the Campbell Industrial Park which is located about 7 miles to the southwest at Barbers Point. Prevailing winds from the northeast will carry these emissions away from the site most of the time. Until recently, air pollution in the area originating from agricultural sources were attributed to sugar cane operations in the general vicinity of the project site. Emissions from both the mill and the canefield operations in the area have now been eliminated with the closure of the Ewa Plantation.

Kunia Road located adjacently west of the Phase II development presently carries moderate levels of vehicle traffic during peak traffic hours. Carbon monoxide emissions from motor vehicles using this roadway will tend to be carried away from the project site by the prevailing winds. Consequently, present carbon monoxide concentrations near the project site were estimated to be well within both state and national ambient air quality standards.

4.1.5.2 Short-Term Impacts

The project could result in short-term direct and indirect impacts on air quality during construction activities. Two potential types of air pollution emissions which could occur are: 1) fugitive dust from vehicle movement and soil excavation; and 2) exhaust emissions from on-site construction equipment. Indirectly, there could 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 from construction activities were estimated to amount to about 1.2 tons per acre per month and may be somewhat higher due to the relatively dry climate and moderate soil silt content. Emissions from on-site mobile and stationary construction equipment would emit air pollutants from engine exhausts. Nitrogen oxide emissions from diesel engines could be relatively high compared to

gasoline powered equipment, however, the standard for this pollutant is set on an annual basis and thus not likely to be exceeded by short-term emissions. Carbon monoxide emissions from diesel engines are low and should be relatively insignificant compared to vehicular emissions on nearby roadways.

Mitigative Measures For Short-Term Impacts

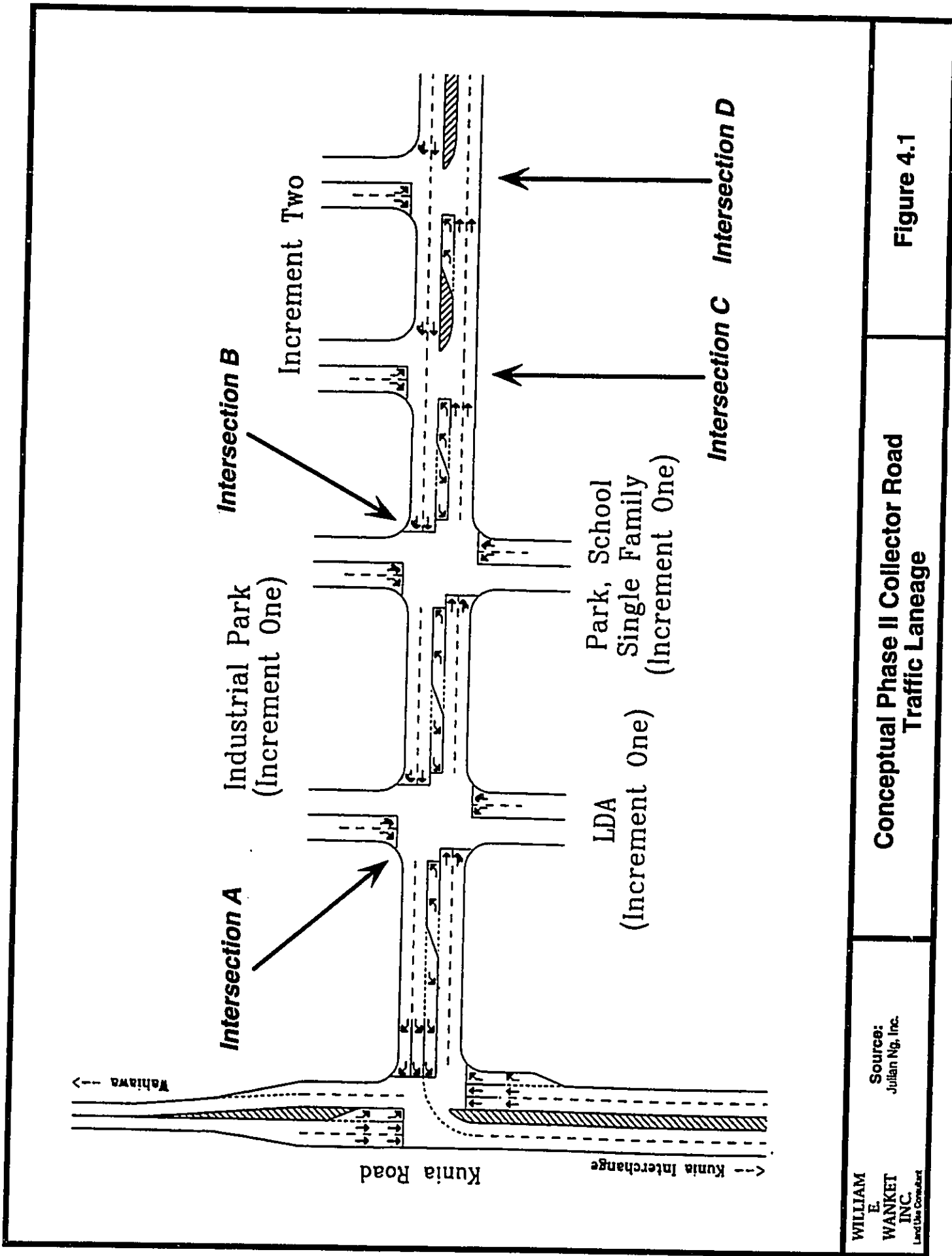
To mitigate short-term impacts, a dust control plan could be developed to prohibit visible emissions of fugitive dust from construction activities at the property line in compliance with the State Department of Health's (DOH) regulations on air pollution control (State of Hawaii 1992). Such measures may include the following:

1. Watering active work areas and any temporary unpaved work roads at least twice daily on days without rainfall;
2. Limiting the areas which are disturbed at any given time to contain fugitive dust emissions;
3. Incorporating measures such as applying chemical soil stabilizers, mulching, or using wind screens;
4. Covering dirt-hauling trucks before traveling on roadways;
5. Paving of parking areas and establishing landscaping early in the construction schedule to control dust; and
6. Establishing a road cleaning or tire washing program to reduce fugitive dust emissions from trucks using paved roadways in the project area.

To minimize indirect short-term impacts in air quality, slow moving construction equipment could be moved during periods of low traffic volume to prevent obstruction of normal traffic flow. Likewise, the schedules of commuting construction workers could be adjusted to avoid peak hours in the project vicinity.

4.1.5.3 Vehicular Traffic-Related Impacts

Five intersections were selected for air quality analysis which were Kunia Road with the Phase II Collector Road, and four intersections within the Phase II development connecting to the Collector Road. These four intersections along the Collector Road are shown on Figure 4.1 and identified as Intersections A to D. The National AAQS for 1-hour carbon monoxide concentrations is 40 mg/m³ while the more stringent State AAQS is 10 mg/m³. The National AAQS for 8-hour concentrations is 10 mg/m³ while the State AAQS is 5 mg/m³.



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E.
WANKET
INC.
Land Use Consultant

Source:
Julian Ng, Inc.

Conceptual Phase II Collector Road
Traffic Laneage

Figure 4.1

Using projected traffic volumes (shown in Appendix E), 1-hour and 8-hour average carbon monoxide concentrations were estimated for present and future conditions in the year 2005 with and without the Increment 3 project. It should be noted that under the without project conditions, the traffic study assumed only 1,420 units would be developed on the Increment 1 and 2 sites eventhough up to 2,000 units are permitted under the Development Plan. Thus, 580 units would be constructed on the Increment 3 project site under this with project scenario. These traffic conditions therefore represent a more conservative scenario assuming worse conditions than would occur if all of the 2,000 units were constructed only within Increments 1 and 2.

These predicted concentrations were also based on worst-case assumptions concerning both traffic movement and meteorological conditions. One assumption concerning meteorological conditions was a wind speed of 1 meter per second with a steady direction for 1 hour which may occur only once a year or less. With wind speeds of 2 meters per second, computed concentrations would be only about half the values estimated. In addition, 8-hour concentration estimates are probably more conservative than 1-hour estimates due to the uncertainties and methodologies involved.

1-Hour Estimated Concentrations

Table 4.1 summarizes the estimated worst-case 1-hour morning and afternoon ambient carbon monoxide concentrations at the study intersections. In the year 2005 without the project, concentrations were estimated to increase substantially over present (1995) conditions at most locations due to the creation of roadway intersections built as part of the Increments 1 and 2 developments. The highest concentration (20.9 mg/m³) was predicted during the morning peak hour near the Kunia Road with Collector Road intersection. Other locations along intersections with this Collector Road ranged between 2.6 and 16.0 mg/m³.

With the project, carbon monoxide concentrations were higher due to the added traffic associated with Increment 3. As previously mentioned, this scenario assumes 580 units would be constructed on the Increment 3 site to estimate more conservative conditions since only 1,420 units would be constructed within Increments 1 and 2. The highest predicted concentration (22.8 mg/m³) occurred during the morning peak hour at Kunia Road with the Collector Road. Other locations along this Collector Road had predicted concentrations ranging between 3.9 and 18.9 mg/m³.

Description Of Roadway Intersection	1995 Existing		2005 W/O Project		2005 With Project	
	AM	PM	AM	PM	AM	PM
1. Kunia Road at Phase II Collector Road	2.5*	1.7*	20.9	18.4	22.8	20.7
2. Intersection A (Collector Road at West Road to Industrial Park)	0.5*	0.5*	16.0	13.3	18.9	13.5
3. Intersection B (Collector Road at East Road to Industrial Park)	0.5*	0.5*	14.8	11.0	16.9	12.4
4. Intersection C (Collector Road at West Road to Increment 2)	0.5*	0.5*	3.9	3.5	4.3	3.8
5. Intersection D (Collector Road at East Road to Increment 2)	0.5*	0.5*	2.6	2.6	7.2	6.7

Note: * Assumes through traffic only on Kunia Road
Assumes background concentration only.
Source: B. D. Neal and Associates, January 1996

These estimated worst-case 1-hour carbon monoxide levels were within the National AAQS of 40 mg/m³. However, with or without the project, future worst-case concentrations of carbon monoxide were predicted to exceed the State AAQS standard near the intersections of Kunia Road with the Collector Road and Intersections A and B along the Collector Road. However, it should be noted that the State standards are set at such stringent levels that they are currently exceeded at many locations in the State which have even moderate traffic volumes.

8-Hour Estimated Concentrations

Table 4.2 summarizes the estimated worst-case 8-hour morning and afternoon carbon monoxide concentrations. Without the project in the year 2005, worst-case concentrations were estimated to increase substantially over present (1995) conditions with the highest concentration (10.5 mg/m³) predicted at the intersection of Kunia Road with Collector Road. This level would exceed both State and National AAQS standards. A worst-case concentration of 8.0 and 7.4 mg/m³ were predicted to occur near Intersection A and Intersection B, respectively. These concentrations are above the State limit but within the National standard. Other intersections had predicted concentrations well within both State and National standards.

Description Of Roadway Intersection	1995 Existing	2005 W/O Project	2005 With Project
1. Kunia Road at Phase II Collector Road	1.2*	10.5	11.4
2. Intersection A (Collector Road at West Road to Industrial Park)	0.5*	8.0	9.5
3. Intersection B (Collector Road at East Road to Industrial Park)	0.5*	7.4	8.4
4. Intersection C (Collector Road at West Road to Increment 2)	0.5*	2.0	2.2
5. Intersection D (Collector Road at East Road to Increment 2)	0.5*	1.3	3.6

Note: * Assumes through traffic only on Kunia Road
Assumes background concentration only.
Source: B. D. Neal and Associates, January 1996

With the project, the highest 8-hour concentration in the project area, 11.7 mg/m³, was again predicted to occur near the intersection of Kunia Road with Collector Road. Similar to the without project case, this exceeds both State and National standards. Worst-case concentrations at Intersection A and Intersection B were 9.5 and 8.4 mg/m³, respectively. These values are within the National standard but exceed the State limit. Worst-case concentrations at other locations studied were within both State and National standards. It should be further noted that the methodologies used to estimate these 8-hour worst-case concentrations generally produce conservatively high estimates. In addition, State standards are set at such stringent levels that it is likely they are currently exceeded at many locations in the State which have even moderate traffic volumes.

Mitigative Measures For Vehicular-Related Impacts

Available options to mitigate long-term, traffic-related air pollution include improving roadways, reducing traffic, or reducing individual vehicular emissions. Aside from further improving roadways, air pollution impacts from vehicular emissions could be mitigated by reducing traffic volumes through the promotion of bus service, car pooling, and adjusting school and business hours to begin and end during off-peak times.

Reduction of emissions from individual vehicles is beyond the control of any single development and would have to be achieved through the promulgation of county, state or federal air pollution control regulations. For example, Hawaii currently does not require annual inspections of motor vehicle air pollution control equipment. Another potential mitigation measure might be to provide added buffer zones between walkways and roadways in areas where space is available.

4.1.5.4 Impacts From Nearby Industrial And Agricultural Park

The already zoned Royal Kunia Phase II, Increment 1 development includes a 123-acre light industrial park which may have some impact on the proposed residential project. However, based upon the I-1 zoning designation for this industrial site, permitted land uses generally do not have the potential to emit significant amounts of air pollution. In addition, State air pollution control rules require activities causing air pollution to obtain a permit from the State DOH to construct and operate.

A 150-acre agricultural park to promote small diversified farming operations would be developed along Kunia Road west of the Increment 3 project site. Under a Memorandum of Understanding between the State DOA and the applicant, this agricultural park would exclude commercial livestock and aquaculture production or other related activities, and the DOA would use its best efforts to minimize the impact of the agricultural park on adjacent areas.

Similar to the industrial park, any agricultural operations permitted by the DOA emitting air pollution would be required to obtain a permit from the DOH to construct and operate, and at such time an air quality impact assessment may be required. In addition to assessing compliance with applicable air quality standards, either the DOH or DOA may review agricultural operations proposing to locate at the park for potential nuisance impacts on adjacent residential areas.

4.1.5.5 Electrical Demand And Solid Waste Disposal-Related Impacts

The project would cause indirect air pollution emissions from power generating facilities as a consequence of electrical power usage. Impacts on air quality due to indirect emissions from electrical generation and solid waste disposal would likely be relatively small based on the magnitudes of both the probable demands and indirect emissions. With the high level of particulate emission control achieved at H-Power, emission quantities resulting from burning solid waste generated by the project would be relatively small compared to emissions from other sources on the island. Indirect emissions associated with electrical generation could be reduced by incorporating energy-saving features into the project's design. Air pollution from solid waste disposal could be reduced through the promotion of conservation and recycling programs within the proposed development.

4.1.6 Noise Environment

An air quality study was performed by Darby and Associates for the project and is included in Appendix D. Various local and federal agencies specify guidelines and standards in assessing environmental noise, and set noise limits as a function of land use. These standards are discussed in Appendix D.

Noise level measurements were taken at selected areas to determine the existing acoustical environment in the general vicinity of the Increment 3 project site. The project site presently experiences relatively low ambient noise levels of 42 to 44 dBA (L_{90}) which is typical of rural areas. With sugarcane agricultural operations ceasing on the site, the dominant noise sources consisted of wind, occasional aircraft fly-overs, and distant construction. Agricultural fields surrounding the Increment 3 project site experience a similar acoustical environment with wind and occasional aircraft being the dominant noise sources.

4.1.6.1 Short-Term Construction Noise Impacts

Development of the project would involve excavation, grading, and construction activities which may generate significant amounts of noise that may impact nearby residential areas. The actual noise created would be dependent upon the methods employed during each stage of the construction process, however, earthmoving equipment, such as bulldozers and diesel-powered trucks, would probably be the loudest.

Mitigative Measures For Construction Noise

To mitigate construction noise, these activities would be conducted in conformance with DOH regulations and permit conditions (State of Hawaii 1981). Construction equipment and on-site vehicles or devices requiring an exhaust of gas or air would need to be equipped with mufflers, and construction vehicles using roadways would need to satisfy the DOH's vehicular noise requirements (State of Hawaii 1981a). Some of the permit conditions for construction activities include:

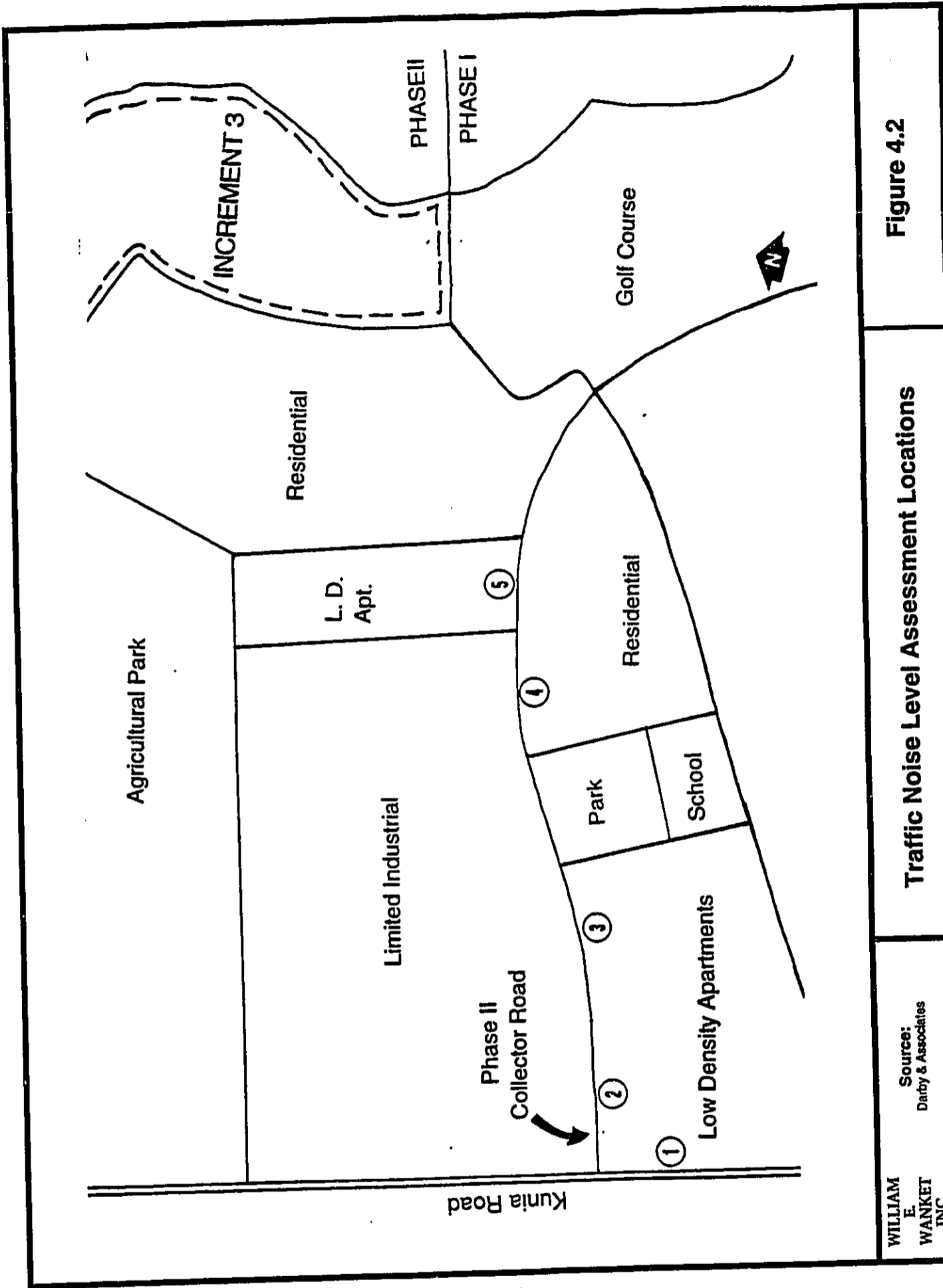
- No permit shall allow construction activities creating excessive noise . . . before 7:00 am and after 6:00 pm of the same day.
- No permit shall allow construction activities which emit noise in excess of 95 dB(A) . . . except between 9:00 am and 5:30 pm of the same day.
- No permit shall allow construction activities which exceed the allowable noise levels on Sundays and on . . . holidays. Activities exceeding 95 dB(A) shall be prohibited on Saturdays.

4.1.6.2 Traffic-Related Noise Impacts

Traffic noise resulting from the Increment 3 project was predicted using vehicle projections from a traffic study (Appendix E) at the following locations along Kunia Road and the Phase II Collector Road shown on Figure 4.2. The existing (1995) and projected future (2005) traffic noise levels with and without the project during the morning and afternoon peak traffic hours are shown below on Table 4.3.

It should be noted that under the without project conditions, the traffic study assumed only 1,420 units would be developed on the Increment 1 and 2 sites eventhough up to 2,000 units are permitted under the Development Plan. Thus, 580 units would be constructed on the Increment 3 project site under the with project scenario. These traffic conditions therefore represent a more conservative scenario assuming worse conditions than would occur if all of the 2,000 units were constructed only within Increments 1 and 2.

Description Of Peak Hour	Location Of Study Intersections				
	1	2	3	4	5
1995 Existing Conditions					
Morning Peak Hour	61.5	N/A	N/A	N/A	N/A
Afternoon Peak Hour	62.0	N/A	N/A	N/A	N/A
2005 Without Project Conditions					
Morning Peak Hour	66.6	61.4	59.7	54.4	51.7
Afternoon Peak Hour	67.8	63.1	61.5	56.4	52.5
2005 With Project Conditions					
Morning Peak Hour	66.9	62.0	60.5	56.3	55.1
Afternoon Peak Hour	68.3	64.2	62.9	58.6	56.4
Note:	Noise levels are equivalent continuous noise levels in dBA at an arbitrary 100 feet. N/A - Not Applicable				
Source:	Darby & Associates, January 1996				



WILLIAM
E.
WANKET
INC.
Land Use Consultant

Source:
Datby & Associates

Traffic Noise Level Assessment Locations

Figure 4.2

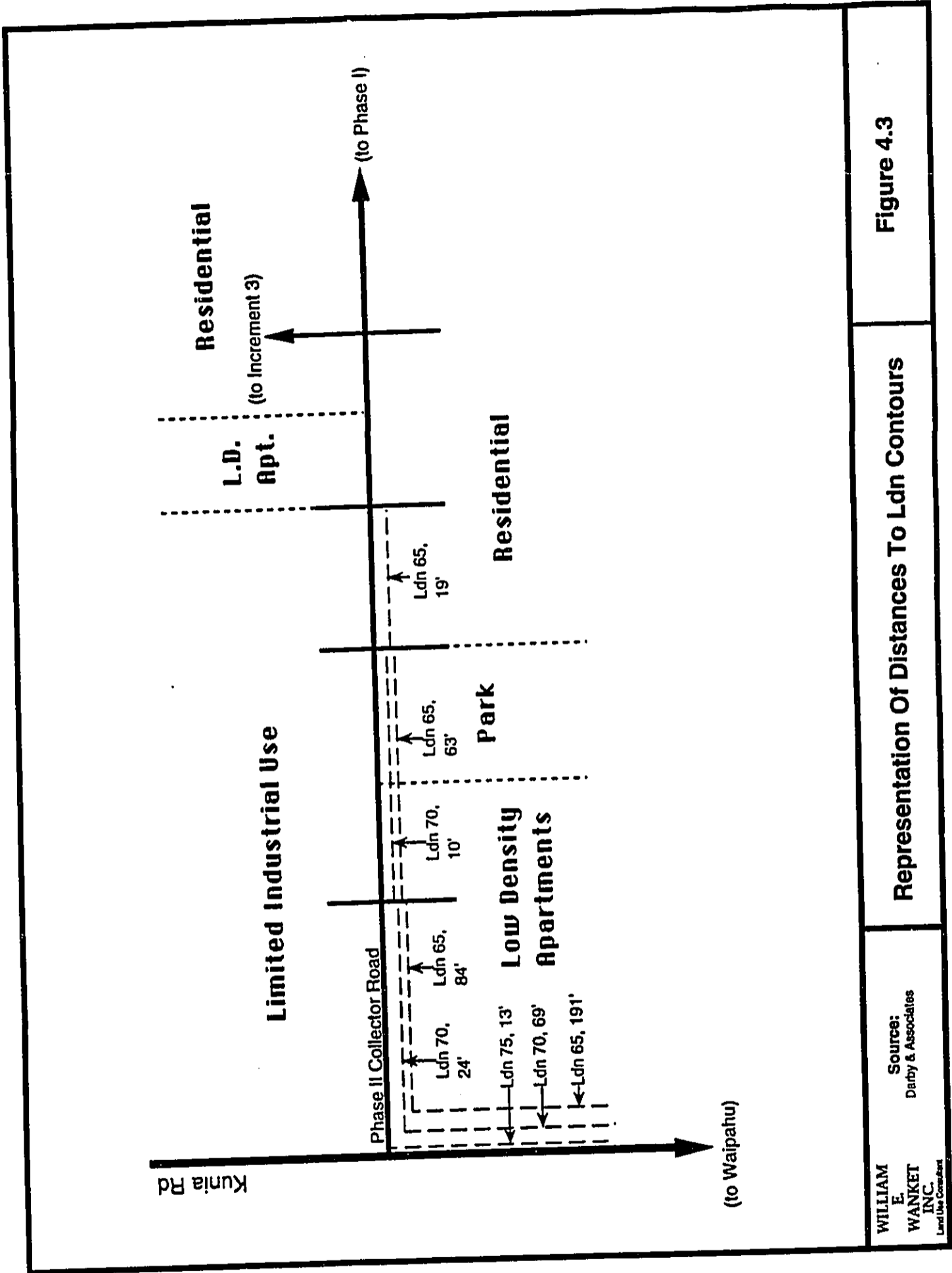
As shown on Table 4.3, the predicted increase in traffic noise level due to the project were typically less than 3 dB except at Location 5 where the increase is 3.4 dB and 3.9 dB during the morning and afternoon peak hours, respectively. These increases in traffic noise levels due to project could be perceptible to some people at noise sensitive locations along the Collector Road, however, the impact is not considered to be significant.

Figure 4.3 provides a graphical representation of distances to the 65 and 70 Ldn noise contour lines along Kunia Road and the Collector Road. As shown, these results indicate that the Increment 1 low-density apartments planned, from Kunia Road to Intersection A, would be exposed to Ldn levels ranging from 65 to 70 dB between 24 and 84 feet from the Collector Road's right-of-way. The remainder of this Increment 1 apartments would be exposed to Ldn levels ranging from 65 to 70 dB if they are situated within 10 and 63 feet of the Collector Road's right-of-way.

The U.S. Department of Housing and Urban Development (HUD) has established Site Acceptability Standards for interior and exterior noise exposure at housing areas. These standards are based on Ldn levels and identify the need for noise abatement. Consequently, housing areas exposed to Ldn levels between 65 and 75 dB require some means of noise abatement, either at the property line or in the building construction in order to meet HUD criteria, to be eligible for HUD/FHA financing. Therefore, noise mitigation measures would be implemented to reduce traffic noise exposure to the Increment 1 low-density apartments planned adjacent to Kunia Road and the Phase II Collector Road.

The HUD standards for residential developments exposed to Ldn levels between 65 and 70 dB, require the building construction to provide a minimum of 5 dB attenuation in addition to "...attenuation provided by buildings as commonly constructed in the area, and requiring open windows for ventilation." Similarly, HUD standards require a minimum of 10 dB additional attenuation for residential developments exposed to Ldn levels between 70 and 75 dB.

Mitigation of traffic noise along Kunia Road and the Collector Road may include constructing a sound barrier along this roadway, such as a wall or a landscaped earth berm, which blocks the line-of-sight to the traffic. Room attenuation for upper-level units is commonly achieved in naturally ventilated living spaces by installing carpeting with pad, louvered closet doors, and absorptive ceiling tiles, as opposed to hard tile floors, solid closet doors, and hard-surface ceilings, respectively. The critical spaces of upper-level apartments units within the 70 to 75 Ldn could be airconditioned to allow closed windows for noise reduction purposes.



WILLIAM
E.
WANKET
INC.
Land Use Consultant

Source:
Darby & Associates

Representation Of Distances To Ldn Contours

Figure 4.3

4.1.6.3 Noise Impacts On Project From Other Uses

Aircraft Noise Impacts

The proposed project site is within approximately 4 to 7 miles of Honolulu International Airport, Hickam Air Force Base, Barbers Point Naval Air Station, and Wheeler Air Force Base. Due to the distance of the project site from these airports, the overall day-night average sound level, Ldn, resulting from air traffic should be less than 60 dB at the project site which is compatible with the State Department of Transportation residential guidelines. However, due to the vicinity of the project site to flight tracks associated with these airports, infrequent aircraft fly-overs may at times be audible. However, aircraft noise should not significantly impact the proposed residential development.

Agricultural Park And Military Noise Impacts

There should be no impact from the proposed agricultural park since noise sources, such as large farm machinery associated with large scale single crop production, would not be employed. In addition, commercial livestock and related activities would be prohibited.

The Waikale Branch, Naval Magazine, Lualualei is located approximately 1/4-mile northeast of the proposed project site. However, there should be no noise impact on the project site from this facility due to the nature of activities occurring there and the removal of all ordnance storage.

Golf Course Noise Impacts

Potential noise sources from the Royal Kunia Phase I golf course development include mechanical equipment at the clubhouse, the public address system, and ground maintenance activities. Noise sources from these activities should not have a significant impact on the Increment 3 project since they would be properly controlled and maintained. Equipment associated with ground maintenance activities, (e.g., tractors, lawn mowers, leaf blowers, etc.), may also impact nearby residential areas. However, such activities are transient and occur for short periods of time only during the day.

4.2 BIOLOGICAL AND HYDROLOGICAL RESOURCES

This section describes the project's probable effect on biological and hydrological resources which include: 1) botanical resources 2) avifaunal resources, and 3) water quality.

4.2.1 Botanical Resources

A botanical survey was conducted by Char and Associates in 1988 as part of technical studies included with the FEIS for the Phase II development of Royal Kunia (WEW 1989). This survey encompassed approximately 670 acres of sugar cane land which included the Increment 3 project site. Consequently, the survey findings are incorporated in this application since the assessment results are pertinent to the proposed project.

The results of this study determined that there were no officially listed, proposed, or candidate threatened or endangered plant species situated within the Increment 3 project site or entire Phase II development area. Since most of the area had been extensively used for sugar cane production for many years, there is little botanical interest on the project site. Of the 59 species of vascular plants found in the entire Phase II development area, 97 percent were exotic weeds or deliberately introduced plants while the remaining 3 percent (2 species) were native or presumed-native plants. These questionably native species found in the area are common weedy plants found in similar habitats throughout the islands.

4.2.2 Avifaunal And Feral Mammal Resources

An avifauna and feral mammal survey was conducted by Phillip L. Bruner in 1988 as part of technical studies included with the FEIS for the Royal Kunia Phase II development (WEW 1989). This survey encompassed approximately 670 acres of sugar cane land which included the Increment 3 project site. Consequently, the survey findings are incorporated in this application since the assessment results are pertinent to the proposed project.

4.2.2.1 Avifaunal Survey Results

The residential development should not have an adverse impact on bird species since no resident endemic or resident indigenous species were present on the site or in the surrounding area. The only likely endemic species which might occasionally occur in the area would be the Short-Eared Owl (*Asio flammeus sandwichensis*), however, the project site and surrounding area do not provide suitable habitation for this species such as dry or rain forests.

Of the migratory indigenous bird species, only the Pacific Golden Plover (*Pluvialis fulva*) was recorded. Most of them were seen along cane haul roads running throughout the Phase II development area and in a cleared sugar cane field area west of Kunia Road. A total of 15 species of exotic birds were also recorded most of which are commonly found in this type of agricultural habitat along with the Waipio and Central Oahu area. The project's creation of a more diverse habitat consisting of landscaped trees and grassed areas should have a positive effect by increasing the populations of these bird species.

4.2.2.2 Feral Mammal Survey Results

The residential development should not have an adverse impact on feral mammal species present on the site or in the surrounding area since no endangered or threatened species were found. The survey of feral mammals found that Mongoose (*Herpestes auro-punctatus*) were common in the area, and feral cats were also observed. Although no rats or mice were observed, a trapping program would likely show that they are present in numbers similar other sugar cane fields on Oahu.

4.2.3 Water Quality

The project is not expected to cause a significant degradation to the quality of stream and coastal waters along with marine resources. An appropriate drainage plan would be prepared and approved by the City for the site which would incorporate measures to minimize the discharge of surface runoff. A possible detention basin is preliminarily planned along the southern portion of the project site. As a result, the project should not have a significant impact on water quality and marine resources.

No significant short-term impacts are expected since construction activities would be performed using common Best Management Practices in conformance with applicable City regulations concerning soil erosion and sediment control to mitigate non-point source pollution. In addition, appropriate National Pollutant Discharge Elimination System permits would be obtained from the State Department of Health.

4.3 SOCIAL AND ECONOMIC FACTORS

This section describes the project's probable effect on social and economic factors. The factors included under this section consist of: 1) demographic factors, 2) housing, and 3) economic factors. The information incorporated under this section is primarily from an updated Social Impact Assessment prepared by Earthplan in 1992.

4.3.1 Demographic Factors

4.3.1.1 Description Of Existing Community

In a regional context, Central Oahu includes the towns of Waipahu, Mililani and Wahiawa, and the residential communities of Village Park, Royal Kunia Phase I, Seaview/Crestview, Waipio Gentry, Waipio Acres, and Melemanu Woodlands. The Increment 3 project site is in the western-most portion of the Central Oahu Development Plan area and borders the Ewa Development Plan area. As a result, its location is unique from existing Central Oahu communities because it functions as a developmental transition between the experienced growth of Central Oahu and the planned growth for Ewa and the City of Kapolei. As Ewa development comes closer to the Waipahu boundary, the physical infrastructure and social interactions will likely supersede the existing community delineations.

Both Central Oahu and Ewa have experienced growth rates higher than islandwide rates. In the 1970's, Central Oahu was Oahu's fastest growing area with its population increasing by over 52 percent from 66,228 people in 1970 to 100,953 in 1980. However, between 1980 and 1990, this population growth occurred at a lesser rate. The bulk of Central Oahu's growth occurred in newer residential subdivisions north of the H-1 Freeway and along Kamehameha Highway and Kunia Road, such as Waipio Gentry, Village Park and Waikele. Mililani was also a major contributor to this growth and is further transforming the region by offering a mix of uses which provide employment alternatives outside urban Honolulu.

Waipahu Neighborhood Board Area

The project site would be part of the Waipahu Neighborhood Board area which extends west from the H-2 Freeway to Kunia Road and in a makai-mauka direction from Kupehau Road (south of Kunia Village) to Mililani Cemetery Road. Demographic information associated with this area is listed below:

- Population Growth - The area contained 51,153 persons in 1990, and had an average annual growth rate of 4.2 percent a year which is higher than Central Oahu's rate of 2.6 percent. About 19,300 persons lived in communities mauka of the H-1 Freeway while almost 32,000 people lived in Waipahu Town and other makai areas.

- Ethnicity - The largest ethnic group in the area is Filipino (38%) which is more than double the county-wide proportion (14%). The second largest ethnic group is Japanese (21%) followed by Caucasians (17.3%) which is under represented compared island-wide (32%).
- Age - The area is slightly younger than Oahu with almost 30 percent of its residents under 17 years of age whereas only 25 percent of Oahu's residents fall into this category. Only 8 percent of the area's population are elderly (over 65 years of age) as compared island-wide (11%).

Village Park And Royal Kunia Phase I

The Increment 3 project site would generally be near the communities of Village Park and Royal Kunia Phase I. Village Park is comprised primarily of single-family detached homes with average lot sizes of 4,000 square feet. This community has 1,806 units, 120 of which are townhome units.

Royal Kunia Phase I currently contains two developments consisting of Royal Kunia Gardens and Halekua Gardens 1. Royal Kunia Gardens contains 299 single-family homes and 152 apartment rental units for families whose incomes are 80 percent or below the median income. Halekua Gardens 1 contains 152 apartment rental units for families with low income. Demographic information associated with these communities are listed below:

- Population - In 1990, a total of 7,407 people lived in Village Park and Royal Kunia Phase I.
- Ethnicity - The ethnic makeup closely follows the overall Waipahu Neighborhood Board Area with 32 percent of Filipino decent, and Japanese and Caucasians each consisting of 22 percent.
- Age - Residents in these communities are among the youngest in the Waipahu Neighborhood Board Area with a median age of 29 in 1990, and only about 3 percent being elderly. About one-third of the population are youngsters under 17 years old.

Future Changes In Central Oahu and Ewa

The Increment 3 project site is in and near regions targeted for major population growth. Both the Central Oahu and Ewa Development Plan areas have encountered 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. Other major developments occurring and planned for Central Oahu include Royal Kunia Phase I, Phase II, Increments 1 and 2, Waikele, Waipio Gentry, and Waiawa Ridge.

4.3.1.2 Resident And Visitor Populations

Residential Population Impacts

In January 1992, the Central Oahu Development Plan was amended to allow the development of 1,000 units for Royal Kunia Phase II, Increment 1 (Ordinance 92-05). These 1,000 units along with similar allocations for the Mililani Mauka and Gentry Waiawa projects conformed to the population guidelines of the General Plan for the Central Oahu area. Since then, this Development Plan was amended in 1994 for the Increment 2 project of Royal Kunia Phase II consisting of 1,000 units (Ordinance 94-71). These additional 1,000 units could result in an additional resident population of 3,030 people using the Planning Department's average household size of 3.03 for Central Oahu (Earthplan 1992).

Central Oahu's projected share of the Oahu population in 2010 (17.1%) is slightly above the 2010 population distribution range of 14.9 to 16.5 percent. However, the share of Oahu's population projected for the combined Central Oahu and Ewa populations (27.3%) meet the 2010 distribution guidelines of 26.9 to 29.8 percent (Planning Department 1995). Furthermore, the combined projected populations of Central Oahu, Ewa, and the Primary Urban Center (76.1%) also meet the General Plan guidelines of 72.0 to 79.6 percent. Therefore, the Central Oahu population distribution approved with Increment 2 implements the General Plan policy of promoting population growth within the Primary Urban Center, Ewa, and Central Oahu Development Plan areas (Planning Department 1995). Since the proposed Increment 3 project would not increase the total approved units for Phase II, there should be no significant changes or impacts to the resident population affecting these distribution guidelines.

It should be noted that these General Plan guidelines are meant to express public policies regarding population ranges for the various Development Plan areas. As such, these guidelines are not intended to be the fixed or sole basis for project evaluation, but instead, serve as part of the overall land use approval process which includes consideration of infrastructure, housing demand, social and economic impacts, and community input (Earthplan 1992).

In addition, the Waipahu Neighborhood Board and other community organizations have been consistent in its public support of the Royal Kunia development. As further discussed under Section 7.1.3, this organizational support often stems from a community's desire for upward mobility, and the project is thus viewed as a catalyst for this desired change and community improvement. Therefore, as with the already approved Phase II, Increment 1 and 2 developments, the proposed Increment 3 project would be consistent with the community's desire for increased diversity in the community.

Visitor Population Impacts

The Increment 3 project is not expected to impact the visitor population since no visitor units are included with the project.

4.3.1.3 Impacts To Neighborhood Character Or Culture

The Waipahu area, particularly Waipahu Town, is generally lower on the economic scale in the island-wide community. Waipahu had proportionally more families below the poverty level, less people in managerial/professional occupations, greater immigrants, and lower educational levels. Residents from mauka communities of Waipahu tended to have higher incomes, better-paying jobs, and a lower unemployment rate. This makeup is consistent with community perceptions of socio-economic differences between Waipahu Town and the mauka communities.

In recent years, the Waipahu Neighborhood Board's actions consistently indicate that the Waipahu community is open to new developments. The Waipahu Neighborhood Board and other community organizations have been consistent in its public support of the Royal Kunia development. The organizational support for development projects in Waipahu often stems from a community's desire for upward mobility. Residents are willing to undergo the impacts of growth related problems, if there are possibilities for community improvement. Implied in this community's position is a feeling that the current composition of the community is not conducive to immediate change and improvement. Thus, Waipahu Town often looks at development projects, including Royal Kunia Phase II, as a catalyst for community change and improvement. Therefore, the addition of new and socio-economically different residents to the community from Increment 3 should provide this catalyst for social and economic improvement of the overall community.

As with the Royal Kunia Phase II, Increments 1 and 2, the Increment 3 project would be consistent with the community's desire for increased diversity in the community. The proposed residential project would bring in a population which would likely reflect the social and economic characteristics of the overall island. This economic mix of new residents in the community is expected to allow for diversity of skills and talents for community-wide projects.

This is already evidenced by present mauka communities which have demographic characteristics similar to the island-wide population. Therefore, to realize the Waipahu community's desire for social and economic heterogeneity, it is important that residents from these newer mauka developments are integrated into the overall Waipahu region. The mauka residents should be solicited and encouraged to become involved in the regional Waipahu organizations, such as the Waipahu Community Association and the Waipahu Neighborhood Board.

Relationship With Village Park And Royal Kunia Phase I

Village Park is estimated to house a population of about 5,500 residents while Royal Kunia Phase I could house approximately 7,500 residents when fully developed. The Phase II, Increment 1 and 2 developments would add about another 4,300 residents while the proposed Increment 3 project would similarly add about 1,760 residents totaling 6,060 for the entire Phase II development. Thus, the total population increase from these three developments could be approximately 19,060 residents.

By increasing the population base, the proposed project would 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. Further, both phases of the Royal Kunia development include public facilities to meet the needs of the additional resident population.

Demographically, Royal Kunia residents would tend to have higher incomes in order to afford the newer units which would be higher-priced. More recent home buyers in Village Park already tend to have higher incomes and higher-paying jobs than earlier buyers. However, this trend could be tempered by income increases in current Village Park homeowners due to increased earning power as the residents become older, income increases due to appreciation of property values, and consequent higher incomes of resale purchases of the older Village Park homes.

It is likely that these developments would eventually develop a single identity similar to that of Mililani. The Mililani community is comprised of several neighborhoods which were developed separately over the years. Though some neighborhoods have distinctive design or unit characteristics, the overall community is one of cohesion. Neighborhoods are linked by a common roadway system, residents use common parks, and children attend the same schools. In time, it is expected that Village Park and the Royal Kunia development, which includes the Increment 3 project, would experience this same type of "blending in."

Both Village Park and Waipio-Gentry have residents who are very active in and have been integrated into Waipahu organizations. Currently, Village Park residents are requesting that a Waipahu Neighborhood Board sub-area be established for the Village Park/Royal Kunia communities. This change would help ensure that these particular mauka communities have a formal and direct voice in Board activities.

To further help the newer community residents integrate into Waipahu, the regional Waipahu organizations, such as the Waipahu Community Association and the Waipahu Neighborhood Board, can continue to actively solicit membership from the newer communities. The newer residents can help existing residents address issues common to the region, likewise, these organizations can help the newer communities solve its internal problems.

4.3.2 Housing

A market study was previously conducted for the entire Royal Kunia Phase II development by John Zapotocky, Consultant in 1992 as part of the development's application to the State Land Use Commission (Zapotacky 1992). The results of these studies indicated that the shortage of residential housing throughout the State of Hawaii in general, and on Oahu in particular, has been a growing problem for over a decade. These results were generally reinforced by an updated market study conducted by The Hallstrom Group which is included in Appendix B.

A review of trends of housing units developed over the past 30 years concluded that the supply of new housing units have not kept pace with the demand. State and City agencies estimated unit shortfalls ranging from 20,000 to 40,000 units while private studies suggested the shortfall may be as high as 50,000 units. Another area of housing shortfall is affordable units. A total of 63,000 affordable units would be needed by 2010, however, about 29,000 affordable units would be required due to a supply of less than 34,000 units.

The State's average household size has declined over the past 50 years from 4.46 persons in 1940 to 3.01 in 1990, and this trend is expected to continue driven primarily by demographic trends (Zapotacky 1992). Oahu vacancy rates in 1989 and 1990 were also at historic lows below 2 percent and well below the 5 percent considered adequate to provide homeowners and renters with mobility.

Representative of these trends, housing indicators for the Waipahu area shows that the proportion of "crowding" in these communities was generally higher than island-wide proportions. The Waipahu area households average 3.68 persons per unit which is larger than the island-wide average household size of 3.02 persons. In addition, over 13 percent of its housing units contain 1.0 to 1.5 persons per room which is an indicator of "mildly crowded" units. In comparison, only 8 percent of the housing units island-wide were mildly crowded. Further, 11 percent of the Waipahu area's housing units were in the "very crowded" category, as compared to only about 8 percent islandwide (Earthplan 1992).

The proposed project would contribute to the State's housing inventory by offering a broad range of unit types at various sizes and costs to both individuals and families. The project proposes to offer a total of 581 single-family residential units. These homes would be available to people of different income levels, and would be constructed to accommodate families of various sizes. Further, the project is not expected to increase speculation in land or housing.

4.3.3 Economic Factors

An economic study assessing the impact on City and State revenues and expenditures was performed by Decision Analysts Hawaii, Inc. and is included in Appendix F. This study incorporated the entire Phase II development along with refinements to the residential unit mix occurring with the Increment 3 project.

This study determined that State and City revenues to be derived from the Phase II development are expected to be significant, and sufficient to allow government to afford the capital improvements and services required to accommodate the development. Revenues are expected to be sufficient to: 1) finance park and school improvements, 2) provide the same level of per-unit services as currently provided to island residents, and 3) serve additional community needs with remaining net revenues.

At full development, City revenues derived from Phase II are projected to be about \$6.6 million per year, while expenditures needed to support the development will be about \$5.1 million. Thus, the City will receive annual net income of about \$1.5 million. State revenues generated by construction activity are estimated to be about \$43.2 million. At full development, State revenues are projected to be about \$27.7 million while expenditures needed to support the development will be about \$19.9 million. Thus, the State will receive annual net income of about \$7.8 million.

With the Increment 3 project, the residential mix for the 2,000 units already approved would shift toward the construction of a greater percentage of single-family units to meet changing market needs and demands. The construction of single-family units requires a longer construction effort (2 man-year per unit) than multi-family units (1.75 man-year per unit). Consequently, construction workers would be employed over a longer duration with the shift toward a greater percentage of single-family units resulting from the Increment 3 project. Under existing plans, the construction effort would result in about 3,700 man-years whereas 3,810 man-years would result due to the proposed project.

4.4 INFRASTRUCTURE

This section describes the project's probable effect on infrastructure serving the site and surrounding area which include: 1) water supply, 2) wastewater treatment, 3) drainage, 4) solid waste, and 5) transportation facilities.

With the exception of transportation, these facilities were addressed using the results of an engineering study prepared by ParEn, Inc. and included in Appendix G of this document. A traffic impact report was conducted by Julian Ng, Inc. for the Increment 3 project and is included in Appendix E of this application.

4.4.1 Water Supply

The Village Park Subdivision and a portion of the Royal Kunia Phase I development are presently serviced by the Board of Water Supply's (BWS) Kunia Wells No. 1, 2, and 3. Two water reservoirs in the area include the 440' Reservoir Site located along Kunia Road about 0.8 miles north of Village Park and the 665' Reservoir Site also along Kunia Road about 0.8 miles north of the Royal Kunia Phase I/Phase II border. The 440' Reservoir Site includes booster pumps with two reservoirs of 1.0 million gallons (mg) and 1.5 mg. The 665' Reservoir Site has a 1.5 mg reservoir. A 24-inch transmission main is routed along Kunia Road which reduces to a 16-inch main near the Phase II, Increment 1 site before increasing to 20 inches near the Phase I development.

Using the BWS's domestic consumption guidelines, the Increment 3 project would require an average daily demand of approximately 0.29 million gallons per day of potable water. This estimate was based upon a flow requirement of 500 gallons per unit per day for single-family dwellings.

To meet the increased demand for potable water from the Royal Kunia, Phase IB and Phase II developments which includes Increment 3, new well sources would be developed. Two wells, Well No. 4 and Well No. 5, would be developed along with a Granular Activated Carbon Treatment System for contaminant removal and booster pumps at the 440' Reservoir Site. In addition, a 2.0 mg storage tank constructed at the 665' Reservoir Site. Thus, the project should not result in a significant impact to water supply facilities serving the area. A Water Master Plan encompassing both Phase I and II was approved by the BWS in October 1992, and construction drawings for improvements associated with the project would be submitted for the BWS's review and approval.

4.4.2 Wastewater Treatment

The sewer system constructed for the Royal Kunia Phase I development along with a 24" sewer trunk line are existing facilities serving the surrounding area. Using the City's design standards for wastewater management, the Increment 3 project would generate an average wastewater flow of approximately 0.19 mgd. This estimate was based upon a flow requirement of 320 gallons per unit per day for single-family dwelling.

Wastewater generated by the project would be collected by a network of pipes constructed on the site which would then carry wastewater through the existing Phase I system to the Waipahu Pump Station on Depot Road. Wastewater would then be pumped from this pump station to the Honouliuli Wastewater Treatment Facility. This sewage is expected to be accommodated at the treatment facility after its expansion is completed in 1997. Thus, the project should not result in a significant impact to wastewater facilities serving the area. In addition, a Sewer Master Plan encompassing both Phase I and II was approved by the City in November 1993, and the project's sewer connection schedule would be coordinated with the Department of Wastewater Management's expansion of the treatment plant.

4.4.3 Drainage

The areas encompassing both the Royal Kunia Phase I and Phase II developments consist of six drainage basins. Of the runoff occurring within this region, 70 percent of the total drainage areas flow toward the Village Park Subdivision while the remaining 30 percent flow into Waikele Stream.

As previously discussed, the project site does not require special flood regulation since the property is designated Zone D under the FIRM. However, development of the project would increase surface runoff due to the construction of impervious surfaces such as roads and buildings. A September 1995 Drainage Master Plan for the entire Phase II development was approved by the City Department of Public Works, and a revised Master Plan was recently submitted to the department reflecting modifications to accommodate the Increment 3 project. In addition, improvements would be designed subject to City approval and constructed in accordance with their *Storm Drainage Standards* (DPW 1988).

Under proposed drainage improvements, about 50 percent of the runoff generated by with Increment 3 would flow into the Village Park drainage facilities. Another 10 percent of runoff, consisting mainly of agricultural runoff, would discharge into a gully and eventually into Waikele Stream.

The final 40 percent of runoff generated would be detained and diverted into a detention basin within the Phase II development. This runoff would then flow into a detention basin planned within the Increment 3 site which would eventually discharge into Waikele Stream. This planned drainage improvements have been approved by the Navy as part of the Royal Kunia Golf Course II Drainage Master Plan.

4.4.4 Solid Waste

Refuse collection is provided by the City for the Village Park Subdivision and for portions of the Royal Kunia Phase I development. Refuse from the Royal Kunia development is being taken to H-Power for disposal. Solid waste generated by the Increment 3 residential project is estimated to amount to about 4.6 tons per day. Upon completion and occupancy of the project, refuse collection for single-family units are expected to be provided by the City. To further reduce the amount refuse generated by the residential project, the development of a solid waste management plan would be coordinated with the City Division of Refuse and the State Department of Health. A recycling program may be one of the components of this plan.

4.4.5 Transportation Facilities

A traffic impact report was conducted by Julian Ng, Inc. for the Increment 3 project and is included in Appendix E of this application. This traffic report addresses the impact of the project on roadway conditions with and without the project. A separate Roadway Master Plan is being prepared to guide development of the roadway system within the residential area of Phase II. Regional roadway improvements have been addressed under a separate report prepared by the Ewa Region Highway Master Plan Working Group of which Halekua Development Corporation is a member.

Access to the Increment 3 site and entire Phase II development from Kunia Road would be from a major collector road. The results of the traffic study indicate that the major intersections along this Phase II Collector Road would operate at acceptable levels of service during peak hours with the project. Roadway right-of-ways planned to be provided would be suitable to accommodate the peak hour traffic from the entire Phase II development including the Increment 3 project. Other unsignalized intersections should adequately serve peak hour traffic demands. Thus, mitigative measures planned associated with Increments 1 and 2 should allow traffic conditions to operate at acceptable levels and thus not result in a significant impact.

4.5 PUBLIC FACILITIES AND UTILITIES

This section addresses the project's probable impact on public facilities and utilities serving the site which include: 1) school facilities, 2) recreational facilities, 3) medical and day care facilities, 4) electrical and communication, 5) police protection, and 6) fire protection.

4.5.1 School Facilities

Public schools serving the Royal Kunia Phase II development consist of Kaleiopuu Elementary School, Waipahu Intermediate School, and Waipahu High School. In addition, a new elementary school (Royal Kunia Elementary School) located within the Phase II, Increment 1 development is being planned for and projected to open in 1999 (DOE 1995). This new school would be situated on an 8-acre site, and is planned to accommodate a peak enrollment of about 880 students.

Using previous student projections provided by staff from the State Department of Education (DOE) for Royal Kunia, Phase II, it is estimated that the Increment 3 residential project would generate an estimated total of 341 students. Of this total, 221 students would attend elementary school (K - 6), 46 would attend intermediate school (7 and 8), and 74 would attend high school (9 - 12).

Impacts to school facilities for the entire Phase II development were addressed in the FEIS for Phase II (Wanket 1989) which initially proposed a total of 2,400 residential units. Previous approvals for Increments 1 and 2 allowed for a total of 2,000 units of which only 1,419 units are now planned based upon further planning and engineering. Thus, the Increment 3 project would develop the remaining allotted 581 units, and will not increase the total number of units already approved and addressed under previous environmental documents and studies.

Therefore, this Increment 3 project should not significantly increase the level of impacts on school facilities already addressed under documents prepared for Increments 1 and 2. Minor changes to the total projected students for the entire Phase II development may occur due to the refined composition of unit mix (single versus multi-family units), however, this change should have minimal if any impact on school facilities and mitigative measures already planned and being implemented.

Prior consultation with the DOE on Increments 1 and 2 determined that existing public schools serving Royal Kunia would become overcrowded with the completion of the Royal Kunia Phase I development, and surrounding elementary schools do not have room to accommodate the overflow of students. The coordination of measures needed to address improvements to school facilities have been occurring throughout the refinement of the various Phase II increments with the DOE. Consequently, the applicant has been and will continue to coordinate development plans and facility requirements with the DOE.

Recently, a joint field survey with DOE staff was organized to inspect the future Royal Kunia Elementary School site. This new elementary school should adequately accommodate students from all increments of the Royal Kunia Phase II development with space to accommodate overflow from Kaleiopuu Elementary School. Two new permanent buildings are also scheduled to be added to Kaleiopuu Elementary School by 1997 to accommodate the Phase I development. To address impacts on secondary schools, the applicant has been meeting and would continue to work with the DOE to determine acceptable fair-share contributions for facility improvements as indicated under the Unilateral Agreement for Increment 1 (Ordinance 95-08).

4.5.2 Recreational Facilities

Several park sites are being provided within the entire Royal Kunia development to meet the recreational needs of residents. Within the Phase I development, there are three park sites which include a 5.5- and 9.0-acre park site along with a 12.1-acre park and recreation center for Royal Kunia residents. In addition, there is a golf course included within the entire Royal Kunia development which provides additional recreational activities for residents along with considerable open space.

Within the Royal Kunia Phase II, Increment 1 development, a 10-acre public park is planned next to the elementary school site to serve residents of both the Increment 1 and 2 developments. This park is intended to meet the City's park dedication regulations which require about 9.5-acres for the entire Phase II development. As part of the Increment 3 project, another 10-acre park is planned along with considerable open space area which could be utilized for passive park use. Consequently, the project should not have a significant impact on parks and recreational facilities since sufficient park sites would be provided to serve area residents.

4.5.3 Medical And Day Care Facilities

In recognition of the population growth occurring in Central Oahu and Ewa, medical service providers have begun to move several of their services to these regions. The Saint Francis Medical Center-West and Kahi Mohala, a psychiatric treatment facility, are the nearest medical facilities to the project site. Kahi Mohala is a general community hospital which contains 136 acute care beds and has 130 resident physicians. This hospital offers X-ray, laboratory, obstetrics and emergency services. Saint Francis Medical Center-West has received State and City and County approvals to increase the land area and further develop the center according to its five-year master plan (WEW 1993). This master plan calls for a research and wellness/conference facility, office building, day care, skilled nursing facilities, and support facilities.

Other medical facilities in the surrounding region include the Pali Momi Medical Center which contains 116 beds, an ambulatory services center and a medical office building. Members of Kaiser Permanente Medical Care Program can obtain services from the Punawai Clinic in Waipahu, and the Wahiawa General Hospital serves residents of Central Oahu. Given these existing and expanding medical facilities, the Increment 3 residential project should not have a significant impact on these medical facilities serving the site and surrounding region. There are a number of facilities available for residents which presently provide a wide array of medical services.

A 30,000 square foot site for a child care facility (Ordinance 88-02) along with a large cash contribution (Ordinance 95-08) were committed to the City in compliance with previous Unilateral Agreements for Royal Kunia Phase I and Phase II, Increment 1, respectively. A Development Plan Amendment was also approved (Ordinance 88-114) for this facility. Thus, these child care facilities are intended for use by residents of the Increment 3 project along with residents from other phases of Royal Kunia. Consequently, the project should have minimal impact on this day care facility.

4.5.4 Electrical And Communication Facilities

Hawaiian Electric Company, Inc.'s (HECO) existing Kunia Makai Substation, located along Kunia Road, may be inadequate to provide sufficient electrical power to the Increment 3 project. Consequently, improvements would need to be constructed to serve the project. These improvements would include a new substation, a single overhead steel pole to extend two 46 kilovolt (kV) circuits, and a new 12 kV distribution circuit system from the new substation to the project site. With these planned improvements, there should be no significant impact to HECO's electrical facilities or ability to provide power.

Hawaiian Telephone Company (HTC) presently provides communication facilities for residents in the area and would continue to provide services to the Increment 3 project. Their existing substation is adequate to serve the entire Royal Kunia development (Phase I and II), thus, improvements would only involve extending communication lines to the units in the project site from a HTC remote office in Royal Kunia Phase I. As a result, the project should not have a significant impact on communication facilities.

4.5.5 Police Protection

The Pearl City Police Station presently serves the Waipahu, Ewa and Waianae areas of which the Increment 3 project site is situated within the Waipahu District, Beat 328. This "Beat" has one officer per watch, and assistance is provided by other officers assigned to the district. Recently an additional Beat was added due to the growing population in the area.

To improve supervision of beat officers and reduce travel times between patrol areas, a new regional police station is planned to be located in the City of Kapolei. A site for this facility was determined and placed on the City's Development Plan Public Facilities Map for Ewa in 1992 under Ordinance 92-28. The general area for this site is designated for either land acquisition or construction within six years, and located near the intersection of Farrington Highway with Fort Barrette Road.

The Increment 3 project would not increase the total number of units approved for Phase II, and thus would not increase the resident population over that already allowed. As a result, impacts to police protection would be similar to those already addressed under prior environmental studies including the FEIS for Phase II and the zone change application for Increment 1. To help deter crime, Village Park residents participate in a Neighborhood Security Watch Program which has been very effective (WEW 1993). The applicant would similarly encourage such programs for the Increment 3 project through the community association established for Royal Kunia, Phase II.

4.5.6 Fire Protection

Fire protection at the Increment 3 site would be provided by the Waipahu and Pearl City Fire Stations. The Waipahu Fire Station has an engine and a ladder company, and 12 people staff these companies in one 24-hour shift. The Pearl City Fire Station has an engine company and six fire fighters available in a 24-hour shift. In addition, backup protection would be provided by the Waiiau, Aiea and Moanalua Fire Stations, and possibly from the recently opened Kapolei Fire Station.

The project would not increase the total number of units approved for Phase II, and thus not increase the resident population over that already allowed. As a result, impacts to fire protection would be similar to those already addressed under prior environmental studies including the FEIS for Phase II and the zone change application for Increment 1. Therefore, the Increment 3 project is expected to have a minimal impact or change in the level of fire protection. Existing fire stations serving the site and surrounding area should not be adversely impacted, and should continue to provide adequate protection. Furthermore, the project would be developed in compliance with Article 10 of the Uniform Fire Code, and construction plans would be reviewed by the Fire Department for approval.

SECTION 5.0 CONFORMANCE WITH PLANS AND POLICIES

This section discusses the project's conformance with applicable plans and policies which include the State Land Use District Boundary Map, Hawaii State Plan, City's General Plan, Development Plan, Zoning requirements, and Chapter 343, Hawaii Revised Statutes.

5.1 STATE LAND USE DISTRICT BOUNDARY MAP

The 156.8-acre Increment 3 project site is currently designated "Urban" under the State's Land Use District Boundary Map for Schofield Barracks (O-5). As discussed in Section 1.2, the entire 504.8-acre Royal Kunia Phase II development was reclassified from the Agricultural to Urban district by the Land Use Commission under Docket No. A92-683 (LUC 1993). Consequently, the project is consistent with the State's Land Use District Boundary Map.

5.2 HAWAII STATE PLAN

The Hawaii State Plan (Chapter 226, HRS) consists of a series of goals, objectives, and policies which serve as a guide for the growth and development of the State. Principles or values integral to the overall theme of the Plan are: 1) individual and family self-sufficiency, 2) social and economic mobility, and 3) community or social well-being. This Plan details somewhat generalized objectives and policies in various areas such as population, the economy, physical environment, facility systems, and socio-cultural. The proposed residential project would be consistent with pertinent policies and objectives from this Plan.

5.3 COASTAL ZONE MANAGEMENT PROGRAM

The project would conform to and be consistent with applicable objectives and policies described under the State's Coastal Zone Management Program, Chapter 205A, HRS (State of Hawaii 1992b). The Increment 3 project will be consistent with the objectives identified under §205A-2 since many of the identified resources are not present on the project site or are not applicable to the residential project. Those policies relevant to the project are discussed below.

Policies (§205A-2(c))

- (1) Recreational Resources;
 - (B) Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:
 - (iv) Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation.
 - (vi) Adopting water quality standards and regulating point and nonpoint sources of pollution to protect and where feasible, restore the recreational value of coastal waters;

The entire Phase II development, which includes the proposed Increment 3 project, will comply with City requirements by providing park space for use by future Royal Kunia residents and the public. The Increment 3 site may also provide an additional 10-acre park subject to the requirements of other agencies. As shown on Figures 2.1 and 2.2, there is considerable open space and recreational facilities being provided within the entire Royal Kunia master-planned community.

Planned drainage improvements will be designed to control runoff, where feasible, and thus comply with policies protecting the recreational value of coastal waters. A revised drainage master plan addressing surface runoff will be prepared and submitted to the City for their review. Under this plan, a detention basin will be included and runoff discharging into Waialeale Stream will not increase over existing conditions.

- (2) Historic resources;
 - (A) Identify and analyze significant archaeological resources;
 - (B) Maximize information retention through preservation of remains and artifacts or salvage operations; and
 - (C) Support State goals for protection, restoration, interpretation, and display of historic resources.

The project will comply with policies regarding historic resources since the residential development have no effect on historic or archaeological resources.

- (3) Scenic and open space resources;
 - (A) Identify valued scenic resources in the coastal zone management area;
 - (B) Insure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;
 - (D) Encourage those developments which are not coastal dependent to locate in inland areas.

The project will comply with policies on scenic and open space resources. This Final EA identified visual resources pertinent to the project, and determined the residential development will not have a significant impact on these resources. Residential units would be developed in conformance to City Development Plan Special Provisions and *Land Use Ordinance (DLU 1994)* standards ensuring that structures are visually compatible with the environment. This residential project will also be located inland and represents the continuing phased development of Royal Kunia.

- (4) Coastal ecosystems;
 - (B) Preserve valuable coastal ecosystems of significant biological or economic importance;
 - (C) Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and
 - (D) Promote water quantity and quality planning and management practices which reflect the tolerance of fresh water and marine ecosystems and prohibit land and water uses which violate state water quality standards.

The project will comply with coastal ecosystem policies since there are none present on the site or in the immediate vicinity. Drainage improvements will be designed to control runoff, and will not increase peak discharge into Waikele Stream over existing conditions. Thus, these drainage improvements will minimize disruptions to the coastal water ecosystem and comply with State water quality standards.

- (5) Economic uses;
 - (C) Direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:
 - (i) Utilization of presently designated locations is not feasible;
 - (ii) Adverse environmental effects are minimized; and
 - (iii) Important to the State's economy.

This residential project will not conflict with economic policies since it is not a coastal dependent development, and is located inland. The Increment 3 development represents the continuing phased development of Royal Kunia on lands designated Urban under the State's Land Use District Boundary Map.

Section 5.0

- (6) Coastal hazards;
 - (B) Control development in areas subject to storm wave, tsunami, flood, erosion, and subsidence hazard;
 - (C) Ensure that developments comply with requirements of the Federal Flood Insurance Program; and
 - (D) Prevent coastal flooding from inland projects.

This residential project will comply with coastal hazard policies because it will not be located in flood designated areas nor subject to hazards along the shoreline. Drainage and other infrastructure improvements planned will be appropriately coordinated with and reviewed by the City to prevent coastal flooding.

- (7) Managing development;
 - (C) Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life-cycle and in terms understandable to the general public to facilitate public participation in the planning and review process.

This Final EA has been prepared under environment review procedures described under Chapter 343, HRS and Title 11, Chapter 200 of the Department of Health's Administrative Rules which allow for public review and participation. Consequently, the preparation of this Final EA and disclosure of impacts associated with the project comply with this policy on managing development.

5.4 GENERAL PLAN

The project would generally conform to and be consistent with applicable objectives and policies described under the City's *General Plan* (DGP 1992). Those objectives and policies pertinent to the project are provided greater discussion below.

Population

- Objective C: To establish a pattern of population distribution that will allow the people of Oahu to live and work in harmony.
- Policy 2: Encourage development within the secondary urban center at Kapolei and the Ewa and Central Oahu urban-fringe areas to relieve developmental pressures in the remaining urban-fringe and rural areas and to meet housing needs not readily provided in the primary urban center.
- 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 population densities are consistent with the character of development and environmental qualities desired for such areas.

The Increment 3 project is intended to offer a variety of housing to meet the existing and future residential needs of the island's growing population. The project's infrastructure would also be installed at the applicant's expense allowing City funds to be used for other critical public projects. Development of the Increment 3 project would be consistent with the urban expansion of Central Oahu to relieve developmental pressures in rural and urban fringe-areas. The project represents a refinement to the continuing phased development of Royal Kunia, and would be consistent with the character and quality of surrounding communities. The spreading out of units within Phase II associated with the Increment 3 project would assist in providing a more unique and better residential community along with a greater diversity of housing types and living space choices for residents.

Economic Activity

- Objective E: To prevent the occurrence of large scale unemployment.
Policy 1: Encourage the training and employment of present residents for currently available and future jobs.

The Increment 3 project would create several hundred construction-related jobs over several years. Thus, the development would provide many short-term jobs to minimize unemployment for residents.

Natural Environment

- Objective A: To protect and preserve the natural environment.
Policy 4: Require development projects to give due consideration to natural features such as slope, flood and erosion hazards, water recharge areas, distinctive land forms, and existing vegetation.
Policy 7: Protect the natural environment from damaging levels of air, water, and noise pollution.
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 areas.
Policy 3: Locate roads, highway, and other public facilities and utilities in areas where they will least obstruct important views of the mountains and the sea.

As discussed in this application, project's development would be consistent with these policies since it would not cause a significant impact to the natural environment due to mitigative measures implemented to adequately minimize disturbances. The project's design would also take into consideration the natural features of the property to minimize disruptions. Important scenic views along Kunia Road would be preserved and new views created due to the new public access allowed into this former

sugar cane fields. Appropriate setbacks and landscaping would further enhance this residential community's character and surrounding views of the area.

Housing

- Objective A: To provide decent housing for all the people of Oahu at prices they can afford.
- Policy 10: Promote the construction of affordable dwellings which take advantage of Oahu's year-round moderate climate.
- Policy 11: Encourage the construction of affordable homes within established low-density communities by such means as "ohana" units, duplex dwellings, and cluster development.
- 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 development that offers a variety of homes to people of different income levels and to families of various sizes.
- Policy 3: Encourage residential development near employment centers.
- Policy 5: Discourage residential development where roads, utilities, and community facilities cannot be provided at a reasonable cost.

Central Oahu has been a leader in providing quality housing for Oahu residents for many years. Housing developments along Kunia Road (Royal Kunia Phase I and Village Park) have provided homes suitable for first- and second-time buyers. The proposed Increment 3 project will continue this pattern of providing homes that are affordable to those from a wide range of income levels. The Increment 3 project would further increase the diversity in housing types, lot size, and other features within the entire Phase II development. 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.

This project would also be located near other employment centers included as part of the entire Royal Kunia development which include the light industrial park, commercial area, and agricultural park. In addition, the project site is located a short distance away from the Waipahu business district, and would be located relatively near the developing City of Kapolei. The surrounding area is already served by major infrastructure facilities, thus, necessary improvements to roadways, water and sewer systems, and other utilities servicing the site are reasonable and would be provided by the applicant.

Section 5.0

Physical 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 3: Phase the construction of new developments so that they do not require more regional supporting services than are available.
- 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 the development.
- Policy 6: Encourage the clustering of developments to reduce the cost of providing utilities and other public services.
- Objective D: To maintain those development characteristics in the urban-fringe and rural areas which make them desirable places to live.
- Policy 1: Develop and maintain urban-fringe areas as predominantly residential areas characterized by generally low rise, low density development which may include significant levels of retail and service commercial uses as well as satellite institutional and public uses geared to serving the needs of households.
- Policy 2: Coordinate plans for developments within the Ewa and Central Oahu urban-fringe areas with the State and Federal governments and with the sugar, pineapple, and other emerging agricultural industries.
- Objective E: To create and maintain attractive, meaningful, and stimulating environments throughout Oahu.
- Policy 5: Require new developments in stable, established communities and rural areas to be compatible with the existing communities and areas.

The Increment 3 project is an extension and continuation of the planned communities of Royal Kunia (Phase I and II) and Village Park. Consequently, the project would be compatible with these established communities by having a similar low-rise and low-density character. Further, the project would be designed appropriately to minimize infrastructure improvements and be compatible with the physical and social character of surrounding communities. Coordination with State and Federal agencies have been and would continue throughout the process. As such, necessary infrastructure and public facilities would be provided by the applicant to serve the project some of which have already been determined such as the agricultural park, school site, and park site.

5.5 DEVELOPMENT PLAN

5.5.1 Development Plan Land Use And Common Provisions

The project site is designated "Preservation" under the City's Central Oahu Development Plan Land Use Map, and was redesignated in 1992 with the intention of developing a then planned golf course. Consequently, this Development Plan Amendment application is being submitted for redesignating the site to "Residential" to allow the construction of 581 single-family units.

As previously discussed under Section 3.3, although designated Preservation, this property does not really satisfy the Development Plan Common Provisions defining Preservation lands (City 1994). Being fallow sugar cane land, this site generally does not meet the characteristics of normal preservation lands under this definition which include: 1) lands necessary for protecting watersheds or water resources, 2) conserving scenic and historic sites, 3) preserving wilderness, natural ecosystems, and sensitive wildlife, 4) being within areas subject to wave action, marine waters, flooding, and severe erosion, and 5) having slopes of 20 percent or more. Consequently, redesignating this site from Preservation to Residential should not significantly impact these characteristics normally associated with other properties designated Preservation.

5.5.2 Common Provisions - Urban Design Principles And Controls

The project would be consistent with the general urban design principles and controls (Section 24-1.4, ROH) under the Development Plan Common Provisions (City 1994). As discussed in another section, the project would not impact important public views from Kunia Road and would have visual characteristics consistent with other surrounding communities. Appropriate setbacks would be provided from roadways and utilities would be located underground. The project would include another 10-acre park and considerable open space areas which could be utilized for passive park use and detention. General height controls and other provisions would be followed. The various social impact factors, identified under Section 24-1.10, ROH, have been addressed under their respective sections in this application.

5.5.3 Central Oahu Special Provisions - Urban Design Principles

The project would be in conformance with the urban design principles and controls for Central Oahu (Section 24-5.2) which relate to open space, public views, height controls, and density controls (City 1994a). Open space viewing areas such as the Waianae mountains and agricultural fields, would be preserved with the project along with important public views from Kunia Road. The residential development would also conform with the height controls and density controls described under these urban design principles.

5.6 ZONING

The present zoning for the Increment 3 project site is AG-1 (Restricted Agricultural District). As a result, a zone change for this project from AG-1 to R-5 (Residential District) would be sought after receiving Development Plan approval from the Council. The single-family units planned would then be consistent with the principal uses permitted under the anticipated zoning district assigned to the site. Furthermore, the minimum development standards applicable to this project described under the *Land Use Ordinance* would be met which include minimum lot areas, yard setbacks, and height setbacks (DLU 1994).

SECTION 6.0 ALTERNATIVES CONSIDERED

Alternatives to the proposed project consisted of the No Action Alternative. Under this alternative, the 581 residential units planned for the site would not be constructed on the property. As a result, the project site would remain preservation and planned for a second golf course while the 581 units would be incorporated within the Increments 1 and 2 property. After consideration, this alternative would not be pursued since it would not be a feasible or viable alternative in meeting the objectives of the proposed project.

The market study, included in Appendix B, concluded that the proposed changes to the Royal Kunia Phase II master plan resulting from the Increment 3 proposal to be reasonable, market-supported, and a quality response in an effort to maximize land use efficiencies and competitiveness. Master plans are, by nature, living designs which must be allowed to evolve in order to achieve success in a market environment typified by cyclical movement and continuously changing demographics.

Land and infrastructure economics have resulted in steadily increasing densities throughout the Central Oahu and Ewa region. During this decade, only 5.3 percent (249) of the 4,699 single-family homes completed in Central Oahu and Ewa/Kapolei were within subdivisions having average lot sizes of 6,000 square feet or larger. Thus, while recognizing the economics of smaller lot sizes, the number one purchaser complaint has been the increasing density of the region. The overall effect of this has created a relatively standardized density format throughout the competitive market area with each project offering an exceptionally homogeneous "narrow band" of inventory. This limited choice of inventory diversity could pose a major market acceptance concern over the long term unless aggressive steps to provide a larger spectrum of product are implemented.

Surveys have demonstrated a significant number of potential home buyers prefer larger lot sizes for single-family homes, lessened densities for all residential product types, and less intense developments. Greater levels of household privacy, space to support future additions to the home, and areas for family recreational pursuits were the reasons most often cited for desiring a larger houselot. The desire among purchasers for larger lots in less dense communities is not surprising, nor is the reluctance on the part of buyers to pay a premium for such benefits.

Therefore, the Increment 3 project proposed would help achieve the applicant's objectives discussed below:

1. Lessened densities and larger lot sizes will provide both a diversity within the Royal Kunia development and offer a product-type currently highly successful, though generally undersupplied, in the regional marketplace.
2. By providing additional space for future home expansion, enhanced privacy, and room for more at-home activities, the inventory will directly appeal to the primary demographic group attracted to the subject project and area.
3. The home-buying public will benefit in several ways.
 - a. First, the average price of finished homes in Phase II will decrease by about 2 percent overall due to elimination of the previously planned premium-priced golf course-fronting lots in Increment 2.
 - b. Secondly, the additional lot area will enhance the value of the home at resale and make it more competitive in the open market.
 - c. Thirdly, larger lots in combination with expandable basic floor plans will allow homeowners to make incremental expansions or upgrades that will further increase the value of the residence upon resale.
4. Regional buyer surveys for moderate housing strongly indicate the vast majority of the Central Oahu and Ewa purchasers would rather spend limited housing dollars for larger homes and larger lots, than golf course fronting properties as would be provided under the present land use designations.
5. As the approvals are already in place for the 2,000 Phase II units, the master plan revision resulting from the Increment 3 proposal will not affect the balanced level of housing supply proposed for Central Oahu and Ewa, but is merely considered a response intended to increase competitiveness by harnessing evolving market forces.
6. The relatively more spread-out design for single-family lots will allow for greater levels of open space and wider roadways allowing on-street parking which were two buyer preferences repeatedly cited in surveys.

SECTION 7.0 PRELIMINARY DETERMINATION AND FINDINGS

7.1 PRELIMINARY DETERMINATION

This Draft EA includes an assessment of the probable environmental impacts resulting from the proposed Royal Kunia, Phase II, Increment 3 residential development. This assessment was conducted in conformance with the requirements of the State Department of Health's Administrative Rules, Title 11, Chapter 200 Environmental Impact Statement Rules.

A Final EIS was previously prepared and accepted by the State Office of Environmental Quality Control in 1989 which addressed the entire Royal Kunia Phase II development. This FEIS included the proposed development of a total of 2,400 residential units and covered about 670 acres of land which included the Increment 3 project site. As a result, environment impacts associated with the Increment 3 site have already been addressed and incorporated in this Final EA as appropriate. The Phase II FEIS also addressed the development of a total of 2,400 units (1,500 single-family and 900 multi-family) whereas only 2,000 units are now presently allowed on the Phase II area. Mitigative measures discussed in the FEIS are applicable to the Increment 3 project, and coordination with pertinent government agencies have been occurring throughout the progress of the Phase II increments.

Consequently, a Supplemental EIS is not warranted for the Increment 3 project because: 1) the proposed development addressed under the Phase II FEIS has not been substantially increased, 2) the intensity of environmental impacts associated with the Increment 3 residential development will not be increased, 3) mitigative measures discussed under the FEIS are being implemented and refined as further design plans are developed, and 4) no new circumstances have identified different or increased impacts not addressed under the FEIS.

Using the results of this assessment, the City Planning Department would determine whether an Environmental Impact Statement is warranted or that a Final EA be prepared for the probable issuance of a Negative Declaration. This determination would be based upon the 11 significance criteria listed under Section 11-200-12 of the State DOH's EIS Rules. Based upon the assessment results of this Final EA, the proposed Increment 3 residential project is not expected to cause a significant impact to the environment nor meet any of the 11 significance criteria, therefore, a Negative Declaration should be warranted.

7.2 FINDINGS AND REASONS SUPPORTING DETERMINATION

The findings and reasons which support the preliminary determination that a Negative Declaration is warranted are discussed below in terms of the 11 significance criteria.

1. Involves an irrevocable commitment to loss or destruction of any natural or cultural resource.

The project would not result in the irrevocable commitment to loss or destruction of any natural or cultural resource since there are none present on the project site. This site and has been extensively modified for use in sugar cane production for several years.

2. Curtails the range of beneficial uses of the environment.

The range of beneficial uses of the environment would not be curtailed by the Increment 3 residential project. The site is presently privately-owned and was used for sugar cane production which is now fallow. As a result, the present range of beneficial uses is limited to strictly agricultural production. With the project, this range of beneficial uses would be increased since the public would be able to purchase fee-simple homes and have access onto the site and surrounding area.

3. Conflicts with the State's long-term environmental policies or goals as expressed in Chapter 344, Hawaii Revised Statutes, and any revisions thereof and amendments thereto, court decisions or executive orders.

The project would not conflict with the State's long-term environmental policies or goals described in Chapter 344, HRS.

4. Substantially affects the economic or social welfare of the community or State.

As discussed in various sections of this Final EA, the project would not substantially affect the economic or social welfare of the Waipahu or Royal Kunia communities nor the State of Hawaii. This project would not increase the total number of units already approved for Royal Kunia, Phase II, therefore, there would be minimal, if any, changes or impacts on the projected resident population with Increment 3. The Waipahu Neighborhood Board and other community organizations have also been consistent in its public support of the Royal Kunia development. As with the already approved Increments 1 and 2, the Increment 3 project would be consistent with the community's desire for increased diversity of the community.

5. Substantially affects public health.

As discussed in the various environmental sections of this Final EA, the project would not substantially affect public health. Impacts resulting from the residential project would not be significant and would be mitigated by acceptable measures some of which are already being implemented as part of prior increments.

6. Involves substantial secondary impacts, such as population changes or effects on public facilities.

The project would be consistent with this criteria since the development would not increase the total number of units already approved by the City Council. As a result, there should be no substantial secondary impacts because there would be no change to the resident population above that already planned and assessed in other studies.

7. Involves a substantial degradation of environmental quality.

Based upon the study results described in this Final EA, the Increment 3 residential project would not involve a substantial degradation of environmental quality. Impacts identified would not be significant, and would be mitigated by measures discussed in this report. Furthermore, several of the required mitigation are already being implemented due to ongoing coordination efforts with agencies and the community for prior Phase II increments.

8. Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions.

The Increment 3 project would not have a cumulatively significant impact upon the environment nor would it involve a commitment for larger actions. As discussed under Section 1.0, this project represents the third increment of the entire Royal Kunia, Phase II development which was studied under a prior Final EIS accepted by the City. The project will not increase the total number of residential units already approved for Phase II, and only involves spreading out the development to utilize units not constructed with prior increments and to create a better unique residential community. This project site was already planned for use as a golf course, and the total number of units presently planned is considerably less than that initially proposed and studied under the Final EIS for Royal Kunia, Phase II.

9. Substantially affects a rare, threatened or endangered species, or its habitat.

The results of this Final EA have determined that there are no rare, threatened, or endangered species present on the Increment 3 project site or in the immediate area which may be affected by the residential development. The project site and surrounding area has been extensively modified for use in sugar cane production over several years. In addition, this site does not provide suitable or unique habitat for potential rare, threatened, or endangered species due to its existing agricultural use.

10. Detrimently affects air or water quality, or ambient noise levels.

The project would not detrimentally affect air quality, water quality, or ambient noise levels. As discussed under respective sections of this Final EA, impacts to these areas have already addressed under prior studies, and planned mitigative measures should adequately minimize these impacts.

11. Affects an environmentally sensitive area such as a flood plain, tsunami zone, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters.

The project would not affect environmentally sensitive areas since the site is not located within flood hazard areas, coastal waters, or other geologically hazardous land. The project would also be constructed in accordance with Federal, State, and City standards to minimize erosion, surface runoff, and other elements which may impact coastal waters.

SECTION 8.0 AGENCY AND COMMUNITY CONSULTATION

8.1 EARLY CONSULTATION COMMENTS

In conformance with the State DOH's EIS Rules (§11-200), early consultation was performed with various government agencies and community groups. Letters soliciting comments on the project were sent to the following agencies and community organizations listed below. However, due to the January 15, 1996 filing deadline for Development Plan Amendment Applications with the City Planning Department, no responses were received for inclusion in the Draft EA previously published. However, discussions with the Planning Department were conducted on the project to identify possible concerns and significance of impacts.

Since the publishing of the Draft EA, early consultation comments were received from the parties identified below, and a copy of these letters along with responses are provided in Appendix A of this Final EA. Comment letters received from various parties are identified with a "Δ" next to them.

STATE AGENCIES

- Department of Agriculture
- Δ Department of Education
- Department of Health
- Department of Human Services
- Department of Land and Natural Resources
- Department of Transportation
- Δ Land Use Commission
- Office of State Planning
- State Land Use Commission

CITY AND COUNTY OF HONOLULU AGENCIES

- Δ Board of Water Supply
- Δ Department of Housing and Community Development
- Department of Human Resources
- Δ Department of Land Utilization
- Δ Department of Parks and Recreation
- Δ Department of Public Works
- Δ Department of Transportation Services

CITY AND COUNTY OF HONOLULU AGENCIES (CONTINUED)

- Δ Department of Wastewater Management
- Δ Fire Department
- Planning Department
- Δ Police Department

COMMUNITY ORGANIZATIONS AND UTILITIES

- Δ Gasco, Inc.
- GTE Hawaiian Tel
- Δ Hawaiian Electric Company, Inc.
- Waipahu Neighborhood Board No. 22

8.2 DRAFT EA COMMENTS

The Draft EA, dated January 1996, was filed with the City Planning Department who subsequently filed the report with the State Office of Environmental Quality Control (OEQC). Notice of this Draft EA was initially published in the February 23, 1996 issue of OEQC's *Environmental Notice* initiating the 30-day public comment period. Copies of this Draft EA was distributed to the following agencies and community organizations for review and comment.

The deadline for receiving comments was March 26, 1996, and those responses received are identified below with a "Δ" next to them.. Copies of these comment letters along with responses are included in Appendix A of this report.

STATE AGENCIES

- Department of Agriculture
- Δ Department of Education
- Δ Department of Health
- Δ Department of Human Services
- Department of Land and Natural Resources
- Δ Department of Land and Natural Resources - Historic Preservation Division
- Δ Department of Transportation
- Δ Land Use Commission
- Δ Office of Environmental Quality and Control
- Δ Office of State Planning
- State Land Use Commission

CITY AND COUNTY OF HONOLULU AGENCIES

- Δ Board of Water Supply
- Δ Department of Housing and Community Development
- Δ Department of Human Resources
- Δ Department of Land Utilization
- Δ Department of Parks and Recreation
- Δ Department of Public Works
- Δ Department of Transportation Services
- Δ Department of Wastewater Management
- Δ Fire Department
- Δ Planning Department
- Δ Police Department

COMMUNITY ORGANIZATIONS AND UTILITIES

- Δ Gasco, Inc.
- Δ GTE Hawaiian Tel
- Δ Hawaiian Electric Company, Inc.
- Δ Waipahu Neighborhood Board No. 22
- Δ Ms. Patricia Tummons

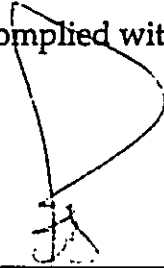
**SECTION 9.0
NOTIFICATION REQUIREMENTS**

In addition to the government agencies and community organizations listed under Section 8.0, Early Consultation, applicable property owners, lessees, sub-lessees, and residents of property abutting the project site were notified of the proposed Development Plan Amendment request in accordance with Ordinance 84-111.

Ordinance 84-111 states:

"No application for Development Plan Land Use Map amendment shall be accepted for processing unless the applicant notifies, by mail, all owners, lessees, sub-lessees and residents of the affected property and of each abutting parcel."

I hereby certify that I have complied with the notification requirements of Ordinance 84-111.



William E. Wanket, President

SECTION 10.0
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APPENDICES

APPENDIX A

Agency And Community Consultation

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

APPENDIX A-1

**Early Consultation
Comments And Responses**

Benjamin J. Cayetano
GOVERNOR

HERMAN M. AIZAWA, PH.D.
SUPERINTENDENT



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

OFFICE OF THE SUPERINTENDENT

January 31, 1996

Mr. William E. Wanket
William E. Wanket, Inc.
Kapolei Building, Suite 320
1001 Kamokila Boulevard
Kapolei, Hawaii 96707

Dear Mr. Wanket:

SUBJECT: Central Oahu Development Plan Land Use Map
Amendment; Royal Kunia, Phase II, Increment 3

Thank you for informing us about the subject amendment. The Department of Education (DOE) will still need to meet with you and Halekua Development Corporation to settle the issue of fair-share contributions.

A major part of the fair-share contribution is the dedication of an eight-(8) acre school site in the proposed development. Because of the size of the proposed development and its impact on the schools in the area, the developer's fair-share contribution will also include a cash contribution.

Please contact Mr. Lester Chuck, Director of the Facilities Branch, at 733-4862 to schedule a meeting.

Sincerely,

A handwritten signature in cursive script, appearing to read "Herman M. Aizawa".

Herman M. Aizawa, Ph.D.
Superintendent

HMA:hy

cc: A. Suga, OBS
A. Maeda, LDO
E. Ueda, SLUC
A. Mitsuda, OSP

Mr. Herman M. Aizawa
Superintendent
Department of Education
P.O. Box 2360
Honolulu, Hawaii 96804

WILLIAM
E.
WANKET
INC.
Land Use Consultant

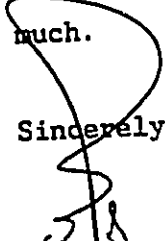
Dear Mr. Aizawa:

Subject: Central Oahu Development Plan Land Use Map
Application, Royal Kunia, Phase II, Increment 3

Thank you for your January 31, 1996 letter on the subject project. Attached is a copy of a March 11, 1996 letter from Halekua Development Corporation to Mr. Lester Chuck of your Department addressing your comments on the dedication of an eight-(8) acre school site and a fair share cash contribution. We will continue to coordinate with Mr. Lester Chuck to satisfy these requirements.

Your letter will be included in the Final Environmental Assessment being prepared. If you have any questions on this matter, please give me a call at 674-3517 or Mr. Ronald Sato of my office at 674-3515. Thank you very much.

Sincerely,


William E. Wanket
President

attachment

Kapolei Building, Suite 320 • 1001 Kamokila Boulevard • Kapolei, Hawaii 96707
Phone: (808) 674-3517 • Fax: (808) 674-1064



Halekua Development Corporation
2024 N. King St. • Honolulu, Hawaii 96819 • Telephone (808) 847-4241 • Fax (808) 848-2344

March 11, 1996

Mr. Lester Chuck
Facilities & Support Services Branch
State of Hawaii Department of Education
P.O. Box 2360
Honolulu, Hawaii 96804

Re: Royal Kunia Phase II

Dear Mr. Chuck,

Halekua hereby reaffirms its commitment to provide an 8-acre elementary school site as shown on the attached metes and bounds map. Also, please note I have asked our engineers to show the topographical features associated with the subject parcel.

Furthermore, as for the issue regarding the cash contribution to offset the remaining 4.9-acre assesment. Halekua will agree to pay the \$490,000 with the understanding that the money will be paid from proceeds derived from the closing of sales for each of the projected 2,000 total units subject to working the terms of a final agreement.

If the above is acceptable, I would appreciate receiving your written confirmation of such, or if you deem it more appropriate we could meet to discuss the matter. I will await your response.

Sincerely,

Albert D.K. Chee, Jr.

cc: Jan Sullivan
Bill Wanket

BENJAMIN J. CAYETANO
GOVERNOR



ESTHER UEDA
EXECUTIVE OFFICER

STATE OF HAWAII
DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM
LAND USE COMMISSION
Room 104, Old Federal Building
335 Merchant Street
Honolulu, Hawaii 96813
Telephone: 587-3822

January 25, 1996

Mr. William E. Wanket
William E. Wanket Inc.
Kapiolani Building, Suite 320
1001 Kamokila Blvd.
Kapolei, Hawaii 96707

Dear Mr. Wanket:

Subject: Central Oahu Development Plan Land Use Map
Amendment for Royal Kunia Phase II, Increment 3
(LUC Docket No. A92-683/Halekua Development
Corporation)

Thank you for your letter dated January 12, 1996, informing our office of proposed revisions to the Royal Kunia Phase II Master Plan.

It is our understanding that the revisions involve the redesignation of approximately 157 acres previously designated for golf course development to residential use. A 10-acre park and a 10-acre retention area for surface runoff are also proposed in lieu of the golf course. We further understand that the 157-acre site will accommodate a portion of the 2,000 housing units already approved in Phase II, and that no additional residential units are proposed.

We further understand that petitioner intends to file a motion to amend the Findings of Fact, Conclusions of Law, and Decision and Order issued in the subject docket pursuant to Section 15-15-70, Hawaii Administrative Rules.

Should you have any questions, please feel free to call me or Bert Saruwatari of our office at 587-3822.

Sincerely,

A handwritten signature in cursive script, appearing to read "Esther Ueda".

ESTHER UEDA
Executive Officer

EU:th

cc: OSP
Halekua Development Corp.
Jan Sullivan, Esq.

April 26, 1996

Ms. Esther Ueda
Executive Director
Land Use Commission
Room 104, Old Federal Bldg.
335 Merchant Street
Honolulu, Hawaii 96813

WILLIAM
E.
WANKET
INC.
Land Use Consultant

Dear Ms. Ueda:

Subject: Central Oahu Development Plan Land Use Map
Amendment, Royal Kunia, Phase II, Increment 3

Thank you for your January 25, 1996 letter on the subject project. Your understanding of the project and of the applicant's intent to file a motion before the Land Use Commission are correct.

Your letter will be included in the Final Environmental Assessment being prepared. If you have any questions on this matter, please give me a call at 674-3517 or Mr. Ronald Sato of my office at 674-3515. Thank you very much.

Sincerely,



William E. Wanket
President

Kapolei Building, Suite 320 • 1001 Kamokila Boulevard • Kapolei, Hawaii 96707
Phone: (808) 674-3517 • Fax: (808) 674-1064

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96843
PHONE (808) 527-6180
FAX (808) 533-2714



February 6, 1996

JEREMY HARRIS, Mayor

WALTER O. WATSON, JR., Chairman
MAURICE H. YAMASATO, Vice Chairman
KAZU HAYASHIDA
MELISSA Y.J. LUM
FORREST C. MURPHY
KENNETH E. SPRAGUE
BARBARA KIM STANTON

RAYMOND H. SATO
Manager and Chief Engineer

Mr. William E. Wanket
William E. Wanket, Inc.
1001 Kamokila Boulevard, Suite 320
Kapolei, Hawaii 96707

Dear Mr. Wanket:


Subject: Your Letters of January 12, 1996, Regarding Central Oahu Development Plan
Land Use Map Amendment Royal Kunia, Phase II, Increment 3

We have no objections to the proposed amendment. We have the following comments:

A revised water master plan should be submitted for our review and approval. The developer will be required to install all water facilities. The availability of water will be confirmed when the construction plans are submitted for our review and approval.

If you have any questions, please contact Barry Usagawa at 527-5235.

Very truly yours,


RAYMOND H. SATO
Manager and Chief Engineer

April 26, 1996

Mr. Raymond H. Sato
Manager and Chief Engineer
Board of Water Supply
630 Beretania Street
Honolulu, Hawaii 96843

**WILLIAM
E.
WANKET
INC.**

Land Use Consultant

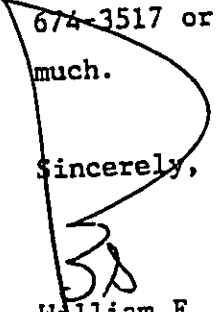
Dear Mr. Sato:

Subject: Central Oahu Development Plan Land Use Map
Application, Royal Kunia, Phase II, Increment 3

Thank you for your February 6, 1996 letter on the subject project stating no objections to the project. A revised water master plan will be submitted as requested, and the developer will install all water facilities.

Your letter will be included in the Final Environmental Assessment being prepared. If you have any questions on this matter, please call me at 674-3517 or Mr. Ronald Sato of my office at 674-3515. Thank you very much.

Sincerely,

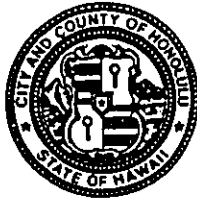

William E. Wanket
President

Kapolei Building, Suite 320 • 1001 Kamokila Boulevard • Kapolei, Hawaii 96707
Phone: (808) 674-3517 • Fax: (808) 674-1064

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 5TH FLOOR • HONOLULU, HAWAII 96813
PHONE: (808) 523-4427 • FAX: (808) 527-5498

JEREMY HARRIS
MAYOR



ROLAND D. LIBBY, JR.
DIRECTOR

ROBERT AGRES, JR.
DEPUTY DIRECTOR

February 14, 1996

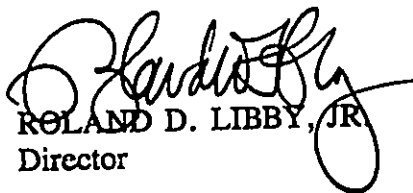
Mr. William E. Wanket
William E. Wanket, Inc.
1001 Kamokila Boulevard, Suite 320
Kapolei, Hawaii 96707

Dear Mr. Wanket:

Subject: Development Plan Land Use Amendment Application and
Draft Environmental Assessment for
Royal Kunia, Phase II, Increment 3

We have reviewed the subject document and have no comments at this time.

Sincerely,


ROLAND D. LIBBY, JR.
Director

cc: Planning Department

April 26, 1996

**WILLIAM
E.
WANKET
INC.**
Land Use Consultant

Mr. Roland D. Libby, Jr.
Director
Department of Housing and
Community Development
650 South King Street, 5th Fl.
Honolulu, Hawaii 96813

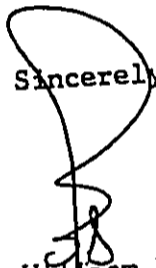
Dear Mr. Libby:

Subject: Central Oahu Development Plan Land Use Map
Amendment, Royal Kunia, Phase II, Increment 3

Thank you for your February 14, 1996 letter on the subject project stating that you have no comments at this time.

Your letter will be included in the Final Environmental Assessment being prepared. If you have any questions on this matter, please call me at 674-3517 or Mr. Ronald Sato of my office at 674-3515. Thank you very much.

Sincerely,

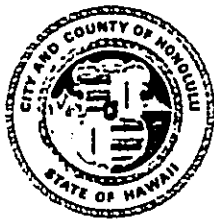


William E. Wanket
President

Kapolei Building, Suite 320 • 1001 Kamokila Boulevard • Kapolei, Hawaii 96707
Phone: (808) 674-3517 • Fax: (808) 674-1064

DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813 • (808) 523-4432



JEREMY HARRIS
MAYOR

PATRICK T. ONISHI
DIRECTOR

LORETTA K.C. CHEE
DEPUTY DIRECTOR
96-00300(rjm)

February 14, 1996

William E. Wanket, Inc.
Kapolei Building, Suite 320
1001 Kamokila Boulevard
Kapolei, Hawaii, 96707

Dear Mr. Wanket:

Central Oahu Development Plan Land Use Map Amendment
Royal Kunia, Phase II, Increment 3

Thank you for your request for comments of January 12, 1996. We note the proposal is to amend the development plan to redesignate approximately 157 from Preservation (proposed for a future golf course) to Residential, including a 10-acre park and 10-acre retention area for precipitation runoff.

We note that in its July 1989 comments on a related rezoning, the Navy supported the proposed golf course as an appropriate buffer between residential uses and an adjacent explosives safety zone. The nature of the explosives safety zone needs to be addressed prior to any approvals for a residential designation. Note that the proposed change in use will likely require amending the existing Unilateral Agreement, recorded in accordance with the conditional zoning for Ordinance No. 91-11, covering the subject property.

We presently have no other specific comments or unique requirements for this proposal.

If you have any questions, please contact Robert J. Mc Graw of our staff at 523-4817.

Very truly yours,

A handwritten signature in cursive script, reading "Patrick T. Onishi".

PATRICK T. ONISHI
Director of Land Utilization

PTO:lg
G:96-00300.RJM

February 15, 1996

Mr. Patrick T. Onishi
Director, Department of
Land Utilization, 7th Fl.
650 South King Street
Honolulu, Hawaii 96813

WILLIAM
E.
WANKET
INC.

Land Use Consultant

RE: ROYAL KUNIA, PHASE II, INCREMENT 3
1996 DEVELOPMENT PLAN AMENDMENT

Dear Mr. Onishi:

Thank you for your February 14, 1996 letter (96-00300 rjm) commenting on Halekua's request to amend the Central Oahu Development Plan Land Use Map for Increment 3 of the Royal Kunia Phase II development. Following is our response to your comments.

Safety Zone

Attached is a January 11, 1996 letter from the Department of the Navy stating that all ordnance has been removed from the Waikele Branch and it is no longer used for ordnance storage. Further, steps have been taken to obtain approval for the removal of the safety zone.

Unilateral Agreement, Ordinance 91-11

Ordinance 91-11 approved the zoning of the Royal Kunia Phase I development. The DP amendment being requested is for Increment 3 of the Royal Kunia Phase II development, and it is not part of Ordinance 91-11.

Again, thank you for your comments.

Sincerely,


William E. Wanket

attachment: Department of the Navy Letter

cc: Ms. Cheryl Soon, Director
Planning Department

Mr. Al Chee
Halekua Development

1001 Kamokila Blvd.
Kapolei Building
Suite 320
Kapolei, HI 96707
Phone
(808) 674-3517
Fax (808) 674-1064



DEPARTMENT OF THE NAVY

COMMANDER
NAVAL BASE PEARL HARBOR
BOX 110
PEARL HARBOR, HAWAII 96860-5020

IN REPLY REFER TO:

11000
Ser N4(203)/ 5819
11 Jan 96

Mr. Clarence K. Tanonaka
Assistant to the President
ParEn. Inc.
dba Park Engineering
Kawaihao Plaza, Suite 300
567 South King Street
Honolulu, HI 96813-3036

Dear Mr. Tanonaka:

Subj: ROYAL KUNIA PHASE II INCREMENT 3: PROPOSED STATE LAND USE CHANGE
(HALEKUA DEVELOPMENT CORPORATION)

In response to your letter of August 21, 1995, informing the Navy of the subject petition for zoning and land use change for the Royal Kunia Phase II, increments II and III, we are providing the following comments.

a. The proposed Royal Kunia Phase II, Increment 3 development borders the Waikēle Branch of Naval Magazine Lualualei. In the past, the Waikēle Branch mission was to receive, renovate, maintain, store, and issue ammunition and explosives for the Navy, Marine Corps, Army, and Air Force. Previous comments provided by the Navy regarding the Royal Kunia project were based on the premise that ordnance would continue to be stored and handled at the Waikēle Branch. As the Navy reacts to changing world events, dynamic forces shape and inevitably affect local conditions. Such has been the case with the Waikēle Branch of Naval Magazine Lualualei.

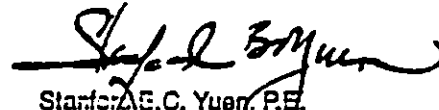
All ordnance has been removed from the Waikēle Branch and it is no longer used for ordnance storage. Although the explosives safety zones still remain along the station boundary, steps have been taken to obtain higher authority approval to disestablish them. The Navy is neither for, nor against, the proposed development; however, once the explosives safety zones cease to exist, our previous concerns and comments pertaining to civilian urban development adjacent to the Waikēle Branch are no longer applicable.

b. As your proposal did not address the effects of drainage on Waikēle Stream and Navy lands, we request that you coordinate future off-site drainage improvements with the Navy such that there be no increase in the amount, nor significant change in the nature, of storm runoff onto Navy land due to the development compared with what has been experienced with the subject lands in sugarcane cultivation.

Subj: ROYAL KUNIA PHASE II INCREMENT 3: PROPOSED STATE LAND USE CHANGE
(HALEKUA DEVELOPMENT CORPORATION)

We appreciate the opportunity to review the proposal and provide our comments.
Our point of contact is Mr. Stanford Yuen (N42) Facilities Engineer at
474-0439.

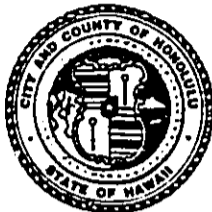
Sincerely,


Stanley E.C. Yuen, P.E.
By direction

DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813

JEREMY HARRIS
MAYOR



DONA L. HANAIKE
DIRECTOR
ALVIN K.C. AU
DEPUTY DIRECTOR

January 31, 1996

Mr. William E. Wanket
William E. Wanket, Inc.
Kapolei Building
1001 Kamokila Boulevard, Suite 320
Kapolei, Hawaii 96707

Dear Mr. Wanket:

Subject: 1996 Central Oahu Development Plan Annual
Amendment Review
Royal Kunia, Phase II, Increment 3

This responds to the subject proposed project for the 1996
Central Oahu Development Plan Annual Amendment Review (AAR).

We cannot, at this time, review or provide any substantial
comments on the subject amendment based on the inadequate
information that has been provided to us.

To better evaluate the impacts of your project, we request
that a copy of your AAR land use application and environmental
assessment be forwarded to our department for review.

Should you have any further questions on the matter, please
contact Brian Suzuki of our Advance Planning Branch at 527-6316.

Sincerely,

A handwritten signature in black ink, appearing to read "Dona L. Hanaike", is written over a horizontal line.

For DONA L. HANAIKE
Director

DLH:ei

cc: Planning Department

We Add Quality to Life

April 29, 1996

Ms. Dona L. Hanaïke
Director
Department of Parks and
Recreation
650 South King Street
Honolulu, Hawaii 96813

WILLIAM
E.
WANKET
INC.
Land Use Consultant

Dear Ms. Hanaïke:

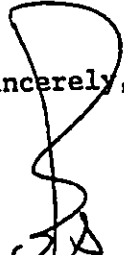
Subject: Central Oahu Development Plan Land Use Map
Amendment, Royal Kunia, Phase II, Increment 3

Thank you for your January 31, 1996 letter on the subject project. A copy of the application and draft environmental assessment was forwarded to your office for review.

We are currently reviewing the comments you submitted on the document, dated February 26, 1996, and we will respond to the comments in a separate letter.

Your letter will be included in the Final Environmental Assessment being prepared. If you have any questions on this matter, please give me a call at 674-3517 or Mr. Ronald Sato of my office at 674-3515. Thank you very much.

Sincerely,

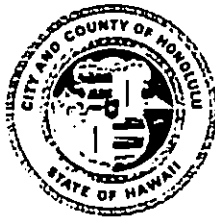

William E. Wanket
President

Kapolei Building, Suite 320 • 1001 Kamokila Boulevard • Kapolei, Hawaii 96707
Phone: (808) 674-3517 • Fax: (808) 674-1064

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813

JEREMY HARRIS
MAYOR



KENNETH E. SPRAGUE
DIRECTOR AND CHIEF ENGINEER

IN REPLY REFER TO:

96-14-0096

February 6, 1996

Mr. William E. Wanket
William E. Wanket, Inc.
Kapolei Building
1001 Kamokila Boulevard, Suite 320
Kapolei, Hawaii 96707

Dear Mr. Wanket:

Subject: Your Letter of January 12, 1996, Relating to Central Oahu Development
Plan Land Use Map Amendment, Royal Kunia, Phase II, Increment 3
TMK: 9-4-02: Por.1

We have reviewed your submitted letter and location map for the proposed
Development Plan Amendment and have the following comments:

ENGINEERING:

The Drainage Master Plan should be updated to reflect the change in land use. Should
there be any questions, please call Dennis Toyama at 523-4756.

All roads and improvements to be dedicated to the City shall comply with City
standards and the Americans with Disabilities Act Accessibility Guidelines. Should
there be any questions, please contact Faith Kunimoto at 527-5084.

Refuse Collection:

We can provide refuse collection service for residential developments, provided that the
site improvements meet City standards and the Refuse Division is notified in writing at
least 12 months prior to when rubbish collection is expected to begin. The notification
shall include an approximate schedule for occupancy. The approval for service will be
void if occupancy is delayed for more than 12 months. We will provide 3-cubic yard
container service for multi-family developments.

Mr. William E. Wanket
Page 2
February 6, 1996

The construction drawings for any non-City standard site improvements such as roadways for single-family cluster developments and roadways/parking lots for townhouse developments should be submitted for our review and approval. Should there be any questions, please call David Shiraishi at 527-5697.

Very truly yours,


KENNETH E. SPRAGUE
Director and Chief Engineer

April 26, 1996

Mr. Kenneth E. Sprague
Director and Chief
Engineer, Department of
Public Works
650 South King Street
Honolulu, Hawaii 96813

WILLIAM
E.
WANKET
INC.
Land Use Consultant

Dear Mr. Sprague:

Subject: Central Oahu Development Plan Land Use Map
Application, Royal Kunia, Phase II, Increment 3


Thank you for your February 6, 1996 letter on the subject project.

The drainage master plan will be updated and all dedicated roads and improvements will comply with City standards and the Americans with Disabilities Act Accessibility Guidelines.

The developer will comply with all refuse collection service standards and requirements, and construction drawings for any non-City standard site improvements will be submitted to your office for review and approval.

Your letter will be included in the Final Environmental Assessment being prepared. If you have any questions on this matter, please give me a call at 674-3517 or Mr. Ronald Sato of my office at 674-3515. Thank you very much.

Sincerely,


William E. Wanket
President

Kapolei Building, Suite 320 • 1001 Kamokila Boulevard • Kapolei, Hawaii 96707
Phone: (808) 674-3517 • Fax: (808) 674-1064

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU

PACIFIC PARK PLAZA
711 KAPIOLANI BOULEVARD, SUITE 1200
HONOLULU, HAWAII 96813



JEREMY HARRIS
MAYOR

CHARLES O. SWANSON
DIRECTOR

TSP1/96-00243R

February 13, 1996

Mr. William E. Wanket
William E. Wanket, Inc.
1001 Kamokila Boulevard
Kapolei Building, Suite 320
Kapolei, Hawaii 96707

Dear Mr. Wanket:

Subject: Central Oahu Development Plan Land Use Map Amendment
Royal Kunia, Phase II, Increment 3; Hoaeae-Waikele, Oahu


Thank you for your letter of January 12, 1996 notifying us of Halekua Development Corporation's request to amend the Development Plan Land Use Map to reflect a change from Preservation to Residential use of 157 acres.

On the basis that there would be no increase from the previous designation in the number of units to be developed, we have no objections to amending the Development Plan.

Thank you for giving us the opportunity to review and comment on this project. When the roadway master plan that reflects the residential and park area circulation becomes available, we would like to again review the project.

If you have any questions, please contact Bruce Nagao of the Transportation Systems Planning Division at 527-6899.

Respectfully,


CHARLES O. SWANSON
Director

April 26, 1996

Mr. Charles O. Swanson
Director
Department of Transportation
Services, Suite 1200
711 Kapiolani Blvd.
Honolulu, Hawaii 96813

WILLIAM
E.
WANKET
INC.
Land Use Consultant


Dear Mr. Swanson:

Subject: Central Oahu Development Plan Land Use Map
Application, Royal Kunia, Phase II, Increment 3

Thank you for your February 13, 1996 letter on the subject project stating that you have no objections to the amendment. As requested, a roadway master plan will be submitted to your office for review.

Your letter will be included in the Final Environmental Assessment being prepared. If you have any questions on this matter, please give me a call at 674-3517 or Mr. Ronald Sato of my office at 674-3515. Thank you very much.

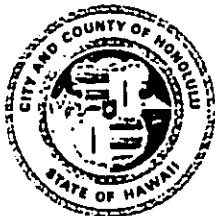
Sincerely,


William E. Wanket
President

Kapolei Building, Suite 320 • 1001 Kamokila Boulevard • Kapolei, Hawaii 96707
Phone: (808) 674-3517 • Fax: (808) 674-1064

DEPARTMENT OF WASTEWATER MANAGEMENT
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813



JEREMY HARRIS
MAYOR

FELIX B. LIMTIACO
DIRECTOR

CHERYL K. OKUMA-SEPE
DEPUTY DIRECTOR

In reply refer to:
WCC 96-14

February 2, 1996

Mr. William E. Wanket
1001 Kamokila Blvd.
Kapolei Building, Suite 320
Kapolei, Hawaii 96707

Dear Mr. Wanket:

Subject: **Central Oahu Development Plan Land Use Map Amendment**
Royal Kunia, Phase II, Increment 3

We have no objections to the proposal to change the Royal Kunia, Phase II master plan by redesignating about 157 acres from Preservation (previously proposed for a future golf course) to Residential. However, we require the following:

- (1) Update the previously approved Royal Kunia Wastewater Master Plan to reflect the changes.
- (2) Verify that the Royal Kunia Offsite Sewer line is able to accommodate the changes.

We understand that the amendment will not increase the 2,000 housing units originally proposed for the Royal Kunia, Phase II development. The purpose of the amendment is to spread these 2,000 units over a larger area which will permit the developer to design a more attractive residential environment with amenities that currently are not available in the market place.

If you have any questions, please contact Ms. Tessa Yuen of the Service Control Branch at 523-4956.

Very truly yours,

A handwritten signature in black ink, appearing to read "Felix B. Limtiaco", is written over a circular stamp.

FELIX B. LIMTIACO
Director

April 26, 1996

Mr. Felix B. Limtiaco
Director
Department of
Wastewater Management
650 South King Street
Honolulu, Hawaii 96813

WILLIAM
E.
WANKET
INC.
Land Use Consultant

Dear Mr. Limtiaco:

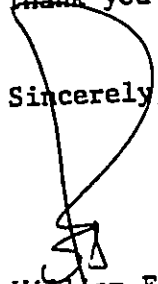
Subject: Central Oahu Development Plan Land Use
Application, Royal Kunia, Phase II, Increment 3

Thank you for your February 2, 1996 letter on the above project noting no objections to the project, and requiring certain information. The information being requested will be provided.

Your letter will be included in the Final Environmental Assessment being prepared. If you have any questions on this matter, please give me a call or Mr. Ronald Sato of my office at 674-3515.

Thank you very much.

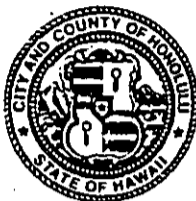
Sincerely,


William E. Wanket
President

Kapolei Building, Suite 320 • 1001 Kamokila Boulevard • Kapolei, Hawaii 96707
Phone: (808) 674-3517 • Fax: (808) 674-1064

FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU

3375 KOAPAKA STREET, SUITE H425
HONOLULU, HAWAII 96819-1869



JEREMY HARRIS
MAYOR

ANTHONY J. LOPEZ, JR.
FIRE CHIEF

ATTILIO K. LEONARDI
FIRE DEPUTY CHIEF

February 6, 1996

Mr. William E. Wanket
William E. Wanket, Inc.
1001 Kamokila Boulevard
Kapolei Building, Suite 320
Kapolei, Hawaii 96707

Dear Mr. Wanket:

Subject: Central Oahu Development Plan Land Use Map Amendment
Royal Kunia, Phase II, Increment 3

We have reviewed the subject material provided and foresee no adverse impact in Fire Department facilities or services. Fire protection services provided from Waipahu and Pearl City engine companies with ladder service from Waipahu are adequate.

Access for fire apparatus, water supply and building construction shall be in conformance to existing codes and standards.

Should you have any questions, please call Assistant Chief Arthur Ugalde of our Administrative Services Bureau at 831-7774.

Sincerely,


ANTHONY J. LOPEZ, JR.
Fire Chief

AJL/JKP:ny

April 26, 1996

Mr. Anthony J. Lopez, Jr.
Fire Chief
Fire Department
3375 Koapaka Street
Suite H425
Honolulu, Hawaii 96819-1869

WILLIAM
E.
WANKET
INC.
Land Use Consultant

Dear Mr. Lopez:

Subject: Central Oahu Development Plan Land Use Map
Amendment, Royal Kunia, Phase II, Increment 3

Thank you for your February 6, 1996 letter on the subject project noting that no adverse impacts on the Fire Department facilities or services are expected. Access for fire apparatus, water supply and building construction will be in conformance to existing codes and standards.

Your letter will be included in the Final Environmental Assessment being prepared. If you have any questions on the matter, please call me at 674-3517 or Mr. Ronald Sato of my office at 674-3515. Thank you very much.

Sincerely,

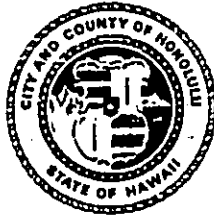


William E. Wanket
President

Kapolei Building, Suite 320 • 1001 Kamokila Boulevard • Kapolei, Hawaii 96707
Phone: (808) 674-3517 • Fax: (808) 674-1064

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU

801 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96813 - AREA CODE (808) 529-3111



JEREMY HARRIS
MAYOR

MICHAEL S. NAKAMURA
CHIEF

HAROLD M. KAWASAKI
LEE DONOHUE
DEPUTY CHIEFS

OUR REFERENCE BS-DL

January 19, 1996

Mr. William E. Wanket
President
William E. Wanket Inc.
Kapolei Building, Suite 320
1001 Kamokila Boulevard
Kapolei, Hawaii 96707

Dear Mr. Wanket:


We have received your letter dated January 12, 1995, concerning an amendment to the Central Oahu Development Plan Land Use Map for the Royal Kunia, Phase II, Increment 3.

This amendment should have no significant impact on the operations of the Honolulu Police Department.

Thank you for the opportunity to comment.

Sincerely,

MICHAEL S. NAKAMURA
Chief of Police

By 
EUGENE UEMURA, Assistant Chief
Administrative Bureau

April 26, 1996

Mr. Michael S. Nakamura
Chief of Police
Police Department
801 South Beretania Street
Honolulu, Hawaii 96813

WILLIAM
E.
WANKET
INC.
Land Use Consultant


Dear Mr. Nakamura:

Subject: Central Oahu Development Plan Land Use Map
Amendment, Roval Kunia, Phase II, Increment 3

Thank you for your January 19, 1996 letter on the subject project. We note that you feel the amendment should have no significant impact on the operations of the Honolulu Police Department. Your letter will be included in the Final Environmental Assessment being prepared.

If you have any questions on this matter, please give me a call at 674-3517 or Mr. Ronald Sato of my office at 674-3515. Thank you very much.

Sincerely,


William E. Wanket
President

Kapolei Building, Suite 320 • 1001 Kamokila Boulevard • Kapolei, Hawaii 96707
Phone: (808) 674-3517 • Fax: (808) 674-1064



BHP Hawaii

February 13, 1996

William E. Wanket, Inc.
Kapolei Building, Suite 320
1001 Kamokila Boulevard
Kapolei, Hawaii 96707

Attention: Mr. William E. Wanket

Gentlemen:

Subject: Draft Environmental Assessment for
Royal Kunia, Phase II, Increment 3

Please be advised that BHP Gas Company has no underground utility gas facilities in the project vicinity.

Thank you for the opportunity to comment on the Draft Environmental Assessment. Should there be any questions, or if additional information is desired, please call me at 594-5574.

Very truly yours,

A handwritten signature in black ink, appearing to read "Keith K. Yamamoto".

Keith K. Yamamoto
Supervisor, Engineering

KKY:kry
96-128

cc: Ms. Cheryl Soon, Planning Department, City and County of Honolulu

April 26, 1996

Mr. Keith K. Yamamoto
Supervisor, Engineering
BHP Gas Company
515 Kamakee Street
P.O. Box 3379
Honolulu, Hawaii 96842

WILLIAM
E.
WANKET
INC.
Land Use Consultant

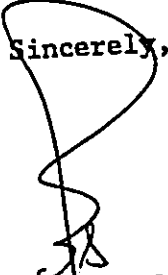
Dear Mr. Yamamoto:

Subject: Central Oahu Development Plan Land Use Map
Application, Royal Kunia, Phase II, Increment 3

Thank you for your February 13, 1996 letter on the subject project advising that BHP Gas Company has no underground utility gas facilities in the project vicinity.

Your letter will be included in the Final Environmental Assessment being prepared. If you have any questions on this matter, please give me a call at 674-3517 or Mr. Ronald Sato of my office at 674-3515. Thank you very much.

Sincerely,


William E. Wanket
President

Kapolei Building, Suite 320 • 1001 Kamokila Boulevard • Kapolei, Hawaii 96707
Phone: (808) 674-3517 • Fax: (808) 674-1064



William A. Bonnet
Manager
Environmental Department

February 22, 1996

William E. Wanket
William E. Wanket Inc.
1001 Kamokila Blvd.
Kapolei Building, Suite 320
Kapolei, Hawaii 96707

Dear Mr. Wanket:

Subject: Central Oahu Development Plan Amendment

Thank you for the opportunity to comment on your January 12, 1996 Plan Amendment for the Central Oahu Development project, as proposed by Halekua Development Corporation. We have reviewed the subject document and would like to point out that there is a 12kV and a 46kV line presently cutting through the proposed area that may require UG conversion. Our point of contact for this project, and the originator of these comments, is William Muench (543-5657). I suggest your staff and consultants deal directly with William to coordinate HECO's continuing input on this project.

HECO shall reserve further comments pertaining to the protection of existing powerlines bordering the project area until construction plans are finalized. Again, thank you for the opportunity to comment on this amendment.

Sincerely,

April 26, 1996

**WILLIAM
E.
WANKET
INC.**

Land Use Consultant

Mr. William A. Bonnet
Manager, Environmental
Department, Hawaiian
Electric Company, Inc.
P.O. Box 2750
Honolulu, Hawaii 96840-0001

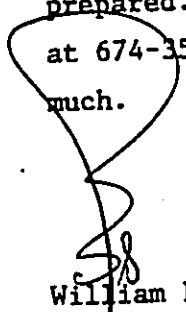
Dear Mr. Bonnet:

Subject: Central Oahu Development Plan Land Use Map
Application, Royal Kunia, Phase II, Increment 3

Thank you for your February 22, 1996 letter on the subject project advising that there is a 12kV and a 46kV line presently cutting through the proposed area that may require UG conversion.

As suggested, we will coordinate with Mr. William Muench of your company as the project continues through the permit approval stages.

Your letter will be included in the Final Environmental Assessment being prepared. If you have any questions on this matter, please give me a call at 674-3517 or Mr. Ronald Sato of my office at 674-3515. Thank you very much.


William E. Wanket
President

Kapolei Building, Suite 320 • 1001 Kamokila Boulevard • Kapolei, Hawaii 96707
Phone: (808) 674-3517 • Fax: (808) 674-1064

APPENDIX A-2

**Draft EA
Comments And Responses**

Benjamin J. Cayetano
GOVERNOR

HERMAN M. AIZAWA, PH.D.
SUPERINTENDENT



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

OFFICE OF THE SUPERINTENDENT

March 8, 1996

Mr. William E. Wanket
William E. Wanket, Inc.
Kapolei Building, Suite 320
1001 Kamokila Boulevard
Kapolei, Hawaii 96707

Dear Mr. Wanket:

SUBJECT: Development Plan Land Use Amendment Application
and Draft Environmental Assessment for Royal Kunia,
Phase II Increment 3; Hoaeae and Waikele, Oahu

We have reviewed the subject draft environmental assessment and have the following comments:

1. The new elementary school projected for 1999 has been pushed back to the year 2001 pending the availability of legislative funding.
2. The Department of Education will request to the County that the subdivision plans be approved by the DOE prior to obtaining the necessary approvals from the County.
3. The developer will provide fair-share contributions in the form of land and/or cash to the satisfaction of the Department of Education to meet the facility needs of the schools in the Waipahu Complex as stated in Ordinance 95-08.

We have no other comments at this time. Should there be any questions, please call the Facilities Branch at 733-4862.

Sincerely,

A handwritten signature in cursive script, appearing to read "Herman M. Aizawa".

Herman M. Aizawa, Ph.D.
Superintendent

HMA:hy

cc: A. Suga, OBS
A. Maeda, LDO
P. Onishi, OSP
D. Griffin, DPR, C&C

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

May 15, 1996

Mr. Herman M. Aizawa
Superintendent
Department of Education
P.O. Box 2360
Honolulu, Hawaii 96804

WILLIAM
E.
WANKET
INC.
Land Use Consultant

Dear Mr. Aizawa:

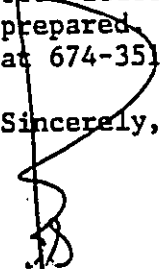
Subject: Royal Kunia, Phase II, Increment 3

Thank you for your March 8, 1996 letter on the subject project.

The revised schedule for the new elementary school has been noted, as well as your comments on the processing of subdivision plans and compliance with Ordinance 95-08. Regarding the latter, we continue to coordinate the requirements of Ordinance 95-08 with your office.

Your letter will be included in the Final Environmental Assessment being prepared. If you have any questions on this matter, please give me a call at 674-3517 or Mr. Ronald Sato of my office at 674-3515. Thanks.

Sincerely,


William E. Wanket
President

Kapolei Building, Suite 320 • 1001 Kamokila Boulevard • Kapolei, Hawaii 96707
Phone: (808) 674-3517 • Fax: (808) 674-1064

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII



LAWRENCE MIKE
DIRECTOR OF HEALTH

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

In reply, please refer to:

May 9, 1996

92-346C/epo

Mr. William E. Wanket
President
William E. Wanket Inc.
1001 Kamokila Boulevard
Kapolei Building, Suite 320
Kapolei, Hawaii 96707

Dear Mr. Wanket:

Subject: Development Plan Land Use Amendment Application
Draft Environmental Assessment (DEA)
Royal Kunia, Phase II, Increment 3
Hoaeae and Waikele, Oahu
TMK: 9-4-02: Por. of 1

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

Solid Waste

The DEA estimates the volume of solid waste which may be generated by this residential increment and states that recycling may be a component of a solid waste management plan.

The DEA also cites the Waipahu Incinerator as a disposal option, however, the Incinerator has been closed for sometime. The City and County of Honolulu is working to achieve a recycling and diversion goal of fifty percent of its waste stream by the year 2000. Presently, trucks with large quantities of yard trimmings and corrugated cardboard are banned from its disposal facilities, and therefore, recycling must be an element of any new development.

The Department of Health requests that the developer commit to providing space for collection of recyclable materials within the development. Furthermore, we request that the developer commit to incorporating locally produced compost for soil amendment and landscaping purposes, as well as using recycled content building materials whenever possible. Glasphalt may be used for road paving purposes, and recycled plastic lumber, produced in Hawaii, is a weather resistant building material.

Mr. William E. Wanket
May 9, 1996
Page 2

92-346C

Should you have any questions, please contact Ms. Carrie McCabe
of the Office of Solid Waste Management at 586-4240.

Sincerely,



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

c: OSWM
C&C Planning Department

01 02 03 04 05 06 07 08 09 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

May 17, 1996

**WILLIAM
E.
WANKET
INC.**

Land Use Consultant

Mr. Bruce S. Anderson
Deputy Director for
Environmental Health
Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801

Dear Mr. Anderson:

Subject: Royal Kunia, Phase II, Increment 3

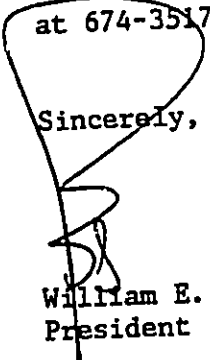
Thank you for your May 9, 1996 letter on the subject project. We respond to your comments as follows.

Refuse for the Royal Kunia area is being taken to H-Power. The report will be revised accordingly.

Through an unilateral agreement, made part of Ordinance 95-08, the developer has already committed to provide space for the collection of recyclable materials within the Royal Kunia Phase 2 development. Further, whenever possible, locally produced compost, as well as recycled content building materials and plastic lumber, and glasphalt will be used.

Your letter will be included in the Final Environmental Assessment being prepared. If you have any questions on this matter, please give me a call at 674-3517 or Mr. Ronald Sato of my office at 674-3515. Thanks.

Sincerely,


William E. Wanket
President

Kapolei Building, Suite 320 • 1001 Kamokila Boulevard • Kapolei, Hawaii 96707
Phone: (808) 674-3517 • Fax: (808) 674-1064

BENJAMIN J. CAYETANO
GOVERNOR



SUSAN M. CHANDLER, M.S.W., Ph.D.
DIRECTOR

KATHLEEN G. STANLEY
DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF HUMAN SERVICES
1390 Miller Street
Honolulu, Hawaii 96813

March 27, 1996

Mr. William E. Wanket
William E. Wanket, Inc.
Kapolei Building, Suite 320
1001 Kamokila Boulevard
Kapolei, Hawaii 96707

Subject: Development Plan Land Use Amendment Application & Draft
Environmental Assessment for the Royal Kunia

Thank you for the opportunity to review this document. We have no comments to offer at this time.

Sincerely,

A handwritten signature in cursive script that reads "Kathleen G. Stanley".

For Susan M. Chandler, M.S.W., Ph.D.
Director

c: Ms. Cheryl Soon, Chief Planning Officer
Planning Department
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

AN EQUAL OPPORTUNITY AGENCY

May 14, 1996

Ms. Susan M. Chandler
Director
Department of Human Services
1390 Miller Street
Honolulu, Hawaii 96813

WILLIAM
E.
WANKET
INC.
Land Use Consultant

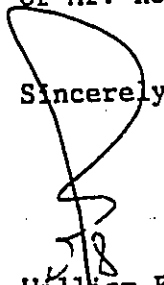
Dear Ms. Chandler:

Subject: Royal Kunia, Phase II, Increment 3

Thank you for your March 27, 1996 letter on the subject project, advising that you have no comments to offer at this time. Your letter will be included in the Final Environmental Assessment being prepared.

If you have any questions on this matter, please give me a call at 674-3517 or Mr. Ronald Sato of my office at 674-3515. Thanks.

Sincerely,


William E. Wanket
President

Kapolei Building, Suite 320 • 1001 Kamokila Boulevard • Kapolei, Hawaii 96707
Phone: (808) 674-3517 • Fax: (808) 674-1064

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

MICHAEL O. WILSON, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTY
GILBERT COLOMA-AGARAN

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

February 22, 1996

Mr. William E. Wanket, President
William E. Wanket Inc.
1001 Kamokila Blvd. Suite 320
Kapolei, HI 96707

LOG NO: 16531 ✓
DOC NO: 9602EJ29

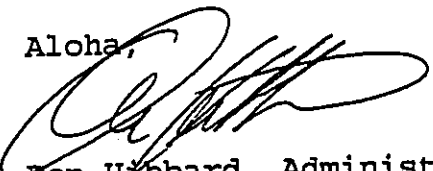
Dear Mr. Wanket:

SUBJECT: Development Plan Land Use Amendment Application and Draft
Environmental Assessment for Royal Kunia, Phase II
Increment 3
Hoaeae, Waikale, 'Ewa, O'ahu
TMK: 9-4-02:001 por.

Thank you for the opportunity to review the Development Plan Land Use Amendment Application and the DEA for this project. The document correctly incorporates our previous comment that no sites were located during an archaeological survey of the area and that given the past agricultural use of the area, we believe that this project would have "no effect" on historic sites.

If you have any questions please call Elaine Jourdane at 587-0015.

Aloha,


Don Hibbard, Administrator
Historic Preservation Officer

EJ:smf

May 14, 1996

WILLIAM
E.
WANKET
INC.

Land Use Consultant

Mr. Donald Hibbard
Administrator
Historic Preservation Officer
Department of Land and
Natural Resources
33 South King Street, 6th Fl.
Honolulu, Hawaii 96813


Dear Mr. Hibbard:

Subject: Royal Kunia, Phase II, Increment 3

Thank you for your February 22, 1996 letter on the subject project,
advising that this project would have "no effect" on historic sites.

Your letter will be included in the Final Environmental Assessment being
prepared. If you have any questions on this matter, please give me a
call at 674-3517 or Mr. Ronal Sato of my office at 674-3515. Thanks.

Sincerely,



William E. Wanket
President

Kapolei Building, Suite 320 • 1001 Kamokila Boulevard • Kapolei, Hawaii 96707
Phone: (808) 674-3517 • Fax: (808) 674-1064

BENJAMIN J. CAYETANO
GOVERNOR



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

KAZU HAYASHIDA
DIRECTOR

DEPUTY DIRECTORS
JERRY M. MATSUDA
GLENN M. OKIMOTO

IN REPLY REFER TO:
STP 8.7253

March 8, 1996

Mr. William E. Wanket
William E. Wanket Inc.
1001 Kamokila Boulevard, Suite 320
Kapolei, Hawaii 96707

Dear Mr. Wanket:

Subject: Central Oahu Development Plan Land Use Amendment
Application and Draft Environmental Assessment
Royal Kunia, Phase II, Increment 3

Thank you for your letters requesting our review and comments on the subject amendment.

Our comments are as follows:

1. Our comments of July 5, 1995, HWY-PS 2.6298 (copy enclosed) are still applicable.
2. The proposed amendment to spread out development over a larger area within Royal Kunia is not anticipated to have any additional impact to our State transportation facilities.

Very truly yours,

A handwritten signature in cursive script, appearing to read "Kazu Hayashida".

KAZU HAYASHIDA
Director of Transportation

Enc.

JUL -5 1995

HWY-PS
2.6298

Mr. William E. Wanket
William E. Wanket, Inc.
1001 Kamokila Blvd., Suite 320
Kapolei, Hawaii 96707

Dear Mr. Wanket:

Subject: Proposed Rezoning to R-5 and A-1, Royal Kunia Phase II
Increment II, Ewa, Oahu, TMK: 9-4-02: Por. 1

Thank you for your letter of April 18, 1995, requesting comments
on the proposed rezoning. We have the following comments:

1. Halekua Development Corporation must provide all required improvements to Kunia Road along the boundary of the Royal Kunia, Phase II development fronting Kunia Road.
2. The applicant should participate with other Ewa developers in providing the needed regional highway improvements (including the improvements needed at the Kunia Interchange).
3. The planning and design of this project and any future increments should provide physical (i.e. bike lanes and racks) and program elements that encourage the use of alternative transportation modes.
4. Zoning conditions imposed on Phase I of this development are also applicable to Phase II.

Very truly yours,



KAZU HAYASHIDA
Director of Transportation

May 15, 1996

Mr. Kazu Hayashida
Director
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

WILLIAM
E.
WANKET
INC.

Land Use Consultant

Dear Mr. Hayashida:

Subject: Royal Kunia, Phase II, Increment 3

Thank you for your March 8, 1996 letter on the subject project. Our response to your comments follows.

The developer is coordinating the required improvements to Kunia Road with the Highways Division. Plans are being prepared for submittal to the Highways Division for approval.

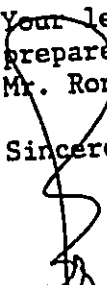
The applicant is participating in the ongoing study to update the Ewa Region Highway Transportation Plan.

The encouragement of alternative modes will be part of the planning of this project. Bike lanes will be provided.

Zoning conditions imposed on Phase I, as appropriate, we understand will also apply to Phase II. We also note your comment that the subject project is not anticipated to have any additional impact to State transportation facilities.

Your letter will be included in the Final Environmental Assessment being prepared. If you have any questions on this matter, please give me a call or Mr. Ronald Sato of my office at 674-3515. Thanks.

Sincerely,


William E. Wanket
President

Kapolei Building, Suite 320 • 1001 Kamokila Boulevard • Kapolei, Hawaii 96707
Phone: (808) 674-3517 • Fax: (808) 674-1064

BENJAMIN J. CAYETANO
GOVERNOR



ESTHER UEDA
EXECUTIVE OFFICER

STATE OF HAWAII
DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM
LAND USE COMMISSION
Room 104, Old Federal Building
335 Merchant Street
Honolulu, Hawaii 96813
Telephone: 587-3822

February 14, 1996

Mr. William E. Wanket
William E. Wanket Inc.
Kapiolani Building, Suite 320
1001 Kamokila Blvd.
Kapolei, Hawaii 96707

Dear Mr. Wanket:

Subject: Development Plan Land Use Amendment Application
and Draft Environmental Assessment for Royal
Kunia, Phase II, Increment 3, Hoaeae and Waikele,
Oahu

We have reviewed the subject document transmitted by your letter dated February 6, 1996, and have the following comments:

- 1) We confirm that the project site is located within the State Land Use Urban District. As noted in the document, the project site was reclassified as part of the Royal Kunia Phase II development under LUC Docket No. A92-683/Halekua Development Corporation.

We would like to point out that on pages 5 and 38, the Agricultural District is incorrectly identified as the "Agriculture" District.

- 2) On pages 4-5, reference is made to the recent sale of a 123-acre parcel planned for an industrial park within Increment I to HRT, Inc. The document states that the Land Use Commission approved this sale. We would like to clarify that the Commission approved the change in ownership interest by issuing an Order Granting Motion To Change Ownership Interest In The Petition Area on September 19, 1995.
- 3) It is our understanding that the subject project involves the same change of land use for the approximately 157-acre Increment 3 site that you previously apprised us of by your letter dated January 12, 1996. Said change involves a request to redesignate the 157 acres from golf course development

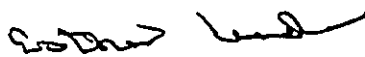
Mr. William E. Wanket
February 14, 1996
Page 2

to residential use to accommodate a portion of the
2,000 housing units already approved in Phase II.

We have no further comments to offer at this time. We
appreciate the opportunity to comment on this matter.

Should you have any questions, please feel free to call me
or Bert Saruwatari of our office at 587-3822.

Sincerely,



ESTHER UEDA
Executive Officer

EU:th

cc: Cheryl Soon
OEQC

May 14, 1996

Ms. Esther Ueda
Executive Officer
State Land Use Commission
P.O. Box 2359
Honolulu, Hawaii 96804-2359

WILLIAM
E.
WANKET
INC.
Land Use Consultant

Dear Ms. Ueda:

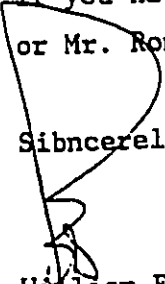
Subject: Royal Kunia, Phase II, Increment 3

Thank you for your February 14, 1996 letter on the subject project. Your letter will be included in the Final Environmental Assessment (EA) being prepared.

Thank you for calling to our attention several errors in our document. Corrections will be made in the Final EA.

If you have any questions on this matter, please give me a call at 674-3517 or Mr. Ronald Sato of my office at 674-3515. Thanks.

Sincerely,


William E. Wanket
President

Kapolei Building, Suite 320 • 1001 Kamokila Boulevard • Kapolei, Hawaii 96707
Phone: (808) 674-3517 • Fax: (808) 674-1064

BENJAMIN J. CAYETANO
GOVERNOR



GARY GILL
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

220 SOUTH KING STREET
FOURTH FLOOR
HONOLULU, HAWAII 96813
TELEPHONE (808) 588-4188
FACSIMILE (808) 588-4188

March 25, 1995

Mr. Al Chee
Halekua Development Corporation
2024 North King Street
Honolulu, Hawai'i 96819

Dear Mr. Chee:

We submit for your response (required by Section 343-5(c), Hawaii Revised Statutes) the following comments on a draft environmental assessment (DEA) entitled "Development Plan Land Use Amendment Application and Draft Environmental Assessment for Royal Kunia, Phase II, Increment 3, Hoaeae and Waikele, Oahu, January 1996." The Office of Environmental Quality Control received the document on February 12, 1996, and subsequently published appropriate notices of availability in the February 23, 1996, March 8, 1996, and March 23, 1996, editions of the *Environmental Notice*.

1. Our examination of the 1989 final environmental impact statement (FEIS) for the project evinces a golf course on 171 acres you currently propose for homes in increment 3, phase II, in your DEA. The FEIS originally disclosed that the golf course would serve as a buffer zone between the proposed residential area and the NAVMAG Lualualei Waikele Branch station boundary. The FEIS then continued to state that "[n]o residential development will take place near the Naval Magazine. Instead, a buffer area consisting of an 18-hole golf course will separate the residential development from the Naval facilities."¹

In Section 4.1.2.3 of the DEA, entitled "Other Hazards", the second paragraph states that "[t]he residential project should not be affected by the Navy's facility [Waikele Branch Naval Magazine] since an appropriate open space buffer zone would be maintained between the eastern end of the project site and Navy facilities in Waikele gulch. [Underscoring supplied]

Please provide a discussion (for the Planning Department's consideration in a final environmental assessment) that describes what constitutes an "appropriate open space buffer zone". In your description, please discuss and document the bases (e.g., minimization of health and safety risks, etc.) for configuring the geometry of such a buffer zone, and please compare and contrast the terms "buffer zone" and "blast zone" as they are used in the FEIS and DEA.

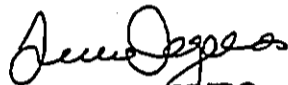
¹ Wanket, William E., *Final Environmental Impact Statement, Royal Kunia Phase II, Hoaeae, Ewa, Oahu, Halekua Development Corporation, Tax Map Keys 9-4-02: Portion of 1, 9-4-03: Portion of 1 and 9, July 1989*, p.18.

Mr. Al Chee
Halekua Development Corporation
March 25, 1996
Page 2 of 2

2. Please provide a discussion (for the Planning Department's consideration in a final environmental assessment) as to whether the proposed project constitutes a change from the FEIS in size, scope, location or timing which requires the preparation of supplemental draft environmental impact statement (see, §11-200-26, Hawaii Administrative Rules).

Please submit this letter and your corresponding response to the Planning Department for inclusion in the final environmental assessment and notice of determination for this project. If there are any questions, please call me at 586-4185. Thank you for the opportunity to comment.

Sincerely,



LESLIE SEGUNDO
Environmental/Health Specialist III

- c: Hon. Cheryl D. Soon, Planning Department, City and County of Honolulu (via telephone facsimile)
Mr. William E. Wanket, William E. Wanket, Inc.
Hon. Gary Gill, Director of Environmental Quality Control

May 17, 1996

Mr. Leslie Segundo
Environmental Health
Specialist III
Office of Environmental
Quality Control, 4th Fl.
220 South King Street
Honolulu, Hawaii 96813

WILLIAM
E.
WANKET
INC.
Land Use Consultant

Dear Mr. Segundo:

Subject: Royal Kunia, Phase II, Increment 3

Thank you for your March 25, 1996 letter on the subject project. Following is our response to your comments.

1. Your understanding of the conditions that existed in 1989 (FEIS, 1989) with respect to the NAVMAG Lualualei Waikele Branch and the golf course area of the Royal Kunia, Phase II, development is essentially correct. However, the conditions in 1996 have changed. Attached are correspondences from the Department of the Navy which disestablishes all explosive safety quantity distance (ESQD) arcs associated with the Waikele Branch Naval Magazine. All explosives have been removed and no need exist for any future storage of explosives in this location. In conclusion, there is no need for a buffer area between the subject project and the NAVMAG Lualualei Waikele Branch. The FEA will be revised accordingly.

With respect to the terms "buffer zone" and "blast zone", a careful reading of the 1989 FEIS (page 39) explains the terms, which were used at the direction of the Department of the Navy (December 5, 1988 letter from the Navy, 1989 FEIS).


2. A discussion with respect to §11-200-26, Hawaii Administrative Rules, will be included in the Final Environmental Assessment (FEA).

Kapolei Building, Suite 320 • 1001 Kamokila Boulevard • Kapolei, Hawaii 96707
Phone: (808) 674-3517 • Fax: (808) 674-1064

Page 2

Your letter will be included in the FEA being prepared. If you have any questions on this matter, please give me a call at 674-3515 or Mr. Ronals Sato of my office at 674-3515. Thanks.

Sincerely,



William E. Wanket
President

attachments



DEPARTMENT OF THE NAVY
 PACIFIC DIVISION
 NAVAL FACILITIES ENGINEERING COMMAND
 (MAKALAPA, HI)
 PEARL HARBOR, HAWAII 96860-7300

11010.31
 Ser 203/ 5559

24 NOV 1995

From: Commander, Pacific Division, Naval Facilities Engineering Command
 To: Chairman, Department of Defense Explosives Safety Board
 Via: Commander, Naval Ordnance Center (N711)

Subj: REQUEST FOR SITE APPROVAL FOR NAVMAG LUALUALEI TO DISESTABLISH
 EXPLOSIVES SAFETY QUANTITY DISTANCE (ESQD) ARCS AT THE WAIKELE BRANCH

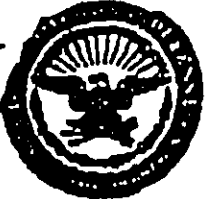
Ref: (a) OPNAVINST 8020.8J
 (b) NAVFACINST 11010.44E, Ch 1
 (c) NAVSEA OP-5, Vol I, Sixth Revision

Encl: (1) NAVMAG Lualualei ltr 8020 Ser 441/0697 of 13 Nov 95 w/encls

1. Following the guidance contained in reference (a) and in accordance with reference (b), we are forwarding enclosure (1) for site plan approval and final safety review.
2. This project proposes to disestablish all existing ESQD arcs at the Waialele Branch. All ordnance has been removed from the branch, which has been declared excess to the command's needs. Sufficient ordnance storage space exists at the NAVMAG Lualualei and West Loch Branches.
3. No permanent personnel are located within the existing ESQD arcs. As the project involves no construction an interim waiver is not needed to comply with paragraph 7-9.2.1.2 of reference (c).
4. PACNAVFACENGCOM point of contact for this project is Mr. Ian Harris at OSN (315) 474-5915, or Commercial (808) 474-5915.


 C. SATO
 By direction

Copy to: (w/o encl)
 CINCPACFLT
 COMNAVFACENGCOM Code 151
 NAVORDCEN ESSOPAC Code 004 (w/encl)
 NAVMAG Lualualei



DEPARTMENT OF THE NAVY
NAVAL ORDNANCE CENTER
FARRAGUT HALL BLDG 0-223
23 STRAUSS AVENUE
INDIAN HEAD MD 20640-6688

8020
OPR N711
Ser N71/5029
24 Jan 96

FIRST ENDORSEMENT on PACNAVFACENCOM ltr 11010.31 Ser 203/
5559 of 24 Nov 95

From: Commander, Naval Ordnance Center
To: Commander, Pacific Division, Naval Facilities
Engineering Command

Subj: SITE APPROVAL REQUEST FOR NAVAL MAGAZINE, LUALUALEI
TO DISESTABLISH EXPLOSIVES SAFETY QUANTITY DISTANCE
ARCS AT THE WAIKELE BRANCH

1. Readdressed and returned.
2. This project, to delete explosives safety quantity distance (ESQD) arcs, has been reviewed with respect to and meets the explosives safety criteria of reference (c). Since all explosives have been removed from all Waikela Branch facilities and no need exists for any future storage of explosives, this location is disestablished as an ordnance storage location. Accordingly, both site and final safety approvals are granted to remove all ESQD arcs from the Waikela Branch of Naval Magazine Lualualei.

Richard T. Adams
RICHARD T. ADAMS
By direction

Copy to:
NAVORDCEN ESSOPAC (Code 004)
CINCPACFLT (N41)
NAVMAG Lualualei (Code 441)

OPTIONAL FORM 96 (7-90)

FAX TRANSMITTAL		Number of Pages = 2
To: Albert Choe	From: Mark Shimabukuro	
Attn: Halekua/Royal Kund	PA CDIV (474-5916)	
Fax # 848-2285	Ext # 474-4890	

NSN 7540 01 113-7088 JUN 91 GENERAL SERVICES ADMINISTRATION
(4/24/96)



OFFICE OF STATE PLANNING

Office of the Governor

MAILING ADDRESS: P.O. BOX 3540, HONOLULU, HAWAII 96811-3540
STREET ADDRESS: 250 SOUTH HOTEL STREET, 4TH FLOOR
TELEPHONE: (808) 587-2848, 587-2800

BENJAMIN J. CAYETANO, Governor

FAX: Director's Office 587-2848
Planning Division 587-2824

Ref. No. P-6119

March 18, 1996

Mr. William E. Wanket
William E. Wanket, Inc.
Kapolei Building, Suite 320
1001 Kamokila Boulevard
Kapolei, Hawaii 96707

Dear Mr. Wanket:

Subject: Development Plan Land Use Amendment Application and
Draft Environmental Assessment for Royal Kunia, Phase
II - Increment 3, Hoaeae and Waikele, Oahu, January
1996

Thank you for the opportunity to review and comment on the above document. The applicant, Halekua Development Corporation, proposes to amend the Development Plan (DP) land use designation for approximately 156 acres of land within the Royal Kunia Phase II project area (Tax Map Key No.: 9-4-02: Portion of 1 and Portion of 52), situated in Hoaeae and Waikele, Oahu. The land area of the proposed DP amendment, currently designated Preservation and zoned AG-1, Restricted Agricultural District, was planned for a golf course.

The applicant is now requesting a change in DP land use designation from Preservation to Residential in order to spread the development of Phase II's 2,000 multi-family and single-family units in three increments over approximately 327 acres instead of the 195.2 residential acres approved.

The Office of State Planning has the following comments regarding the DP land use amendment and the change in residential land use being proposed.

General Concerns

Urbanization of Prime Agricultural Land and Impact on Agricultural Resources. On December 9, 1993, the Land Use Commission (LUC) reclassified 504.865 acres from the Agricultural District to the Urban District in Docket No. A92-683. The project area was not recommended for Urban reclassification in the OSP's Final State Land Use District Boundary Review report for Oahu because of the agricultural resource value of the land. However, OSP conditionally supported the applicant's petition for urban reclassification because of the opportunity to preserve in perpetuity 150 acres of prime agricultural land as an agricultural park, which was adjacent to but not part of the petition area. Residential development on the site is likely to increase urban development pressure on prime agricultural lands mauka of the project area, and increase the potential for conflicts between residents and agricultural activities in the adjacent agricultural park. Residential development instead of a golf course will eliminate open space which is compatible with the existing Waikele Naval Magazine located to the east of the proposed golf course.

Mr. William E. Wanket
Page 2
March 18, 1996

Change in Housing Type Mix and Residential Densities. Although the total number of residential units are unchanged, the applicant now proposes to provide 750 multi-family and 1,250 single-family units, rather than 1,200 multi-family and 800 single-family units as originally proposed in the petition to the LUC. The applicant should discuss the probable increase in infrastructure costs associated with spreading development over the much larger area.

Potential Impacts Related to Findings of Fact and Conditions Contained in the Decision and Order for the Royal Kunia Phase II Petition

Proximity of Development to the Waikele Branch of Naval Magazine, Lualualei. It is stated in the Findings of Fact of the Decision and Order that the golf course site is to also serve as a buffer zone between the residential development of Phase II - Increment 2 and the Naval Magazine, and will not be subject to residential development. Condition 20 states that the "Petitioner shall coordinate the development of the Project with the Department of the Navy to insure that no residential units are constructed in the Navy's blast or buffer zone within the (Project) Property." OSP testimony cites a Navy statement that if the proposed development changes from golf course to residential, that prospective home buyers should be informed by a written disclosure statement in the purchase documents that the development is adjacent to the Naval Magazine, which handles and stores ordnance, explosives, and ammunition.

Conditions 10 and 11 of the Decision and Order also require that the Naval Magazine station boundary be fenced and that a 20-foot security buffer along the project boundary be maintained free of trees and vegetation over eight inches high.

Stormwater, Drainage, and Impacts on Waikele Stream. Of particular concern to Coastal Zone Management program objectives, is the project's potential for nonpoint source pollution since the site is in close proximity to Waikele Stream. It would appear that 10 percent of Phase II drainage is to be discharged into a gully which empties into Waikele Stream. Another 40 percent of drainage is to be collected in a detention basin within the Increment 3 site with eventual discharge into Waikele Stream. The proposed Increment 3 residential development will significantly increase the impermeable surface area of the project. This will increase runoff (and flow velocity) due to the proposed development, and potentially increase petrochemical and other contaminants in runoff. The Revised Drainage Master Plan would need to mitigate any impacts these development changes would have on groundwater, coastal waters, and the water quality and habitat of Waikele Stream in accordance with Conditions 12 and 18 related to stormwater and drainage improvements on- and off-site.

Comments for the Application and Final Environmental Assessment

While the project is not in the Special Management Area, all lands within the State are subject to the provisions of Chapter 205A, Coastal Zone Management (CZM), HRS. Therefore, there should be explicit consideration in Section 5.0, "Conformance with Plans and Policies," of the project's relationship to CZM program objectives and policies when the Final Environmental Assessment (EA) is prepared.

Although the number of residential units to be developed is unchanged, the proposed shift in housing type to predominantly single-family dwellings and lower densities is likely to result in an increase in costs and a slightly larger residential population than originally proposed with

Mr. William E. Wanket
Page 3
March 18, 1996

potentially different consumption and service utilization patterns. This housing shift has been accounted for in the traffic impact analysis with the use of higher trip generation rates for single-family units, but has not been discussed with respect to other infrastructure or services. It would be helpful if the Final EA would identify other areas of potential impact and any mitigative measures if appropriate.

It is not clear in Section 6.0, "Alternatives Considered," why the "no-action" alternative—developing the 2,000 units in Increments 1 and 2 and retaining the golf course as originally proposed—would not be pursued because it is not a feasible or viable alternative. The Final EA should provide more specifics as to why the no-action alternative is not viable, as it appears that single-family units on the Increment 1 site will be built at the densities originally proposed in the LUC Docket (see attached table for a rough comparison of the LUC Docket proposal and the DP Application proposal).

There appears to be a discrepancy in the number of residential units in Figure 3, "Land Use Map." This should be corrected to reflect the total number of units to be developed over the three increments. The traffic impact study incorporates a golf school in the development proposal, while the Application/draft EA does not. This should be clarified in the final documents, particularly, the DP land use designation being requested for the golf school and the potential impacts of the golf school, if any, described. The traffic impact study may also be strengthened by comparing traffic generated under the Increment 3 scenario with traffic impacts under the original Phase II proposal, i.e., 800 units of single-family and 1,200 multi-family units within Increments 1 and 2.

Compliance with Specific Conditions of the Decision and Order. The proposed DP land use amendment necessitates that the applicant demonstrate compliance with those Conditions identified above related to the Navy's blast or buffer zone, stormwater and drainage improvements, as well as disclosure to Increment 3 buyers in accordance with Condition 17, which states: "Petitioner shall provide notification to all owners and occupants of the Property of the potential odor, noise, and dust pollution resulting from surrounding Agricultural District lands, and that the Hawaii Right-to-Farm Act, Chapter 165, Hawaii Revised Statutes, limits the circumstances under which pre-existing farming activities may be deemed a nuisance." Public safety issues regarding the blast/buffer zone should be resolved with the Navy, and the Navy's response to the applicant's proposal should be thoroughly documented.

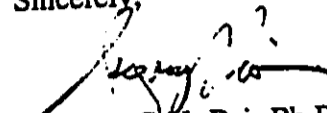
It should be noted that the applicant needs to resolve the issue of fair-share contribution with the State Department of Education for a new elementary school to be sited in Increment 1 in accordance with Condition 7.

Motion to Amend the Decision and Order. It is our understanding that the Land Use Commission has requested that the applicant file a motion to amend the Findings of Fact, Conclusions of Law, and Decision and Order issued in Docket A92-683. OSP recommends that the amendment to the Decision and Order be obtained prior to DP amendment approval.

Mr. William E. Wanket
Page 4
March 18, 1996

Should you have any questions regarding these comments, please contact Ruby Edwards,
587-2817.

Sincerely,


Gregory G.Y. Pai, Ph.D.
Director

Attachment

cc: Ms. Cheryl Soon, Planning Department, C&C of Honolulu
Ms. Esther Ueda, Land Use Commission
Mr. Rick Eichor, Deputy Attorney General

ATTACHMENT 1

**Comparison of Residential Unit Mix and Densities for
Royal Kunia Phase II**

The following table compares the applicant's proposal for residential land uses as represented in Land Use Commission Docket A92-683, Halekua Development Corporation, and as proposed in the DP amendment application (Ng, Inc., *Traffic Impact Report, Royal Kunia Phase II - Increment 3*, January 1996).

Land Use	LUC Docket A92-683			DP Amendment Application		
	Acres	Units ¹	Units/res-acre	Acres	Units ²	Units/res-acre
Single-Family						
Increment 1	35.0	200	5.7	39.2 ¹	219	6.3
Increment 2	89.0	600	6.7	89.0 ¹	451	5.1
Increment 3	-	-	-	131.8 ³	580	4.4
Single-family totals	124.0	800	6.5 (avg)	260.0	1,250	4.9 (avg)
Low-Density Apartments						
Increment 1	57.0	800	14.0	50.0 ¹	630	12.6
Increment 2	17.0	400	23.5	17.0 ¹	120	7.1
Increment 3	-	-	-	-	-	-
Multi-family totals	74.0	1,200	16.2 (avg)	67.0	750	11.2 (avg)

¹ ParEn, Inc., Figure 3, "Land Use Map," *Development Plan Land Use Amendment Application and Draft Environmental Assessment for Royal Kunia, Phase II - Increment 3*.

² Ng, Inc., Exhibit 2, "Conceptual Roadway Plan," *Traffic Impact Report, Royal Kunia Phase II-Increment 3*.

³ Approximate net Increment 3 residential acreage excluding 10-acre park and 15-acre golf school. Ng, Inc., *Traffic Impact Report*.

May 17, 1996

Mr. Gregory G.Y. Pai
Director
Office of State Planning
P.O. Box 3540
Honolulu, Hawaii 96811-3540

WILLIAM
E.
WANKET
INC.
Land Use Consultant

Dear Mr. Pai:

Subject: Royal Kunia, Phase II, Increment 3

Thank you for your March 18, 1996 letter on the subject project. Following is our response to your comments.

General Concerns

Regarding lands mauka of the project, a golf course would have been more likely to trigger urban development than would the proposed residential development because home lots offering views of golf courses sell for premium prices. Furthermore, Robinson Estate recently leased this land for a 15-year period for agricultural use. Also, the high-voltage power lines mauka of the Royal Kunia form somewhat of a barrier for any future housing development because homes cannot be located under high-voltage power lines. Further, a ±90-foot setback will be provided next to the HECO easement and appropriately landscaped as a buffer area.

Regarding the 150-acre agricultural park, homes will not be downwind from the agricultural activities. Also, a 30±-foot wide buffer is planned along the edge of the property, and through mutually agreement, agricultural uses bordering the project will be limited to activities that have minimal residential impacts. Furthermore, new home buyers will be informed in advance that adjacent areas are being farmed.

Kapolei Building, Suite 320 • 1001 Kamokila Boulevard • Kapolei, Hawaii 96707
Phone: (808) 674-3517 • Fax: (808) 674-1064

The original golf course was proposed as a compatible use adjacent to the Waikele Naval Magazine where explosives were stored. Attached is a January 24, 1996 letter from the Department of the Navy which disestablishes this area as an ordnance storage location. All explosives have been removed and no need exists for any future storage of explosives at this location. Therefore, the issue of land use compatibility no longer applies.

According to the applicant's engineer (Park Engineer, Inc.), the increased cost is expected to be about ten (10) percent.

Decision and Order, Royal Kunia Phase II Petition

As discussed above, the Naval Magazine no longer handles and stores ordnance, explosives, and ammunition. Regarding conditions 10 and 11, the applicant intends to file a motion to amend the Findings of Fact, Conclusions of Law, Decision and Order issued pursuant to Section 15-15-70, Hawaii Administrative Rules that will address these conditions and others.

In accordance with the City and County of Honolulu, Department of Public Work's policy for Drainage, Flood and Pollution Control, a detention basin is being proposed in the Increment 3 development. The proposed detention basin will be used as a best management practice (BMP) and mitigative measure for flood control, erosion control and nonpoint pollution control.

Stormwater runoff from a portion of the Increment 3 project will be conveyed into the detention basin which will be located to the north of the existing Royal Kunia Golf Course No. 2 site. The detention basin will be designed to provide an adequate storage volume for urban stormwater quality improvements of the 2-year 24-hour stormwater runoff. The basin will also function as a flood control facility, decreasing the 100-year 24-hour peak stormwater runoff rate to pre-developed conditions.

An ancillary component to the drainage master plan for Drainage Area No. 3 is an existing detention basin situated in the Royal Kunia Golf Course No. 2 site. The basin was sized to accommodate the stormwater runoff generated from the upstream tributary area. The outlet works were designed to reduce the 100-year 24-hour peak discharge rate to pre-developed conditions prior to discharging into US Navy lands.

These existing and proposed grass-lined detention basins will reduce the flow rate and provide for stormwater quality improvements by allowing sediment particles to settle. The reduced flow rate will also increase the contact time with vegetation, thus increasing the potential for nutrient and pollutant removal.

Final Environmental Assessment

The Final EA will address the provisions of Chapter 205A, Coastal Zone Management (CZM), HRS, as appropriate.

All known impacts and needed mitigation associated with the development will be identified and the discussion on alternatives will be expanded in the Final EA.

Figure 3 will be corrected to reflect the 2,000 units to be developed over the three increments. The golf school is not part of this request for amendment. With respect to traffic impacts, this issue was reviewed by the State and City and County Transportation Departments, which had no objections to the project.

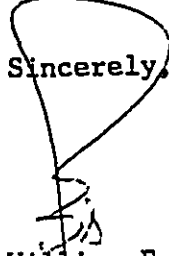
Compliance with the specific conditions of the Decision and Order will be addressed in the motion to be filed to amend the Findings of Fact, Conclusions of Law, and Decision and Order. Your recommendation that action be taken on

Page 4

motion first, prior to DP amendment approval is noted.

Your letter will be included in the Final Environmental Assessment being prepared. If you have any questions on this matter, please give me a call at 674-3517 or Mr. Ronald Sato of my office at 674-3515. Thanks.

Sincerely,



William E. Wanket

attachment



DEPARTMENT OF THE NAVY
NAVAL ORDNANCE CENTER
FARRAGUT HALL BLDG D-323
22 STRAUSS AVENUE
INDIAN HEAD MD 20640-6665

8020
OPR N711
Ser N71/5029
24 Jan 96

FIRST ENDORSEMENT ON PACNAVFACENGCNOM ltr 11010.31 Ser 203/
5559 of 24 Nov 95

From: Commander, Naval Ordnance Center
To: Commander, Pacific Division, Naval Facilities
Engineering Command

Subj: SITE APPROVAL REQUEST FOR NAVAL MAGAZINE, LUALUALEI
TO DISESTABLISH EXPLOSIVES SAFETY QUANTITY DISTANCE
ARCS AT THE WAIKELE BRANCH

1. Readdressed and returned.
2. This project, to delete explosives safety quantity distance (ESQD) arcs, has been reviewed with respect to and meets the explosives safety criteria of reference (c). Since all explosives have been removed from all Waikale Branch facilities and no need exists for any future storage of explosives, this location is disestablished as an ordnance storage location. Accordingly, both site and final safety approvals are granted to remove all ESQD arcs from the Waikale Branch of Naval Magazine Lualualei.

Richard T. Adams
RICHARD T. ADAMS
By direction

Copy to:
NAVORDCEN ESSOPAC (Code 004)
CINCPACFLT (N41)
NAVMAG Lualualei (Code 441)

OPTIONAL FORM NO 17-82

FAX TRANSMITTAL 2

To: Albert chee	From: Mark Stimabukuro
Work Address: Halekua/Royal Kona	Work Address: PACDIV (474-5916)
Fax # 848-2285	Fax # 474-4890

NSN 7540 01 117-7000 WWW 101 GENERAL SERVICES ADMINISTRATION

(4/24/96)

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU

630 SOUTH BERETANIA STREET

HONOLULU, HAWAII 96843

PHONE (808) 527-6180

FAX (808) 533-2714



March 18, 1996

JEREMY HARRIS, Mayor

WALTER O. WATSON, JR., Chairman

MAURICE H. YAMASATO, Vice Chairman

KAZU HAYASHIDA

MELISSA Y. J. LUM

FORREST C. MURPHY

KENNETH E. SPRAGUE

BARBARA KIM STANTON

RAYMOND H. SATO

Manager and Chief Engineer

Mr. William E. Wanket
William E. Wanket, Inc.
Kapolei Building, Suite 320
1001 Kamokila Boulevard
Kapolei, Hawaii 96707

Dear Mr. Wanket:


Subject: Your Letter of February 6, 1996 Regarding the Development Plan Land Use Amendment Application and Draft Environmental Assessment for the Royal Kunia, Phase II, Increment 3 Residential Project, TMK: 9-4-02: 1

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

1. The developer will be required to install the necessary water system improvements including source, booster pumping station, reservoir, and transmission mains to serve the development.
2. An updated water master plan showing the proposed Increment 3 should be resubmitted for our review and approval.
3. The construction drawings for the water system improvements should be submitted for our review and approval.

If you have any questions, please contact Barry Usagawa at 527-5235.

Very truly yours,


RAYMOND H. SATO
Manager and Chief Engineer

cc: Cheryl Soon, Planning Department

May 15, 1996

Mr. Raymond H. Sato
Manager and Chief Engineer
Board of Water Supply
630 South Beretania Street
Honolulu, Hawaii 96843

WILLIAM
E.
WANKET
INC.
Land Use Consultant

Dear Mr. Sato:

Subject: Royal Kunia, Phase II, Increment 3

Thank you for your March 18, 1996 letter on the subject project. Below is our response to your comments.

A revised Water Master Plan was submitted to your office and is currently being reviewed. Construction drawings for the water system improvements will be submitted for your review and approval at the appropriate time. Further, we will install the necessary water system improvements as needed to serve the development.

Your letter will be included in the Final Environmental Assessment being prepared. If you have any questions on this matter, please give me a call at 674-3517 or Mr. Ronald Sato of my office at 674-3515. Thanks.

Sincerely,

William E. Wanket
President

Kapolei Building, Suite 320 • 1001 Kamokila Boulevard • Kapolei, Hawaii 96707
Phone: (808) 674-3517 • Fax: (808) 674-1064

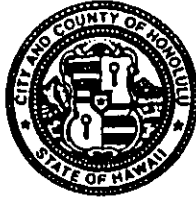
4176-0700
1/2/CFPC

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 5TH FLOOR • HONOLULU, HAWAII 96813
PHONE: (808) 523-4427 • FAX: (808) 527-5498

'96 FEB 14 AM 9:07

JEREMY HARRIS
MAYOR

CITY AND COUNTY OF HONOLULU



ROLAND D. LIBBY, JR.
DIRECTOR

ROBERT AGRES, JR.
DEPUTY DIRECTOR

February 14, 1996

Mr. William E. Wanket
William E. Wanket, Inc.
1001 Kamokila Boulevard, Suite 320
Kapolei, Hawaii 96707

Dear Mr. Wanket:

Subject: Development Plan Land Use Amendment Application and
Draft Environmental Assessment for
Royal Kunia, Phase II, Increment 3

We have reviewed the subject document and have no comments at this time.

Sincerely,

ROLAND D. LIBBY, JR.
Director

cc: Planning Department

May 15, 1996

Mr. Roland D. Libby, Jr.
Director
Department of Housing
and Community Development
650 South King Street
5th Floor
Honolulu, Hawaii 96813

WILLIAM
E.
WANKET
INC.
Land Use Consultant


Dear Mr. Libby:

Subject: Royal Kunia, Phase II, Increment 3

Thank you for your February 14, 1996 letter on the subject project, and for advising us that you have no comments to offer at this time.

Your letter will be included in the Final Environmental Assessment being prepared. If you have any questions on this matter, please give me a call at 674-3517 or Mr. Ronald Sato of my office at 674-3515. Thanks.

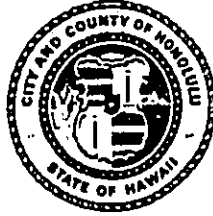
Sincerely,


William E. Wanket
President

Kapolei Building, Suite 320 • 1001 Kamokila Boulevard • Kapolei, Hawaii 96707
Phone: (808) 674-3517 • Fax: (808) 674-1064

DEPARTMENT OF HUMAN RESOURCES
CITY AND COUNTY OF HONOLULU

STANDARD FINANCE PLAZA
715 SOUTH KING STREET
HONOLULU, HAWAII 96813



JEREMY HARRIS
MAYOR

SALVATORE S. LANZILOTTI, ED.D.
DIRECTOR

MICHAEL T. AMII
DEPUTY DIRECTOR

ADMINISTRATION
2ND FLOOR: (808) 527-5311
FAX: (808) 523-4074

ELDERLY AFFAIRS DIVISION
HONOLULU COMMITTEE ON AGING
5TH FLOOR: (808) 523-4761

WORKHAWAII DIVISION
5TH FLOOR: (808) 523-4102

SPECIAL PROJECTS SECTION
HONOLULU COUNTY COMMITTEE ON THE STATUS OF WOMEN
MAYOR'S COMMITTEE FOR PERSONS WITH DISABILITIES
MAYOR'S CHILD CARE ADVISORY BOARD
5TH FLOOR: (808) 527-6264

March 25, 1996

Mr. William E. Wanket
William E. Wanket, Inc.
Kapolei Building, Suite 320
1001 Kamokila Boulevard
Kapolei, Hawaii 96707

Dear Mr. Wanket:

SUBJECT: Royal Kunia, Phase II, Increment 3 Development Plan Use Amendment Application and Draft Environmental Assessment (Draft EA)

This is to acknowledge receipt of your letter of February 6 and accompanying document pertaining to the subject matter cited above.

As noted in the application, Halekua Development Corporation has dedicated a 30,000 square foot parcel (Ordinance 88-02) and is obligated towards making a cash contribution (Ordinance 95-08) to the City to support the construction of a child care facility.

In Section 4.3.1.3 of your application (page 28, paragraph 1) it is stated:

"As with the Royal Kunia Phase II, Increments 1 & 2, the Increment 3 project would be consistent with the community's desire for increased diversity in the community. The proposed residential project would bring in a population which would likely reflect the social and economic characteristics of the overall island. This economic mix of new residents in the community is expected to allow for diversity of skills and talents for community-wide projects."

We also recognize the community's desire for diversity in the community. Consequently, in our memorandum of 12/7/93, pertaining to the applicant's request for zone change for Phase II, Increment I, we made note of our intention to expand the designated use of the aforementioned 30,000 square feet parcel for other social needs of the community in addition to child care.

Mr. William E. Wanket
March 25, 1996
Page Two

By permitting the City with the discretion of expanding the use of this parcel to address the social, human, and economic service needs of the community, the most optimum use of the parcel will be ensured. Please be informed that we would involve the community in the determination of the type of programs and services that would be implemented at this site.

We would, therefore, ask that the applicant favorably support this request in the further progression of this project.

If you have any questions, or require further clarification concerning our comments, please direct your inquiries to Mr. Ernie Martin of our department's *Special Projects Division* at 527-6264.

Thank you for the opportunity to comment on this matter.

Sincerely,



S SALVATORE S. LANZILOTTI, Ed.D.
Director

SSL/EM:ds

c: Cheryl D. Soon, Chief Planning Officer
Planning Department

c:PhasaLRK

May 14, 1996

Dr. Salvatore S. Lanzilotti
Director, Department of
Human Resources
Standard Finance Plaza
715 South King Street
Honolulu, Hawaii 96813

WILLIAM
E.
WANKET
INC.

Land Use Consultant

Dear Dr. Lanzilotti:

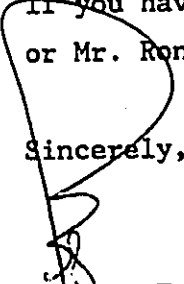
Subject: Royal Kunia, Phase II, Increment 3

Thank you for your March 25, 1996 letter on the subject project. Your comments are noted, and your letter will be included in the Final Environmental Assessment being prepared.

In response to your comments, we have no objections to your department's efforts in seeking community support to expand the range of services at the dedicated parcel to better serve the community.

If you have any questions on this matter, please give me a call at 674-3517 or Mr. Ronald Sato of my office at 674-3515. Thanks.

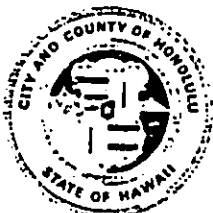
Sincerely,


William E. Wanket
President

DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813

JEREMY HARRIS
MAYOR



DONALD HANAIKE
DIRECTOR

ALVIN K. C. AU
DEPUTY DIRECTOR

February 26, 1996

Mr. William E. Wanket, President
William E. Wanket Inc.
1001 Kamokila Boulevard, Suite 320
Kapolei, Hawaii 96707

Dear Mr. Wanket:

Subject: Development Plan Land Use Amendment Application
and Draft Environmental Assessment for the Proposed
Royal Kunia, Phase II, Increment 3
Residential Development Project
Hoaeae and Waikele, Oahu, Hawaii
Tax Map Key 9-4-002:001 (Por.)

We have reviewed the above-described reports and make the following comments.

The project will need to comply with the following:

1. Our department's park space standard of two (2) acres of "active" recreational park space for every 1,000 residents.
2. The City's Park Dedication Ordinance No. 4621.
3. Our department's street tree requirements.

To confirm that the project is meeting our park space requirements, please provide us with the total number of existing and proposed residential units and park areas in the Royal Kunia and Village Park development project. Park areas will need to include the size of each area. These areas may include public parks dedicated to the City, private recreation centers, or other recreational areas that may not be dedicated.

In addition, a DLU Master Application Form will need to be submitted to the Subdivision Branch of the Department of Land Utilization, and street tree planting plans will need to be submitted to our department for approval.

Mr. William E. Wanket
Page 2
February 26, 1996

Should you have any questions, please contact Lester Lai of
our Advance Planning Branch at 523-4696.

Sincerely,



For DONA L. HANAIKE
Director

DLH:ei

cc: Planning Department

May 17, 1996

Ms. Dona L. Hanaïke
Director, Department of
Parks and Recreation
650 South King Street
Honolulu, Hawaii 96813

WILLIAM
E.
WANKET
INC.
Land Use Consultant

Dear Ms. Hanaïke:

Subject: Royal Kunia, Phase II, Increment 3

Thank you for your February 26, 1996 letter on the subject project. We have discussed your comments with Mr. Lester Lai of your office, and we offer the following in response.

We have complied with the park requirements of your office for the Village Park and Royal Kunia, Phases I and II developments. Village Park and Royal Kunia, Phase I are developments already zoned and developed or under construction. All park requirements for these developments have been satisfied and approved by your office.

With respect to Royal Kunia, Phase II, your office required, and the developer has provided a 10-acre site, which was accepted as adequate to meet the park needs of this 2,000 unit development. The subject Increment 3 will not increase the number of units. The purpose of this amendment is to spread these 2,000 units over a larger area, which will permit us to design a more attractive residential environment that may, subject to the requirements of other agencies, result in an additional park area of up to 10-acres.

In summary, the Village Park/Royal Kunia Community will consist of approximately 5,806 units, or a population of about 17,418 persons. The park areas already provided and approved by your office, plus the private recreation center, will total about 47 acres, or 2.7 acres per 1,000 population. Following is a listing of the park areas.

Kapolei Building, Suite 320 • 1001 Kamokila Boulevard • Kapolei, Hawaii 96707
Phone: (808) 674-3517 • Fax: (808) 674-1064

EXISTING APPROVED VILLAGE PARK/ROYAL KUNIA DEVELOPMENTS
PARK AREAS


DEVELOPMENT	UNITS	PARK AREAS
Village Park	1,806	10.104 ac (public)
RK, Phase I	2,000	5.532 ac (public) 9.046 ac (public) 12.093 ac (private rec. center)
RK, Phase II	2,000	10.000 ac (public)
	<u>5,806</u>	<u>46.775 ac</u>

Further, over 335 acres of open space is in two (2) golf courses and, subject to the requirements of other agencies, an additional park site of up to 10 acres may be made available in the design of Increment 3.

Lastly, a DLU Master Application Form will be submitted at the appropriate time, and street planting plans will be submitted to your office for approval.

Your letter will be included in the Final Environmental Assessment being prepared. If you have any questions on this matter, please give me a call at 674-3517 or Mr. Ronald Sato of my office at 674-3515. Thanks.

Sincerely,


William E. Wanket
President

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813



JEREMY HARRIS
MAYOR

KENNETH E. SPRAGUE
DIRECTOR AND CHIEF ENGINEER

IN REPLY REFER TO:

96-14-0174

March 8, 1996

Mr. William E. Wanket
William E. Wanket, Inc.
Kapolei Building
1001 Kamokila Boulevard, Suite 320
Kapolei, Hawaii 96707

Dear Mr. Wanket:

Subject: Your Letter of February 6, 1996, Relating to a Development Plan Land Use Map Amendment, Royal Kunia, Phase II, Increment 3, TMK: 9-4-02: Por. 1

We have reviewed the application for the Development Plan Land Use Amendment and have the following comments:

ENGINEERING:

The Drainage Master Plan should be updated to reflect the change in land use. A revised drainage master plan has not been received as of February 20, 1996. Please submit a revised Drainage Master Plan. Should there be any questions, please call Dennis Toyama at 523-4931.

All roads and improvements to be dedicated to the City shall comply with City standards and the Americans with Disabilities Act Accessibility Guidelines. Should there be any questions, please contact Faith Kunimoto at 527-5084.

REFUSE COLLECTION:

We can provide refuse collection service for residential developments, provided that the site improvements meet City standards and the Refuse Division is notified in writing at least 12 months prior to when rubbish collection is expected to begin. The notification shall include an approximate schedule for occupancy. The approval for service will be void if occupancy is delayed for more than 12 months. We will provide 3-cubic-yard container service for multi-family developments.

Mr. William E. Wanket
Page 2
March 8, 1996

The construction drawings for any non-City standard site improvement, such as roadways for single-family cluster developments and roadways/parking lots for townhouse developments, should be submitted for our review and approval.

The sentence in Paragraph 4.4.4 Solid Waste, "Within the Ewa area, the City operates the Waipahu Incinerator," should be deleted because the City permanently stopped refuse incineration at Waipahu in 1994. Should there be any questions, please call David Shiraishi at 527-5697.

Very truly yours,


KENNETH E. SPRAGUE
Director and Chief Engineer

cc: Planning Department

May 15, 1996

Mr. Kenneth E. Sprague
Director and Chief Engineer
Department of Public Works
650 South King Street
Honolulu, Hawaii 96813

**WILLIAM
E.
WANKET
INC.**

Land Use Consultant

Dear Mr. Sprague:

Subject: Royal Kunia, Phase II, Increment 3

Thank you for your March 8, 1996 letter on the subject project. Below are our responses to your comments.

A revised Drainage Master Plan has been submitted to your office and is currently under review. All roads and improvements to be dedicated to the City will comply with City standards and the Americans with Disabilities Act Accessibility Guidelines.

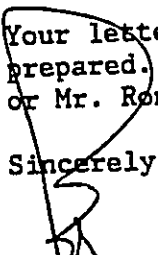
We will meet City standards for refuse collection service, and we will comply with your notification requirements.

Any construction drawings for any non-City standard site improvements will be submitted to your office for review and approval.

We will delete reference to the Waipahu Incinerator. Refuse for the Royal Kunia area is being taken to H-Power.

Your letter will be included in the Final Environmental Assessment being prepared. If you have any questions, please give me a call at 674-3517 or Mr. Ronald Sato of my office at 674-3515. Thanks.

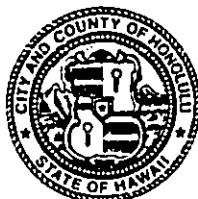
Sincerely,


William E. Wanket
President

Kapolei Building, Suite 320 • 1001 Kamokila Boulevard • Kapolei, Hawaii 96707
Phone: (808) 674-3517 • Fax: (808) 674-1064

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU

PACIFIC PARK PLAZA
711 KAPIOLANI BOULEVARD, SUITE 1200
HONOLULU, HAWAII 96813



JEREMY HARRIS
MAYOR

CHARLES O. SWANSON
DIRECTOR

2/96-00689R

March 25, 1996

Mr. William E. Wanket
William E. Wanket, Inc.
Kapolei Building, Suite 320
1001 Kamokila Boulevard
Kapolei, Hawaii 96707

Dear Mr. Wanket:

Subject: Development Plan Land Use Amendment Application
and Draft Environmental Assessment for
Royal Kunia - Phase II, Increment 3

In response to your February 6, 1996 letter, the subject document was reviewed. We have been working with the applicant throughout the development of the Royal Kunia, Phase II project and have no objections to the proposed land use amendment.

As the project progresses, the applicant should, as has been done with previous phases, continue to work with this department by providing the following:

1. Preliminary plans, roadway layouts, and lot lines should continue to be provided to this department prior to formal submittal of the subdivision plans to the City.
2. A roadway master plan report and overall site plan has been submitted to this department for separate review. The site plan is conceptually acceptable, with provisions for minor modifications regarding the limits of minor collector streets and roadway transition points. An updated roadway plan for the entire Phase II development, indicating areas that have been completed and an approximate estimate or phasing of when subsequent areas will be completed, should be submitted to this department annually. Based on our review of the overall plan, locations of driveways to the multi-family units may need to be revised due to sight distance requirements.

Mr. William E. Wanket
Page 2
March 25, 1996

3. Updated traffic studies should be provided to primarily address traffic signal warrants and any modifications to intersection design based on increased traffic during the interim period prior to full buildout. We note that the developer intends to provide underground conduits at all intersections along the major collector road. The developer will be required to install traffic signals, where warranted, throughout the progress and until the completion of this project. An updated study should be submitted at the completion of about 500 housing units or approximately every two years.

Should you have any questions regarding these comments, please contact Faith Miyamoto of the Transportation System Planning Division at 527-6976.

Respectfully,

C. Swanson
for CHARLES O. SWANSON
Director

cc: Ms. Cheryl Soon, Planning Department

May 15, 1996

Mr. Charles O. Swanson
Director
Department of Transportation
Services, Pacific Park Plaza
Suite 1200
711 Kapiolani Bl
Honolulu, Hawaii 96813

WILLIAM
E.
WANKET
INC.
Land Use Consultant

Dear Mr. Swanson:

Subject; Royal Kunia, Phase II, Increment 3

Thank you for your March 25, 1996 letter on the subject project and stating that you have no objections to the proposed land use amendment.

We will continue to work with your department as the project progresses, and we will provide you with the information and plans noted in your letter. Driveway locations, as necessary, will be revised to meet sight distance requirements. A traffic monitoring program will be established to provide timely updates to address traffic signal warrants and other intersection modifications as the project develops.

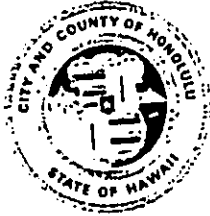
Your letter will be included in the Final Environmental Assessment being prepared. If you have any questions on this matter, please give me a call at 674-3517 or Mr. Ronald Sato of my office at 674-3515. Thanks.

Sincerely,


William E. Wanket
President

Kapolei Building, Suite 320 • 1001 Kamokila Boulevard • Kapolei, Hawaii 96707
Phone: (808) 674-3517 • Fax: (808) 674-1064

DEPARTMENT OF WASTEWATER MANAGEMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813



JEREMY HARRIS
MAYOR

FELIX B. LIMTIACO
DIRECTOR
CHERYL K. OKUMA-SEPE
DEPUTY DIRECTOR

In reply refer to:
WCC 96-27

February 27, 1996

Mr. William E. Wanket
1001 Kamokila Blvd.
Kapolei Building, Suite 320
Kapolei, Hawaii 96707

Dear Mr. Wanket:

Subject: **Development Plan Land Use Amendment Application and
Draft Environmental Assessment for
Royal Kunia, Phase II, Increment 3
TMK: 9-4-2: por. 1**

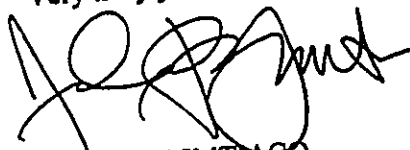
We have no objection to the proposal to change the Royal Kunia, Phase II master plan by redesignating about 157 acres from Preservation (previously proposed for a future golf course) to Residential. However, we require the following:

- (1) Update the previously approved Royal Kunia Wastewater Master Plan to reflect the changes.
- (2) Verify that the Royal Kunia Offsite Sewer line is able to accommodate the changes.

We understand that the amendment will not increase the 2,000 housing units originally proposed for the Royal Kunia, Phase II development. The purpose of the amendment is to spread these 2,000 units over a larger area which will permit the developer to design a more attractive residential environment with amenities that currently are not available to the market place.

If you have any questions, please contact Ms. Tessa Yuen of the Service Control Branch at 523-4956.

Very truly yours,


FELIX B. LIMTIACO
Director

cc: Ms. Cheryl Soon, Chief Planning Officer
Planning Department

May 15, 1996

Mr. Felix B. Limitiaco
Director
Department of Wastewater
Management
650 South King Street
Honolulu, Hawaii 96813



Dear Mr. Limitiaco:

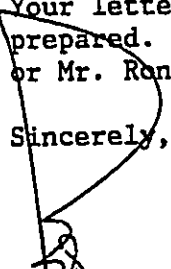
Subject: Royal Kunia, Phase II, Increment 3

Thank you for your February 27, 1996 letter on the subject project, and for your comment that you have no objections to the proposal.

We have been in contact with Ms. Tessa Yuen of your office and have provided her with a revised map and calculations. It is currently being reviewed by your office.

Your letter will be included in the Final Environmental Assessment being prepared. If you have any questions, please give me a call at 674-3517 or Mr. Ronald Sato of my office at 674-3515. Thanks.

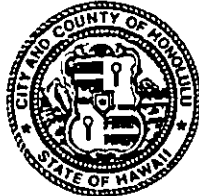
Sincerely,



William E. Wanket
President

FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU

3375 KOAPAKA STREET, SUITE H425
HONOLULU, HAWAII 96819-1869



JEREMY HARRIS
MAYOR

ANTHONY J. LOPEZ, JR.
FIRE CHIEF

ATTILIO K. LEONARDI
FIRE DEPUTY CHIEF

February 26, 1996

Mr. William E. Wanket
William E. Wanket, Inc.
Kapolei Building, Suite 320
1001 Kamokila Boulevard
Kapolei, Hawaii 96707

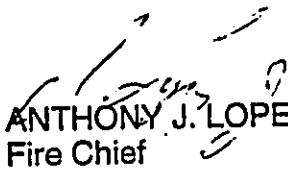
Dear Mr. Wanket:

SUBJECT: Development Plan Land Use Amendment Application
and Draft Environmental Assessment for
Royal Kunia, Phase II, Increment 3 Residential Project
Hoaeae and Waikele, Oahu

We have reviewed the subject material provided and have made corrections to Section 4.5.6 to reflect our current staffing levels of five (5) Fire Fighters per company.

Should you have any questions, please call Assistant Chief Arthur Ugalde of our Administrative Services Bureau at 831-7774.

Sincerely,


ANTHONY J. LOPEZ, JR.
Fire Chief

AJL/PHG:ny

cc: Planning Department (Cheryl Soon)

May 15, 1996

Mr. Anthony J. Lopez, Jr.
Fire Chief
Fire Department
3375 Koapaka Street
Suite H425
Honolulu, Hawaii 96819-1869

WILLIAM
E.
WANKET
INC.
Land Use Consultant

Dear Mr. Lopez:


Subject: Royal Kunia, Phase II, Increment 3

Thank you for your February 26, 1996 letter on the subject project.

The information provided on the current staffing levels will be reflect in the Final Environmental Assessment being prepared. Your letter will be included in the Final EA.

If you have any questions on this matter, please give me a call at 674-3517 or Mr. Ronald Sato of my office at 674-3515. Thanks.

Sincerely,

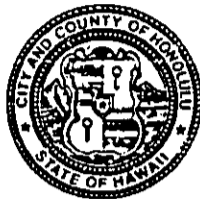

William E. Wanket
President

Kapolei Building, Suite 320 • 1001 Kamokila Boulevard • Kapolei, Hawaii 96707
Phone: (808) 674-3517 • Fax: (808) 674-1064

PLANNING DEPARTMENT
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813

JEREMY HARRIS
MAYOR



CHERYL D. SOON
CHIEF PLANNING OFFICER
CAROLL TAKAHASHI
DEPUTY CHIEF PLANNING OFFICER

LW

March 29, 1996

Mr. William E. Wanket
William E. Wanket Inc.
Kapiolani Building, Suite 320
1001 Kamokila Boulevard
Kapolei, Hawaii 96707

Dear Mr. Wanket:

Development Plan Land Use Map Amendment Application
and Draft Environmental Assessment for Royal Kunia,
Phase II, Increment 3, Hoaeae and Waikele, Oahu

We have reviewed the subject Draft Environmental Assessment (DEA) and offer the following comments:

Land Use Information

We note that the boundaries and acreages of Phase II, Increment 2 shown on the Land Use Map (Figure 3) of the DEA are slightly different from the existing Development Plan Land Use Map (DPLUM) designations for the site. For clarification, the Final Environmental Assessment (FEA) should include existing DPLUM for Phase II and proposed DPLUM for the subject site. The existing DPLUM map should indicate approved acreage by land use categories and corresponding number and types of dwelling units approved for Phase II.

Housing Units

The DEA states that the total number of housing units for Phase II remains unchanged at 2,000, and the subject proposal is needed to spread out the previously approved 2,000 units in three increments. However, the Land Use Map shows a total of 2,000 units in Increments 1 and 2, and an additional 581 units in Increment 3. Please be advised that we would have serious concerns about recommending additional units beyond what was previously approved.

Mr. William E. Wanket
William E. Wanket Inc.
March 29, 1996
Page 2

Also, we note that the housing type mix proposed in the DEA differs from what was previously approved in the existing DPLUM for Phase II. The discrepancies are summarized as follows:

	Allowed under Existing DPLUM for Inc. 1 & 2	As Proposed the DEA for Inc. 1, 2 & 3	
		Land Use Map	Traffic Impact Report
Multi-family units	1,200	1,200	750
Single-family units	<u>800</u>	<u>1,381</u>	<u>1,250</u>
	2,000	2,581	2,000

The FEA should address and explain these discrepancies.

The DEA indicates that the Increment 3 site would be developed with market units and a total of 600 affordable housing units would be provided within the Increments 1 and 2 portion of the Phase II development. We would add that the Department of Housing and Community Development has previously recommended that of the total 2,000 units proposed for Phase II, around 10% (200 units) should be affordable to households earning 80% or less of median income and an additional 20% (400 units) be made available for those with 81% to 120% of median income. Please address this in the FEA.

The FEA should also provide an update on housing development status in Phase I and additional information on development schedule for Phase II, with or without this proposal.

Preliminary Site Plan

We note that the Preliminary Site Plan (Figure 2.1) in the DEA proposes full development of the site to the eastern boundary as a standard single-family subdivision served by a street pattern customary to these uses. We are currently promoting development of compact communities configured to create a sense of place and neighborhood identity. We recommend that masterplanned communities incorporate the following planning principles: physical definition of neighborhoods; compatible mix of housing types and densities where appropriate; avoidance of monotonous, repetitious frontages; clustering of neighborhood-serving community and commercial facilities at centralized locations emphasizing pedestrian and transit access; and an overall circulation network which provides for transit service, bike paths and pedestrian walkways. We recommend that the Royal Kunia, Phase II site plan incorporate these principles.

Mr. William E. Wanket
William E. Wanket Inc.
March 29, 1996
Page 3

Setbacks and Open Space

The current site plan does not provide the kind of setback and open space buffer between the project's other residential areas and the adjacent agricultural park and gulch which would have been provided by the golf course previously proposed for this site. Adequate buffer areas to minimize impacts on Waikele Stream and to avoid conflicts between residential and agricultural uses are needed. The site plan should be revised to include adequate open space and setbacks. In addition, the FEA should include acreage information about the proposed open space area on the subject site.

The golf course was intended as a buffer between proposed residential uses and the Waikele Branch Naval Magazine. The DEA states that the proposed residential uses should not be affected by the Navy facility since an appropriate open space buffer zone would be maintained between the eastern end the project site and the Navy facility. However, the preliminary site plan does not include a buffer zone. The FEA should demonstrate how a buffer zone will be achieved.

While it is our understanding that the Navy has since removed all ordnance from the Waikele Branch and is no longer using it for ordnance storage, there are nonetheless ongoing concerns about eliminating the golf course buffer and locating residential uses adjacent to the Waikele Branch. The FEA should address these concerns and include verification from the Navy stating that the Waikele Branch is no longer used for ordnance storage. However, we would reiterate that the proposal should include more open space and setback than currently proposed in the preliminary site plan.

Drainage

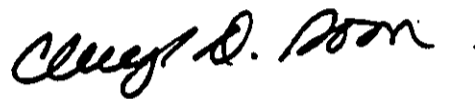
We note that the replacement of the golf course site with the proposed residential uses would reduce the potential drainage capability of the larger Phase II development and increase surface runoff from the area due to the construction of impervious surfaces. The FEA should provide additional information on drainage impact on the Waikele Stream and Village Park drainage facilities as a result of change in proposed land use for the subject site.

The Department of Public Works (DPW) has indicated that it has not received a revised drainage masterplan which reflects the current proposal for the subject site. The FEA should include an updated drainage masterplan.

Mr. William E. Wanket
William E. Wanket Inc.
March 29, 1996
Page 4

Should you have any questions, please do not hesitate to contact Lin Wong of my staff at 523-4485.

Sincerely,



CHERYL D. SOON
Chief Planning Officer

CDS:js

cc: Al Chee, Halekua Development Corporation

May 20, 1996

Ms. Cheryl D. Soon
Chief Planning Officer
Planning Department
8th Floor
650 South King Street
Honolulu, Hawaii 96813

WILLIAM
E.
WANKET
INC.
Land Use Consultant

Dear Ms. Soon:

Subject: Royal Kunia, Phase II, Increment 3

Thank you for your March 29, 1996 letter on the subject project. Following is our response to your comments.

Land Use Information

The Final Environmental Assessment (FEA) will show the existing Development Plan Land Use Map (DPLUM) designations for the site and the approved acreages by land use categories and corresponding number and types of dwelling units approved for Phase II. Your reference to Figure 3 is an exhibit from the Appendices. It does not represent the official request of the applicant and will be changed accordingly. The FEA text will include the proper figures to illustrate the proposal. Any differences from the existing DPLUM will be clarified.

Housing Units

The total number of units for Phase II remains unchanged at 2,000. As explained above Figure 3 of the DEA Appendices was not meant to represent the project, and it will be modified as necessary. Figures representing the project will be shown in the text of the FEA.

Although the 2,000 unit total remains unchanged with our proposal, it was always represented by us that the housing mix would change from the initial approval in response to changes in the market. A market study will be included in the FEA documenting the support for this shift in unit types. The housing mix includes 750 multi-family units and 1,250 single-family units.

The 600 affordable housing units will include 200 units affordable to households earning 80% or less of median income, with the remaining 400 units available for those with 81% to 120% of median income. This will be clarified in the FEA. Also, an update on the housing development status for Phase I and a development schedule for Phase II will be included in the FEA.

Kapolei Building, Suite 320 • 1001 Kamokila Boulevard • Kapolei, Hawaii 96707
Phone: (808) 674-3517 • Fax: (808) 674-1064

Preliminary Site Plan

As discussed in meetings with you and your staff, we will reevaluate the Preliminary Site Plan shown in the DEA to more appropriately address the concerns you expressed. However, it must be noted that the subject project and its development needs to be reviewed in context with the entire Royal Kunia/Village Park Community that exist and continues to be developed in accordance with Development Plan and zoning approvals. This relationship will be described and illustrated in the FEA.

Setbacks and Open Space

Setbacks and open space provisions will be discussed in the FEA. In addition to the 250-foot wide HECO easement to the north, a ±90-foot wide landscaped buffer area will be provided. Along the agricultural park, a ±30-foot wide landscaped buffer will be provided, and through mutual agreement with DOA, agricultural uses bordering the project will be limited to activities that have minimal residential impacts. The site plan also show a 10-acre site that may be available for park purposes, subject to the requirements of other agencies. Further, an open space detention area, at least 15 acres in size, is included in the site plan.

The original golf course was proposed as a compatible use adjacent to the Waikele Naval Magazine where explosives were stored. Attached is a January 24, 1996 letter from the Department of the Navy which disestablishes this area as an ordnance storage location. All explosives have been removed and no need exists for any future storage of explosives at this location. Therefore, the issue of land use compatibility no longer applies.

Drainage

The proposed land use change from golf course to residential development will not have a significant impact on the existing Village Park drainage facilities. Stormwater runoff generated from a portion of the Increment 3 residential development will flow into the existing Royal Kunia Golf Course No. 2 site, which is located in the Royal Kunia Phase I development, then discharged into US Navy land and ultimately flow into Waikele Stream.

Stormwater runoff from the Increment 3 residential development will be conveyed into a detention basin which will be located to the north of the existing Royal Kunia Golf Course No. 2 site. The detention basin will be designed in accordance with the City and County of Honolulu, Department of Public Works' policy for Drainage, Flood and Pollution Control. The basin will provide an adequate

storage volume for urban stormwater quality improvements of the 2-year 24-hour runoff. The basin will also function as a flood control facility, decreasing the 100-year 24 hour stormwater runoff rates to pre-developed conditions.

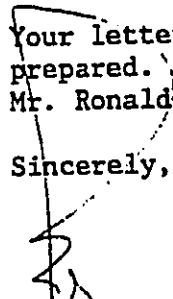
An ancillary component to the drainage master plan for Drainage Area No. 3 is an existing detention basin situated in the Royal Kunia Golf Course No. 2 site. The basin was sized to accommodate the stormwater runoff generated from the upstream tributary area. The outlet works were designed to reduce the 100-year 24-hour peak discharge rate to pre-developed conditions prior to discharging into US Navy lands.

These existing and proposed grass-lined detention basins will reduce the flow rate and provide for urban stormwater quality improvements by allowing sediment particles to settle. The reduced flow rate will also increase the contact time with vegetation, thus increasing the potential for nutrient and pollutant removal.

We are coordinating with the Department of Public Works, and we will submit the revised drainage plan for its review and approval.

Your letter will be included in the Final Environmental Assessment being prepared. If you have any questions, please give me a call at 674-3517 or Mr. Ronald Sato of my office at 674-3515. Thanks.

Sincerely,



William E. Wanket

attachment



DEPARTMENT OF THE NAVY
 NAVAL ORDNANCE CENTER
 FARRAGUT HALL BLDG 0-323
 28 STRAUSS AVENUE
 INDIAN HEAD MD 20640-6665

8020
 OPR N711
 Ser N71/5029
 24 Jan 96

FIRST ENDORSEMENT on PACNAVFACENCOM ltr 11010.31 Ser 203/5559 of 24 Nov 95

From: Commander, Naval Ordnance Center
 To: Commander, Pacific Division, Naval Facilities Engineering Command

Subj: SITE APPROVAL REQUEST FOR NAVAL MAGAZINE, LUALUALEI TO DISESTABLISH EXPLOSIVES SAFETY QUANTITY DISTANCE ARCS AT THE WAIKELE BRANCH

1. Readdressed and returned.
2. This project, to delete explosives safety quantity distance (ESQD) arcs, has been reviewed with respect to and meets the explosives safety criteria of reference (c). Since all explosives have been removed from all Waikela Branch facilities and no need exists for any future storage of explosives, this location is disestablished as an ordnance storage location. Accordingly, both site and final safety approvals are granted to remove all ESQD arcs from the Waikela Branch of Naval Magazine Lualualei.

Richard T. Adams
 RICHARD T. ADAMS
 By direction

Copy to:
 NAVORDCEN ESSOPAC (Code 004)
 CINCPACFLT (N41)
 NAVMAG Lualualei (Code 441)

OPTIONAL FORM NO 17-90
 FAX TRANSMITTAL 2

To: Albert chae	From: Mark Shimabukuro
Attn: Hakeka/Royal Kund	Attn: PACDIV (474-5916)
Fax #: 840-2285	Fax #: 474-4890

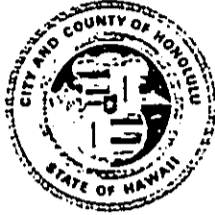
NSM 7-540 DT 117-708 10/7 101 GENERAL SERVICES ADMINISTRATION

(4/24/96)

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU

801 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96813 - AREA CODE (808) 529-3111

JEREMY HARRIS
MAYOR



MICHAEL S. NAKAMURA
CHIEF

HAROLD M. KAWASAKI
LEE DONOHUE
DEPUTY CHIEFS

OUR REFERENCE BS-DL

March 20, 1996

Mr. William E. Wanket
President
William E. Wanket Inc.
Kapolei Building, Suite 320
1001 Kamokila Boulevard
Kapolei, Hawaii 96707

Dear Mr. Wanket:

Thank you for forwarding a copy of the Development Plan Land Use Amendment Application and Draft Environmental Assessment for Royal Kunia, Phase II, Increment 3 residential project. The comments below pertain to section 4.5.5, pp. 36-37.

It is true that HPD plans to build a regional station in Kapolei in the near future. However, that station has nothing to do with police response time or protection of the surrounding areas. Thus, your statement that, "This future regional police station should therefore improve police response time and protection in the surrounding region which includes Royal Kunia" is not correct.

There is no connection between police stations and response times. Officers respond to cases from wherever they are located in the field, not from the station. Furthermore, the department can acquire a new facility like the Kapolei station without acquiring any new beat officer positions at all, or vice versa. Without enough officers in the field, response times will lengthen and protection will suffer, even in the vicinity of a new station.

You state that, "the Increment 3 project is expected to have a minimal impact or change in the level of police protection," meaning that it will not "increase the total number of units approved for Phase II." It would be more accurate to state that Increment 3 will not have a greater impact than the earlier plans. But because HPD has not been able to obtain new positions to deal with either plan, the impact of Increment 3 on HPD's operations will be significant.

HPD needs more officers in the region. We have attempted for years to obtain new beat officer positions to keep up with development, but are still far behind. We will continue those efforts, as we are fully aware that Royal Kunia and other projects are growing daily. We would appreciate any support you can offer our efforts.


Mr. William E. Wanket
Page 2
March 20, 1996

We applaud your encouragement for Neighborhood Security Watch programs in your developments. By working together, HPD and the community can provide safe environments for the people of Oahu.

Thank you for the opportunity to comment.

Sincerely,

MICHAEL S. NAKAMURA
Chief of Police

By 
EUGENE UEMURA, Assistant Chief
Administrative Bureau

cc: Ms. Cheryl Soon
Planning Dept.

May 15, 1996

Mr. Michael S. Nakamura
Chief of Police
Police Department
801 South Beretania Street
Honolulu, Hawaii 96813

**WILLIAM
E.
WANKET
INC.**
Land Use Consultant

Dear Mr. Nakamura:

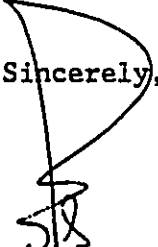
Subject: Royal Kunia, Phase II, Increment 3

Thank you for your March 20, 1996 letter on the subject project, and for your explanation regarding police stations and response times. Our final report will be revised accordingly.

We agree that Neighborhood Security Watch programs are important, and we will continue to encourage their formation in our developments.

Your letter will be included in the Final Environmental Assessment being prepared. If you have any questions on this matter, please give me a call at 674-3517 or Mr. Ronald Sato of my office at 674-3515. Thanks.

Sincerely,


William E. Wanket
President

Kapolei Building, Suite 320 • 1001 Kamokila Boulevard • Kapolei, Hawaii 96707
Phone: (808) 674-3517 • Fax: (808) 674-1064

2/96-0457
1/2/01 PD



RECEIVED

'96 FEB 15 PM 3:13

BHP Hawaii

February 13, 1996
C&C HONOLULU

William E. Wanket, Inc.
Kapolei Building, Suite 320
1001 Kamokila Boulevard
Kapolei, Hawaii 96707

Attention: Mr. William E. Wanket

Gentlemen:

Subject: Draft Environmental Assessment for
Royal Kunia, Phase II, Increment 3

Please be advised that BHP Gas Company has no underground utility gas facilities in the project vicinity.

Thank you for the opportunity to comment on the Draft Environmental Assessment. Should there be any questions, or if additional information is desired, please call me at 594-5574.

Very truly yours,

Keith K. Yamamoto
Supervisor, Engineering

KKY:krs
96-128

cc: Ms. Cheryl Soon, Planning Department, City and County of Honolulu

May 15, 1996

Mr. Keith K. Yamamoto
Supervisor, Engineering
BHP Gas Company
515 Kamakee Street
P.O. Box 3379
Honolulu, Hawaii 96842

WILLIAM
E.
WANKET
INC.

Land Use Consultant

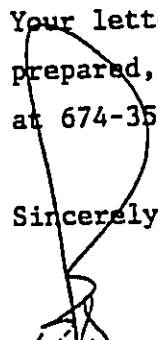
Dear Mr. Yamamoto:

Subject: Royal Kunia, Phase II, Increment 3

Thank you for your February 13, 1996 letter on the subject project, and advising us that your company has no underground utility gas facilities in the project vicinity.

Your letter will be included in the Final Environmental Assessment being prepared. If you have any questions on this matter, please give me a call at 674-3517 or Mr. Ronald Sato of my office at 674-3515. Thanks.

Sincerely,


William E. Wanket
President

Kapolei Building, Suite 320 • 1001 Kamokila Boulevard • Kapolei, Hawaii 96707
Phone: (808) 674-3517 • Fax: (808) 674-1064



William A. Bonnet
Manager
Environmental Department

March 18, 1996

Mr. William E. Wanket
William E. Wanket, Inc.
Kapolei Building, Suite 320
1001 Kamokila Boulevard
Kapolei, Hawaii 96707

Dear Mr. Wanket:

Subject: Royal Kunia, Phase II Increment 3

Thank you for the opportunity to comment on your January 1996 Draft Environmental Assessment report for the Royal Kunia, Phase II Increment 3 project, as proposed by the Halekua Development Corporation. We have reviewed the subject document and have the following comments:

- 1) Existing 46KV/12KV lines may need to be relocated.
- 2) We will need to check if there is sufficient capacity for Increment 3 from the current substation.

HECO shall reserve further comments pertaining to the protection of existing powerlines bordering the project area until construction plans are finalized. Our points of contact for this project, and originators of these comments, are Francis Hiramami (comment 1, 543-7536) principal engineer and Matthew Goo (comment 2, 543-7826) lead planning engineer. I suggest you staff and consultants deal directly with Francis and Matthew to coordinate HECO's continuing input on this project.

Sincerely,

xc. F. Hiramami
M. Goo



May 3, 1996

Mr. William A. Bonnet, Manager
Environmental Department
Hawaiian Electric Company, Inc.
P.O. Box 2750
Honolulu, Hawaii 96840-0001

Dear Mr. Bonnet:


Subject: Royal Kunia, Phase II, Increment 3

Thank you for your letter dated March 18, 1996 on the subject project. Your letter will be included in the Final Environmental Assessment being prepared.

Coordination with your utility company will continue during the phased development of Royal Kunia, Phase II as more detailed design plans are developed to address relocation of utility lines, if needed, and capacity of existing substations.

If you have any questions on this matter, please give me a call at 674-3517 or Mr. Ronald Sato of my office at 674-3515.

Sincerely,



William E. Wanket
President

Kapolei Building, Suite 320 • 1001 Kamokila Boulevard • Kapolei, Hawaii 96707
Phone: (808) 674-3517 • Fax: (808) 674-1064

187-C Hokulani Street
Hilo HI 96720

March 23, 1996

William E. Wanket, Inc.
Kapolei Building, Suite 320
1001 Kamokila Blvd.
Kapolei HI 96707

Dear Sir or Madam:

Re: Draft Environmental Assessment for Royal Kunia, Phase II, Increment 3

Thank you for sending me a copy of this document so promptly. I have the following comments. Numbers used refer to the corresponding sections in the Draft EA.

3.3; 4.1.1.2; 4.1.5.3 Agricultural Park

The DEA describes the 150-acre area to be dedicated for ag park use as "some distance northwest of the project site." There is no map indicating what distance, precisely, the ag park will be from the residences. Without this information, it is difficult to assess the impact of future ag activities upon the planned residential development in Increment 3.

4.1.2.3 Other Hazards

In this section, the only hazard identified with agricultural use of adjoining land is the fire hazard that attends cane burning. Other hazards include possible misuse or overuse by novice farmers of herbicides or other pesticides; blowing dust from unplanted land; untreated human waste from farm laborers becoming waterborne and carried to the development site; and fire hazards from farm machinery.

4.1.5.2 Vehicular Traffic-Related Impacts

The discussion of mitigative measures is incomplete. What provision has been made for reduction in vehicular-related traffic? Are bike paths planned or contemplated? What about lots where car-poolers or bus-riders may leave their cars for the day? Has any thought been given to setting aside a small commercial-zoned area where a convenience store might be sited? The presence of a small store to serve the neighborhood would substantially reduce traffic generated by trips to the supermarket to pick up foods and other sundries whose needs cannot be anticipated in the weekly shopping trip.

It is true that "reduction of emissions from individual vehicles is beyond the control of any single development," as the DEA states. Yet means to reduce emissions overall — such as those suggested in the paragraph above — are well within the developer's control. I suggest they be considered not just for Phase II, Increment 3, but for all other aspects of this development.

4.4.1 Water Supply

Have all necessary approvals for additional wells (Well No. 4 and Well No. 5) been received from the Commission on Water Resource Management? If not, what will the potable water source be?

Mention is made of a granular activated carbon treatment system being installed for contaminant removal from the two potable water wells. Who will maintain this? Will the water facilities be dedicated to the Board of Water Supply? If so, will the increased cost of maintaining the flow of water from contaminated

wells that supply this subdivision have to be borne by all O'ahu ratepayers? What are the contaminants? Will they all be removed by a GAC filter?

To reduce water use, landscaping for this arid region of O'ahu should be appropriate. Has any thought been given to the use of xeriscaping in this subdivision?

4.4.3 Drainage

It is stated that "about 50 percent of the runoff generated by with [sic] Increment 3 would flow into the Village Park drainage facilities." Will the Village Park drainage facilities be able to handle this increase? Some discussion of the drainage capacity of Village Park might be appropriate.

4.5.2 Recreational Facilities

The DEA states that a 10-acre park is planned as part of the Increment 3 project. Will this be available for public use, or will it be restricted to residents? If it is to be restricted, what means will be used to keep non-residents from using the park?

5.3 Conformance with Plans and Policies; General Plan

Policy 3 of the General Plan is to "manage physical growth and development in the urban fringe and rural areas so that an undesirable spreading of development is prevented..." By spreading out the development, the density of Increments 1 and 2 is decreased, while residential development is spread to an area that, prior to this EA, had not been proposed for residential use. How does this project comply with Policy 3 of the General Plan?

In the discussion of economic activity, the statement is made that Increment 3 "would create several hundred construction jobs over several years." However, most of these jobs would be associated with the construction of houses - the same houses that, if this project is denied, would presumably be built anyway (in Increments 1 and 2). Thus, the implication that "several hundred" additional jobs are to be created by this project is misleading.

Unaddressed Impacts

Will the development of housing instead of a golf course on this site have adverse impacts to Waikele Stream? There will be more runoff, presumably, from the larger area of impervious surface associated with residential construction as opposed to a golf course. This, in turn, could cause an increase of runoff into the stream. Water from a planned detention basin also would be diverted into the stream. Has there been any study of how much stream flow may increase (i.e., how much water that would normally seep into the ground would be diverted into surface water flow by the development)? Will an NPDES permit be required for the discharge from the detention basin? Will a petition for amending the interim stream flow of Waikele Stream be sought from the Commission on Water Resource Management?

Thank you very much for allowing me the opportunity to comment on this project. If you have questions or otherwise wish to reach me by phone, my number in Hilo is 808 934-0115 (fax 808 934-8321).

Yours truly,



Patricia Tummons

cc: OEQC
City Planning Department
Halekua Development Corp.



May 21, 1996

Ms. Patricia Tummons
187-C Hokulani Street
Hilo, Hawaii 96720

Dear Ms. Tummons:

Subject: Royal Kunia, Phase II, Increment 3

Thank you for your letter dated March 23, 1996 on the subject project. Your letter will be included in the Final Environmental Assessment (EA) being prepared.

Agricultural Park And Hazards Comments

Figure 2.1 of the Final EA will show the location of the agricultural park. Pertinent impacts associated with activities occurring on this agricultural park site, such as air quality and noise, were addressed under the Draft EA. The State Department of Agriculture (DOA) will be responsible for activities occurring on this site, and will use their best efforts in minimizing impacts on adjacent areas by limiting agricultural development closest to the residential areas to less intensive uses such as tree farms, nurseries, etc. Also, a minimum 30-foot setback will be provided along the property bordering the agricultural lots. Furthermore, commercial livestock and aquaculture production or other related activities will be excluded from this site.

Regarding hazards associated with the agricultural park, as previously discussed, the DOA will be responsible for regulating activities occurring on the site, and tenants will need to comply with applicable rules and regulations.

Traffic Comments

The roadway and intersection improvements planned as mitigative measures for Phase II and discussed in the Draft EA's traffic impact study will provide sufficient capacity to accommodate the projected traffic volumes. Consequently, all Collector Road intersections will operate at acceptable levels of service and sufficient laneage provided. Regional roadway improvements are being addressed by the Ewa Region Highway Master Plan Working Group of which the applicant is a member. Furthermore, the State Department of Transportation stated that the proposed amendment will not have additional impacts to their facilities, and the City Department of Transportation Services has no objections to the proposed amendment.

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Phone: (808) 674-3517 • Fax: (808) 674-1064

Bike paths are planned along the Collector Road, and an area for a park and ride facility is already planned in Phase I to serve the entire Royal Kunia development. Commercial sites are already provided at convenient locations within Phase I to serve area residents. Measures to encourage alternative modes of transportation are already being provided as previously discussed in the Draft EA, however, the use of these alternatives are individual choices.

Water, Drainage, And Recreation Facilities Comments

Necessary approvals for additional wells planned will be obtained at the appropriate time. Potable water facilities, including planned well systems, would be developed in conformance to applicable standards and regulations by the applicant and dedicated to the Board of Water Supply (BWS) for their use and maintenance. Since these wells have not been developed as yet, existing contaminants are not known at this time. However, other wells developed in the area with the granular activated carbon treatment system have effectively removed contaminants to allowable limits in compliance with regulatory standards. Operation and maintenance costs will be borne by the BWS on a continual basis through their annual operations and maintenance budget. For water conservation purposes, the use of drought tolerant plants and xeriscape principles for landscaping will be considered.

Village Park's drainage facilities will not be significantly impacted by runoff generated by the Increment 3 project. Furthermore, a revised drainage master plan for Phase II incorporating the proposed project will be submitted for review and approval by the Department of Public Works.

The park planned as part of the Increment 3 project will be for public use.

General Plan Policies Comments

Regarding comments on Policy 3 of the General Plan, the Draft EA stated that the project would be consistent with the urban expansion of Central Oahu, and represents a refinement to the continuing phased development of Royal Kunia. Consequently, the project will not cause an undesirable spreading of development since the site is designed Urban under the State Land Use Commission's district classifications and was previously planned for urban use such as a golf course. Furthermore, the Royal Kunia development has consistently been supported by the Waipahu Neighborhood Board and other community organizations.

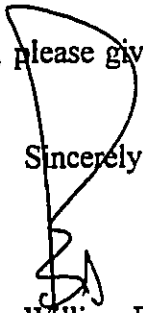
The construction effort for single-family homes generally has a higher number of man-years per unit than townhomes. Consequently, construction workers will be employed over a longer period to build the planned single-family homes occurring under the Phase II unit mix refinement provided by the Increment 3 project. However, the Final EA will be appropriately revised to reflect additional construction-related jobs created by the Increment 3 project.

Unaddressed Impacts Comments

The Draft EA addressed impacts to Waikele Stream and determined that the project is not expected to cause a significant impact on water quality. A revised drainage plan will be prepared and reviewed by the City which includes a detention basin to further mitigate surface runoff. Under planned drainage improvements, runoff generated by the project which discharges into Waikele Stream will not increase over existing conditions. Development plans and infrastructure plans shown are conceptual and would be refined during the design stage of development, however, necessary permits and government approvals for the project will be obtained at the appropriate time.

If you have any questions on this matter, please give me a call at 674-3517 or Mr. Ronald Sato of my office at 674-3515.

Sincerely,



William E. Wanket
President

APPENDIX B

**Market Study Of The Proposed
Royal Kunia, Phase II Master Plan Revision**

Prepared By: The Hallstrom Group, Inc.



**Market Study of the
PROPOSED ROYAL KUNIA
PHASE II MASTER PLAN REVISION**

Oahu, Hawaii

**Mr. Albert D. K. Chee, Jr.
Senior Project Manager
Halekua Development Corporation
Horita Development, Inc.**

**ARBITRATION
VALUATION AND
MARKET STUDIES**

**PAUHI TOWER
SUITE 1352
1201 BISHOP STREET
HONOLULU
HAWAII 96813**

**(825) 526-2444
FAX (825) 513-2147**

May 1996

STUDY CONCLUSION

Based on our investigation of the subject site, its environs, and analysis of its standing in the Oahu real estate market, we have reached the following conclusions regarding the proposed Phase II portion of the Royal Kunia master planned community and the land use map changes proposed for this "approved" acreage:

- The **Central Oahu** and **Ewa/Kapolei** regions of Oahu, which respectively comprise the primary and secondary market sectors for the Royal Kunia project, have the fastest growing populations on the island. Between 1980 and 1995, the number of residents in these areas increased by nearly 40 percent, to a total of 191,900; a period in which the population of the entire county grew by only 15 percent overall.

An estimated 27,837 housing units have been constructed over the past two decades in these Development Plan Areas as land use patterns have moved from feral and/or uneconomical agricultural cultivation to integrated, urbanized communities. The units have been well-received by the Oahu residential market with more than 98 percent sold to date. The favored product has been detached single-family homes which comprise more than 60 percent of the sector.

This fundamental land use transition has been a manufactured response by private interests and public agencies to relieve Oahu's chronic housing shortage, create additional quality homeownership options, and move the focus of residential development beyond the overstressed central core of Honolulu.

In addition to the large numbers of residential product and support development made available in the study area over the last 25 years, it has also evolved into a major economic force on Oahu. An estimated 11,200 persons are presently employed in the region, many within the James Campbell Industrial Park (the location of much of Hawaii's "heavy" industries), and the emerging retail/service/commercial industries. Although the demise of cane production will affect near-term employment in

the agricultural sector, this job loss will be replaced by general business growth in the area. Most importantly, extensive economic infrastructure, including a deep draft harbor, destination resort, and arterial upgrades have been undertaken to support future economic development.

- The westerly urbanization trend away from the historic Honolulu corridor is anticipated to continue unabated during the next several decades. Mid-point extrapolation using population estimates made by the City and County of Honolulu Planning Department indicate that up to 54,000 new housing units will be required in Central Oahu (19,000 units) and in Ewa/Kapolei (35,000) by the year 2010 if the regional market is to be adequately serviced. A similar level of growth is projected for the decade thereafter as well. Approximately 75 percent of this demand would be oriented towards units having a current price of \$350,000 or less (as is anticipated for the subject inventory).

Some 19,617 additional units in Central Oahu and 14,828 units in Ewa/Kapolei have been approved for construction over the next 20-plus years in order to meet the housing demands of island residents; representing upwards of 70 percent of the housing inventory to be built in the county by 2020. An additional 20,000-plus units have been preliminarily discussed by landowners. Virtually all are to be within master planned developments, such as Royal Kunia, which offer a range of land uses intended to promote integrated lifestyle opportunities.

A wide diversity of commercial real estate product is also proposed for the study region. An estimated 1,482 acres in business park and various intensity industrial lands have been approved, and demand for up to two million square feet of commercial floor area has been projected. The proposed construction of a University of Hawaii at Kapolei would further enhance real estate demand. These uses could cumulatively create 25,000 to 30,000 total new jobs in the region by 2020. Central Oahu and Ewa now contain the largest reservoirs of vacant industrial, business, and office lands on the island; with the structured component design of the City of Kapolei and the campus setting of the Mililani Technology Park being prime examples of the comprehensive development envisioned. It is

estimated that more than 60 percent of all new employment positions and 75 percent of new business ventures created on Oahu by 2020 will be located in the study area.

These new employment opportunities will more than offset the loss of direct and indirect regional employment due to the demise of the sugar industry. They will also be higher paying, more stable, and of greater diversity than the agricultural positions. These employees represent the prime purchase demographics for the proposed housing units.

The near-term slump in the Hawaii economy, while showing private construction activity and business growth statewide and in the study area, has affected Central Oahu and Ewa/Kapolei to a lesser degree than many other areas of the islands. Several large space commercial tenants have relocated to the area in recent years, and there continues to be confidence in long-term demand forecasts despite cyclical impacts.

- Central Oahu and Ewa have long been planned as areas for moderate priced, low to moderate density housing development. However, land and infrastructure economics, coupled with developer profit goals, have resulted in steadily increasing densities throughout the region, resulting in a greater building "weight" on the underlying land base than originally intended for the area.

Comprehensive surveys of home construction in the study area since 1978 show that 16,981 single-family residences were built on lots averaging 4,862 square feet. Over the study period, average lot sizes have dropped in 12 of the 16 years, stabilizing recently at about 4,600 square feet, about 82 percent of the homes built since 1978 are on lots averaging 5,000 square feet or less. The trend toward lots smaller than 6,000 square feet (outside of selected Makakilo projects) is continuing unabated in almost every community in an effort to cut cost and maximize profit.

During this decade, of the 4,699 single-family homes completed in Central Oahu and Ewa/Kapolei, only 249, or 5.3 percent, were within subdivisions having average lot sizes of 6,000 square feet or larger. While recognizing the economics

of smaller lot sizes, the number one purchaser complaint in the study area is the increasing density of the region, of its "becoming more like town."

Although lot sizes have uniformly decreased over time, the living areas of single-family residences have constantly increased in recent years. Since 1990, new homes in the study area have averaged circa 1,700 square feet in living space; this represents a 30 percent increase in average home size relative to those constructed between 1978 and 1987, which averaged about 1,300 square feet.

The movement towards greater planning densities is evident in multi-family projects as well. Units have decreased in average sizes, from some 1,150 square feet in the early 1980's, to between 650 to 1,000 square feet per unit in the more recent projects. Construction density has similarly increased from about 12 units per acre a decade ago to nearly 16 units per acre today.

The overall effect of increasing land use carrying capacities has been to create a relatively standardized density format throughout the competitive market area, with each project offering exceptionally homogeneous, "narrow band" of inventory. For the most part, the market is dominated by competitive product featuring similar-sized units on similar-sized lots. While this allows for maximum pricing efficiencies and developer profits, and fits a wide portion of the buyer demographic pyramid, it does not provide potential purchasers with a meaningful diversity of choice. Further, it has begun to degrade the long-term land use goals for the master planned communities of Central Oahu and Ewa which were intended to provide a low density suburban (as opposed to moderate to high urban) lifestyle.

Our analysis indicates this generally limited choice of inventory diversity could pose a major market acceptance concern over the long term unless aggressive steps to provide a larger spectrum of product are implemented. The integrated success of the Central Oahu and Ewa/Kapolei regional plans is dependent upon attracting the majority of Oahu home purchasers over the next two decades. Enhancing market

appeal by lowering residential densities is a prudent response by developers.

Several communities, notably at Makakilo and Mililani, stress the availability of larger lot sizes (6,000 to 7,500 square feet) in promotional materials, and discussions with these project agents indicate it to be a highly successful approach.

Our surveys demonstrate a significant number of potential home buyers prefer larger lot sizes for single-family homes, lessened densities for all residential product types, and less intense developments. Greater levels of household privacy, space to support future additions to the home, and areas for family recreational pursuits were the reasons most often cited for desiring a larger house lot. There is a general perception that many of the projects in Central Oahu and Ewa have become "cookie-cutter" developments, with the increasing intensities (while minimizing prices) eliminating the low density lifestyle which had been one of the region's primary selling points.

The longing among purchasers for larger lots in less dense communities is not surprising, nor is the reluctance on the part of buyers to pay a premium for such benefits; many of whom are already being stretched to the maximum in order to qualify for the existing inventory. Most prospective purchasers have indicated they would be willing to absorb the nominal per unit cost associated with a larger lot, to the extent they are able, but would not be willing to pay an exorbitant premium for an additional 1,000-plus square feet of land area.

However, those projects offering larger lot sizes (greater than 5,500 square feet) have experienced absorption rates 15 to 40 percent faster than otherwise competitive inventory cited on smaller parcels even though their prices are 5 to 12 percent higher. Given the subdued status of the residential real estate market on Oahu, this acceleration of sales is a highly notable indicator.

We are confident that were larger lot single-family products offered within Royal Kunia at the reasonable price currently envisioned, it would prove highly competitive with the other

regional existing and proposed inventory and achieve a faster rate of sales than would otherwise be experienced.

- The Royal Kunia project is one of more than a dozen approved in-construction or planned residential oriented developments in Central Oahu. Since ground-breaking in 1988, a total of 245 single-family homes and 471 multi-family units (including 152 rental apartment units) have been completed in the subject community; over 95 percent of which have been successfully absorbed. At present, there are 82 units under-construction, with another 214 units being in the site development phase. The project is being actively marketed through a multi-media promotion program. These units represent just under half of the 2,000 total units proposed for Phase I of the community, and project realtors anticipate absorption of the under-construction units by mid-1998. Full sell-out and delivery of Phase I is forecast by year 2007-08.

Prices for the units currently being offered range from \$290,000 to \$350,000 for the "market" single-family homes, and from \$95,000 to \$196,300 for the salable multi-family units. 150 units of the initial multi-family product were offered as "affordable-rental" apartments and were quickly absorbed upon offering. These prices are comparable to competitive products being offered in other regional developments and would be considered affordable to about three-quarters of the overall area market demographics.

To date, the inventory constructed has been typical of the region, with single-family homes ranging in size from 1,200 to 1,800 square feet and sited on lots averaging less than 4,500 square feet. Multi-family product has ranged in size from 500 to 1,000 square feet of living area and is built at densities averaging 15-plus units per acre. The remainder of Phase I development at Royal Kunia is anticipated to follow these general guidelines.

The project has been "captured" approximately 11.2 percent of the overall Central Oahu new unit residential sector since 1989. This is about average among the regional developments. It is anticipated the market share or capture rate of the subject community will increase as it becomes more established in the

market and unit construction progresses. Without the proposed master plan changes to Phase II, which we believe will stimulate sales, we would expect the project could achieve stabilized capture rates of 12 to 14 percent of total area demand.

Surveys of Royal Kunia purchasers and strongly interested parties show the majority are young (with an average age of about 33), relocating from elsewhere in Central Oahu (79 percent), currently renting or living with extended families (93 percent), and of Filipino or Japanese ancestry (66 percent).

Within the context of our study, a critical demographic indicator is that *80 percent of the respondents are married with children, or part of an extended family occupying a single home*. The market data indicates large and growing households are distinctly attracted to products having the capability for expansion of household living area. Such prospects are inherently limited by smaller lots (less than 5,000 square feet) within intense developments, but will be possible within the revised Phase II master plan. Model homes are currently being designed for the proposed larger lots which will have readily expandable layouts and exteriors.

- We conclude the proposed adaptations to the Royal Kunia Phase II master plan to be reasonable, market-supported, and a responsive effort to maximize land use efficiencies and product competitiveness.

Master plans are, by nature, living designs which must evolve in order to achieve success in a cyclical market environment demographics. We support the proposed master plan changes for the following reasons:

1. Lessened densities and larger lot sizes will provide diversity within Royal Kunia by offering a product-type which is highly sought after, though generally undersupplied, in the regional marketplace. It will serve to set the project apart from the large number of competitive developments.

2. By providing additional space for future home expansion, enhanced privacy, and room for more at-home activities, the inventory will directly appeal to the primary home-buyer group which has historically been attracted to the subject project. It will also help "turn the tide" in Central Oahu and Ewa/Kapolei away from increasing project intensities, a trend that is proving discouraging to purchasers who view the region as a low-density alternative to urban Honolulu.
3. The home-buying public will directly benefit in several ways from the master plan changes. First, with the exclusion of the premium-priced golf course-fronting lots, the average price of finished homes in Royal Kunia Phase II will decrease by about two percent overall. Secondly, while the cost of the additional lot area will be nominal to the initial purchaser, it will enhance the value of the home at resale and make it more competitive in the open market. And thirdly, larger lots in combination with expandable basic floor plans will allow homeowners to make incremental expansions/upgrades when money is available that will further increase the value of the residence upon resale.
4. The market penetration, or capture, rate of Royal Kunia Phase II will be increased by several points through the offering of larger houselots, thereby speeding product absorption. We anticipate construction under the revised master plan would increase capture rates for the entire community by several points to some 15 to 18 percent of total Central Oahu residential demand. Such levels would be competitive with other major projects (notably Mililani) which also offer a diversity of inventory densities. A market share of this scale would lead to sell-out of the Phase II units two to five years faster than under the existing land use design.
5. The demand for further golf course construction on Oahu has declined dramatically in recent years due to poor capital investment and over-supply factors. The conversion of this subject acreage into low intensity residential development is highly prudent given market

influences. Additionally, according to the developer, the need for the buffering course acreage no longer exists.

6. The approved golf course design, fully contained within a bulk acreage buffer holding at different grade from the rest of the development, would have provided only a nominal amenity for Phase II. There were to be only about 60 course-fronting premium lots (an exceptionally low number) and terrain undulations restricted available course views. The large majority of Phase II homeowners would not have benefited from the course, while under the revised plan the lower densities and increased lot sizes and open space allocations enhances all of the homes. Regional buyer surveys strongly indicate the vast majority of the Central Oahu and Ewa purchasers would rather spend limited housing dollars for larger homes and larger lots, than course fronting properties. Data also indicate the primary purchaser demographic for Royal Kunia units are not avid golfers.
7. As the approvals are already in place for the 2,000 Phase II units, the master plan revision will not affect the balanced level of housing supply proposed for Central Oahu and Ewa, but is merely considered a response intended to increase competitiveness by harnessing evolving market forces.
8. The proposed Increment 3 changes in Phase II are the cornerstone of the planned land use revisions. The conversion of this 156.8 acres from golf course to single-family use will allow for lessened intensity throughout the entire phase. Containing 581 single-family homes, the site will have a density of only 3.7 units per acre; a highly desirable level in the competitive market. The net density (after allowances for park land, roadways, and open space) will be only 4.64 acres, about 50 percent less than the initially approved level for Phase II.

The relatively "spread-out" design of Increment 3 will allow for greater levels of open space, and (importantly) on-street parking as the roadways will all be wider; two buyer preferences repeatedly cited in surveys taken as part of Phase I sales.

- By increasing the rate of residential product absorption, the economic impact of Royal Kunia Phase II on the Oahu economy will be enhanced in the near term relative to the existing master plan. Speedier home sales will create needs for more construction and supply jobs sooner and place more consumers in the region faster.

PROJECT IDENTIFICATION AND REGIONAL OVERVIEW

The Royal Kunia community was conceived in the mid-1980's as an opportunity to service the chronic housing shortages then-plaguing Oahu through development of a master planned, mixed-use project providing a quality of lifestyle generally unavailable to the lower to mid-market households. The approved two-phased design encompassed some 1,346 gross acres and called for construction of up to 4,000 housing units (evenly divided between the phases), with supporting golf course, industrial, commercial, agricultural, public and open space uses.

The subject was envisioned as a natural expansion of greater Waipahu Town, Oahu's fourth largest city, building upon the strong market acceptance of the abutting Village Park project, a first-generation master planned development which had successfully sold all its residential inventory (on a leasehold basis) by the late 1980's. Although the historically strong employers of the region, primarily cane cultivation/processing and the Pearl Harbor shipyards, have been in decline in recent years, Waipahu continues to be a sought after housing location due to its ease of access to both central Honolulu and the emerging job centers at Ewa/Kapolei, its well-established ethnic composition, and proximity to the "country" areas of the island.

Royal Kunia is located within the Ewa Taxation District of the City and County of Honolulu, a 200 square mile region comprising the southwesterly quadrant of Oahu. The district, the island's largest,

includes the Central Oahu and Ewa/Kapolei development plan areas. The subject is located on the cusp of the two areas, lying within the Central Oahu boundaries but heavily influenced by the nearby Ewa/Kapolei market.

Over the past two decades this area of Oahu has experienced significant development, with the resident population more than doubling since 1970, expanding at a rate of more than three percent compounded annually; twice the state average. Capital investment and economic opportunities have commensurately escalated. Generally, the region has been moving through a transition from agrarian to urbanized land uses, a transformation which has and is occurring in many sectors of Hawaii.

By year-end 1995, the resident population of the two Development Plan Areas was estimated at 191,900, roughly 20 percent of the Oahu total, and contained about 11,200 employment positions, or circa 2.5 percent of island jobs. If development proceeds as planned through 2010, Central Oahu and Ewa/Kapolei will contain up to 322,500 residents (21.9 percent of the island total), more than 40,000 employment opportunities (8.2 percent of all Oahu jobs), some three million square feet of commercial space, and 3,000-plus acres of industrial development.

In light of the exceptional growth of Honolulu since statehood, the movement of urban uses towards the study area was logical and anticipated. Being constrained between the mountains and the sea, Honolulu has absorbed virtually all of the vacant acreage to the east (Kahala-Hawaii Kai), and is rapidly redeveloping the older neighborhoods in the urban core. Westward expansion into Central Oahu and the Ewa plain presented the most reasonable alternative for county planners and private developers alike, utilizing the H-1 Freeway corridor as a transportation link. These areas of the island have become the focus of residential construction activity during the past 15 years.

Overall, the Ewa District has perhaps the widest variety of land use types of any region in the state, including agricultural, military, resort, marine, industrial, residential, commercial and vast tracts of conservation/open lands.

The Central Oahu portion of the Ewa District contains a wide diversity of land forms, stretching from the estuary lowlands encircling Pearl Harbor to heavily wooded rain forests in the upper valleys of the Koolau and Waianae Mountains, which include large isolated tracts comprising the Ewa and Honouliuli Forest Reserves.

Generally, the area is considered to be defined by the interior slopes of the two mountain ranges and the central plateau which connects them. Elevations range from sea level to 3,500 feet at the crest of the Koolaus, with most urban and agricultural land uses confined to areas below the 1,000 foot elevation.

The land rises from Pearl Harbor inland at a relatively consistent slope, increasing in severity at the foothills and lower flanks of the respective defining mountain ranges. The central section, which continues a gradual grade to the most northerly areas of the district, is cut by deep ravines (or gulches) leading seaward from the mountains.

Excellent mauka and makai views are available from many points throughout the 70,000 acre (9 by 12 miles) Central Oahu region, a result of the sloping topography. Even for those locations on the interior plateau, which have no ocean view, the panorama provided by the sculpted mountain ranges is one of the most scenic in the islands.

Average daily temperatures range from 72 to 81 degrees at Waipahu, decreasing to 70 to 78 degrees at Mililani Town, and down to 55 degrees at the crest of the Koolaus. Regional rainfall has a similar variance; less than 20 inches annually at Waipahu, 40 inches at Mililani, and over 200 inches in some of the cloud-shrouded mountain valleys.

Details regarding the Central Oahu and Ewa/Kapolei regions, addressing the economic, population and planning parameters of the area are further available through The Hallstrom Group, Inc.

We consider the tabular presentation of the lands approved for industrial and commercial uses to be of specific importance to our study. These lands represent the majority of developable acreage needed for Oahu's economic growth over the coming decades. The availability of zoned lands, supporting infrastructure and regional amenities will serve not only to focus capital investment in the region,

but also attract large numbers of resident workers and businessmen who desire to live near their place of employment.

The Royal Kunia holding represented one of the best locations at which to meet the residential and associated land use requirements of Central Oahu. It is less than a mile from the H-1 Freeway, with direct access via the Kunia Road interchange. Kunia Road, which fronts the project, is a major arterial running into central Waipahu (makai) and to Wahiawa/North Shore (mauka). Ease of movement is a critical factor in purchaser decisions, as traffic congestion continues to increase throughout the island, and lessening of commute time is an emerging lifestyle issue.

Although ocean views are not specifically available from the property, excellent mountain and territorial panoramas are unobscured from most sites. Being somewhat inland from Pearl Harbor, and at the 475 to 550 foot elevation level, the climate is cooler and less humid than Waipahu, and among the more favorable in the region.

As initially approved, Royal Kunia was planned to contain the following land uses:

	Use Type	Acreage	Units
Phase I	Single-Family	190.3	1,200 homes
	Multi-Family	58.1	800 units
	Industrial	15.7	
	Golf Course	335.1	36 holes
	Park Circulation	20.4	
Phase II	Single-Family	124.0	800 homes
	Multi-Family	74.0	1,200 units
	Business Park	123.0	
	School	6.0	
	Park	10.0	
	Agricultural Subd.	150.0	
	Circulation Golf Course	8.0 123.0	18 holes

Like all master plans encompassing large areas being developed over a prolonged period, adaptations to the initially approved subject design were inevitable due to changes in market, capital, resource or other conditions. Virtually all such projects throughout the islands, whether

residential, resort, industrial or commercially oriented have experienced the need to revise their land use component structure in response to the on-going evolutions in the marketplace.

Typically, the revisions are intended to result in a more efficient use of the underlying site and place the development in a more competitive position.

In this light, the proposed changes to the Phase II increments of Royal Kunia are both anticipated and reasonable progressions in the lifespan of the community. With the demand for golf courses sagging, and an expressed desire among regional purchasers for larger lots, the use of the golf course lands to create lower densities within the residential component is a highly logical move by the developers.

Whereas the initial Phase II design called for 2,000 units to be spread over 198 net developable acres, equal to a density of 10.1 units per acre, the proposed master plan changes will add about another 125 acres to the residential component without increasing the total number of units. The overall density will thus decrease by 40 percent, to about 6.1 units per acre.⁽¹⁾

Most critically, the density of the single-family component will drop from the originally designed 6.5 units per acre, or an average lot size of about 4,500 square feet (similar to most of the other products in the region), to a density of 3.7 units per acre, or an average lot size upwards of 6,000 square feet (notably larger than most competitive projects). Elimination of the golf course site will also allow for some 30 additional acres of community park areas, open space, and green belts.

In summary, we believe the Royal Kunia project is considered by the market to be a single master planned entity within the Central Oahu and Ewa/Kapolei market region. As such, the proposed design changes for Phase II (and particularly Increment 3) are merely a

(1) The initially approved golf course component of Phase II contained 156.8 acres. This area is now to be used as the Increment 3 single-family expansion acreage, of which approximately 10 acres will be a park site and circa 20-plus acres will be used for open space, roadways and drainage control. The net subdividable residential land created by removing the course will thus be about 125 acres.

natural progression in the reallocation of community land resources in order to maximize the market appeal of the single-family product.

QUANTIFICATION OF REGIONAL HOUSING DEMAND

Demand for the 2,000 housing units of Royal Kunia Phase II will be a function of two factors: **population growth** in the region, and the **competitiveness of the subject inventory** relative to alternative projects. As previously noted, the proposed subject units have already achieved necessary approvals to proceed, but we have undertaken this baseline demand analysis in order to provide a context for our investigation of supply trends and absorption forecasts for the revised subject product.

We have quantified the demand for housing units in the Central Oahu market sector until the year 2020 through extrapolation of the published City and County of Honolulu Development Plan range of population estimates for the region in combination with derived market factors.

The Development Plan Annual Report - Fiscal Year 1995, presents four population estimate alternatives. The forecasts are defined as follows:

- **General Plan Population Guidelines for the Year 2010.** These low and high estimates are based on the state's Series M-K projections for Oahu according to the population distribution set forth in Population Objective C of the General Plan, Policy 4. Under these projections the resident population of Central Oahu by 2010 will be in the range of 148,900 to 164,900 persons, and represent 14.9 to 16.5 percent of the total island population.
- **Likely Population in the Year 2010.** In this estimate, supply-side factors are taken into account along with demand-side factors. These variables include the Series M-K projections, historical development trends, market conditions and expectations, and land use policies of the Development Plan. In this forecast, the resident population of Central Oahu by the

year 2010 would be 166,700 persons (or 1.09 percent above the high end of the General Plan guidelines).

- **Population Capacity/Potential.** This estimate is determined by identifying all of the housing units which either the Development Plan either explicitly allow or cannot prohibit. Market-based household sizes are applied to the unit count, with the result being the level of population which could occur in the year 2010 if the land use policies of the Development Plan were completely followed. This projection generates a study area population of 176,700 persons, or 7.16 percent above the high end of the published General Plan guidelines. Under these assumptions, Central Oahu would be the second most populous of Oahu's eight Development Plan Areas (trailing only the Primary Urban Center), and house some 16.4 percent of the island's residents.

A summary of these extended projections for the study area is shown on Table 1.

While we recognize the Central Oahu Development Plan estimates prepared by city and county agencies are defined public objectives, the reality is that market demand moves independently and cannot be strictly contained without the specter of severe adverse economic impacts if real property supply fails to meet demand trends. Under such conditions, which have historically plagued Oahu's housing market, unit prices appreciate rapidly, competition for available homes results in lower-income families being displaced, and the local commercial sectors stagnate without the "new blood" necessary to keep it vitalized.

In the past, public agency population estimates have been generally conservative and understated relative to actual market movement. However, we have adopted these county agency figures for our forecast purposes while acknowledging their historically moderate nature.

Using these population projections as a range of minimum to maximum indicators, we have calculated the number of housing units which will be necessary to fully service the Central Oahu region over the next 25 years (1996 through 2020). In order to adapt the county population estimates to the extended time frame, as we consider the

TABLE 1

CITY & COUNTY OF HONOLULU RESIDENT POPULATION PROJECTIONS FOR
 THE CENTRAL OAHU DEVELOPMENT PLAN AREA 1995 TO 2020
 Market Study of the Proposed Royal Kunia Phase III Development
 Kunia, Oahu, Hawaii

Scenario One: Projections Using "Low" City & County General Plan Guidelines

Year	1995 (1)	2000	2005	2010	2015	2020	Net Population Increase
Resident Population (2)	133,500	137,350	141,200	145,050	148,900	152,750	19,250

Scenario Two: Projections Using "High" City & County General Plan Guidelines

Year	1995 (1)	2000	2005	2010	2015	2020	Net Population Increase
Resident Population (2)	133,500	141,350	149,200	157,050	164,900	172,750	39,250

Scenario Three: Projections Using City & County "Likely Population" Guidelines

Year	1995 (1)	2000	2005	2010	2015	2020	Net Population Increase
Resident Population (2)	133,500	141,800	150,100	158,400	166,700	175,000	41,500

Scenario Four: Projections Using City & County "Population Capacity" Guidelines

Year	1995 (1)	2000	2005	2010	2015	2020	Net Population Increase
Resident Population (2)	133,500	144,300	155,100	165,900	176,700	187,500	54,000

(1) Year-end estimate.

(2) Assuming straight-line population growth from present to Development Plan Annual Report 2010 forecasts.

Source: C&C of Honolulu Dept. of Planning Department Fiscal Year 1995 report, and The Hallstrom Appraisal Group, Inc.

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

15-year projection period (to 2010) too brief for meaningful long-term projections, we have merely assumed the rate of population growth from 1996 through 2010 will continue into the subsequent decade.

While a significant portion of the housing demand will be created by resident households (existing, newly formed and in-migrating), there are several other demand factors which must be considered when quantifying the total number of units required to create a healthy and stable regional market. They include:

- A **vacancy allowance**, to account for units under repair, in transition between users, and as a margin to cushion against hyperappreciation during strong demand periods. We have tested vacancy rates ranging from three to five percent.
- A **non-resident "investor/second home" allowance**, to account for the fact that upwards of seven percent of all Oahu units are held by off-island interests and generally kept out of the resident pool. While we do not consider Central Oahu to be a focus of such purchasers, the central location, quality and affordability of product, and availability of numerous golf courses in the region will attract a reasonable number of such buyers. We have, therefore, tested non-resident allowances of four to six percent of total resident household demand.

While this demand component is depicted as a static factor, it has historically been highly cyclical, as evidenced by the massive influx of Southern California and Canadian purchasers in the late 1970's, and Japanese purchasers in the late 1980's; periods which were followed by years of substantially lessened activity for non-resident purchasers. We anticipate similar investor "spikes" will occur periodically over the projection period.

- A **transient housing allowance**, to account for military users, students at the proposed UH Kapolei campus, and other short-term needs for housing on a non-permanent basis. A minimal allowance of one to two percent of total resident demand was incorporated to account for this demand component.

While not considered as a separate factor, during the projection period some units will reach the end of their effective lifespan, becoming

dilapidated and unavailable to service the resident population. We have assumed this minor loss component to be captured within the other factors comprising the model.

The average household size figure in the equation is based on historical trends evident in the Central Oahu region as taken from the *Neighborhood Statistics Program* covering the subject area. The study "neighborhoods" have among the highest average household sizes for any region on the island, currently estimated at 3.60 persons per unit. This compares with a countywide average of 3.01 persons.

We consider the above-average size of the subject area households to further support for the proposed larger lot sizes at Royal Kunia Phase II which could more readily provide for larger homes and greater house expansion potentials.

However, in keeping with evident long-term demographic trends, we do anticipate the average household size in Central Oahu will decline over the next two decades, falling to between 3.02 and 3.25 persons, which would still be above the anticipated Oahu average of circa 2.75 persons per unit by that time.

The application of the housing demand formula to the subject region is shown on Table 2.

Based on our analysis, the actualization of a healthy and stable housing market in Central Oahu will require the construction of some 26,362 additional units in the region by the year 2020 (using the average demand estimate), or an average of 1,054 new units finished annually.

In accordance with long-term trends, these future housing requirements can be striated into probable percentile demand by sales prices at current dollar levels. Table 3 illustrates this estimated price division of forecast minimum, mid-point and maximum demand.

As can be seen, circa 75 percent of the entire market demand, having a current sales price of up to \$350,000 will be necessary over the next 25 years if all sectors of the market are to be filled.

At this time, it is anticipated that virtually all of the Royal Kunia Phase II units will fall into this price range. In fact, approximately 30 percent of the units will fall into the "affordable" pricing

TABLE 2

**QUANTIFICATION OF HOUSING UNIT DEMAND FOR THE
CENTRAL OAHU DEVELOPMENT PLAN AREA 1995 TO 2020**
Market Study of the Proposed Royal Kunia Phase III Development
Kunia, Oahu, Hawaii

	1995 (1)	2000	2005	2010	2015	2020	Additional Units Required by 2020 (2)
Scenario One: Projections Using "Low" City & County General Plan Guidelines and Conservative Allowance Factors							
Resident Population (3)	133,500	137,350	141,200	145,050	148,900	152,750	
Average Household Size	3.60	3.50	3.40	3.32	3.25	3.20	
Total Resident Units Required	37,083	39,243	41,529	43,690	45,815	47,734	
Vacancy Allowance (3% of resident unit demand)	1,113	1,177	1,246	1,311	1,374	1,432	
Non-Resident Purchaser Allowance (6% of resident unit demand)	2,225	2,355	2,492	2,621	2,749	2,864	
Transient Housing Allowance (2% of resident unit demand)	742	785	831	874	916	955	
TOTAL MARKET UNIT DEMAND	41,163	43,560	46,098	48,496	50,855	52,985	12,166
Scenario Two: Projections Using "High" City & County General Plan Guidelines and Optimistic Allowance Factors							
Resident Population (3)	133,500	141,350	149,200	157,050	164,900	172,750	
Average Household Size	3.60	3.45	3.32	3.20	3.10	3.02	
Total Resident Units Required	37,083	40,971	44,940	49,078	53,194	57,202	
Vacancy Allowance (5% of resident unit demand)	1,854	2,049	2,247	2,454	2,660	2,860	
Non-Resident Purchaser Allowance (8% of resident unit demand)	2,967	3,278	3,595	3,926	4,255	4,576	
Transient Housing Allowance (2% of resident unit demand)	742	819	899	982	1,064	1,144	
TOTAL MARKET UNIT DEMAND	42,646	47,117	51,681	56,440	61,173	65,782	24,963
Scenario Three: Projections Using City & County "Likely Population" Guidelines and Conservative Allowance Factors							
Resident Population	133,500	141,800	150,100	158,400	166,700	175,000	
Average Household Size	3.60	3.50	3.42	3.36	3.30	3.25	
Total Resident Units Required	37,083	40,514	43,889	47,143	50,515	53,846	
Vacancy Allowance (3% of resident unit demand)	1,113	1,215	1,317	1,414	1,515	1,615	
Non-Resident Purchaser Allowance (6% of resident unit demand)	2,225	2,431	2,633	2,829	3,031	3,231	
Transient Housing Allowance (2% of resident unit demand)	742	810	878	943	1,010	1,077	
TOTAL MARKET UNIT DEMAND	41,163	44,971	48,717	52,329	56,072	59,769	18,950
Scenario Four: Projections Using City & County "Population Capacity" Guidelines and Optimistic Allowance Factors							
Resident Population	133,500	144,300	155,100	165,900	176,700	187,500	
Average Household Size	3.60	3.45	3.32	3.20	3.10	3.20	
Total Resident Units Required	37,083	41,826	46,717	51,844	57,000	58,594	
Vacancy Allowance (5% of resident unit demand)	1,854	2,091	2,336	2,592	2,850	2,930	
Non-Resident Purchaser Allowance (8% of resident unit demand)	2,967	3,346	3,737	4,148	4,560	4,688	
Transient Housing Allowance (2% of resident unit demand)	742	837	934	1,037	1,140	1,172	
TOTAL MARKET UNIT DEMAND	42,646	48,100	53,724	59,620	65,550	67,383	26,564

CONCLUDED HOUSING UNIT DEMAND RANGE

MINIMUM	12,166
MAXIMUM	26,564
AVERAGE	20,661

- (1) Year-end estimate.
 (2) There were an estimated 40,819 housing units in Central Oahu at year-end 1995, resulting in a latent market demand for a minimum of 344 units needed to achieve market stability.
 (3) Assuming straight-line population growth from present to Development Plan Annual Report 2010 forecasts.

Source: C&C of Honolulu Dept. of General Planning, Various and The Hallstrom Appraisal Group, Inc.

TABLE 3

STRATIFICATION OF PROJECTED HOUSING UNIT DEMAND ACCORDING TO CURRENT PRICE LEVELS IN THE CENTRAL OAHU DEVELOPMENT PLAN AREA
 Market Study of the Proposed Royal Kunia Phase III Development
 Kunia, Oahu, Hawaii

Current Sales Price	ADDITIONAL HOUSING UNITS REQUIRED BY YEAR 2010					
	Minimum		Average		Maximum	
	Number of Units	Percent of Total Demand	Number of Units	Percent of Total Demand	Number of Units	Percent of Total Demand
Under \$175,000	3,771	31.00%	6,405	31.00%	8,232	31.00%
\$175,000 to \$325,000	4,866	40.00%	8,264	40.00%	10,622	40.00%
\$325,000 to \$500,000	2,555	21.00%	4,339	21.00%	5,577	21.00%
\$500,000 to \$700,000	730	6.00%	1,240	6.00%	1,593	6.00%
Over \$750,000	243	2.00%	413	2.00%	531	2.00%
Totals	12,166	100.00%	20,661	100.00%	26,556	100.00%

Source: US Dept. of Housing & Urban Development, Honolulu Board of Realtors,
 and The Hallstrom Appraisal Group, Inc.

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.

spectrum. Based on this analysis we believe there is more than sufficient demand to absorb the subject units under either the initial or revised master plan within a reasonable period. And, even if the prices for subject single-family homes are increased by an average of ten percent to account for the larger lots sizes offered (which is not planned at this time), the inventory would still fall within the dominant portion of the demographic demand pyramid.

Presentation of the housing quantification formula and statistical support have been retained in The Hallstrom Group, Inc. files.

ANALYSIS OF THE HISTORIC CENTRAL OAHU/EWA HOUSING MARKET

Prior to 1970, the Central Oahu housing market was primarily limited to Waipahu, Wahiawa, and scattered villages, gathered around employment and commercial centers; primarily involving cane production/processing and servicing nearby military installations. Subsequently, first generation master planned residential communities were developed on bulk acreage holdings on the fringe of existing urban centers or on sites having access to the then-new H-1 and H-2 Freeways. Mililani, Foster Village, Village Park and Waipio were early (and successful) examples of this market trend.

By 1978, there were an estimated 43,000 total housing units in the Ewa Taxation District (which incorporates the Central Oahu and Ewa Development Plan Areas), most being of an older vintage, but with newer construction beginning its emergence towards domination of the market. Central Oahu and Ewa were no longer viewed as undesirable, outlying locales but as moderately priced, less intense lifestyle alternatives to urban Honolulu neighborhoods.

Since that time, some 27,837 units have been constructed in the study regions, almost all within large-scale developments. Demand for both single and multi-family units were extraordinarily high until late 1992, with absorption over the past three years being dampened by the prolonged Hawaii economic slump.

To date more than 98 percent of all finished inventory has been sold and average prices have nearly tripled since the late 1970's, moving

upward from an average of \$111,881 in 1979, to \$316,563 by year-end 1994.

From 1978 through 1994 (the most recent full-year survey data available), the majority of units built in Central Oahu and Ewa/Kapolei have been single-family homes totaling 16,981 residences, or about 61 percent of the units constructed. Some 10,856 multi-family units were finished during the same time frame, or 39 percent of the residential construction activity.

A comprehensive annualized project-by-project summary of the single-family homes built in the study region since 1978 is shown on Table 4. Of primary concern in our investigation was the average lot and unit sizes and the way in which these factors may have impacted speed of product absorption.

We note, the tendencies evidenced by the data extracted from 1978 through 1994 from Bank of Hawaii publications, continued into 1995 according to discussion with the Bank's survey personnel and information compiled by the City and County of Honolulu Planning Department as released in the aforesaid 1995 annual report. The most notable change has been in the rate of sales of finished inventory, which continued to decline during last year to 82 percent of finished units.

Still, some 1,264 units were constructed in 1994 and an estimated 1,307 in 1995. These two years were considered as slow economically for the state. Overall, the unit completion figures continue to compare favorably with the annual average over the study period of 1,547 units finished each year.

In comparison with the entirety of Oahu, the proportion of single to multi-family units is heavily weighted towards the former in the study regions. According to the 1990 census, 155,467 units, or 55 percent of the island's total housing inventory of 281,683 units were classified as "1 unit, detached" or "1 unit, attached", virtually all of the remaining 45 percent being considered as one of several multifamily-type structures.

As our report is intended to focus on the single-family residential component of the subject. Supporting multi-family construction and

TABLE 4

SUMMARY OF SINGLE FAMILY HOUSING DEVELOPMENT AND ORIGINAL SALES IN THE CENTRAL OAHU & EWA / KAPOLEI REGIONS 1978 TO 1994
Market Study of the Proposed Royal Kunia Phase III Development
Kunua, Oahu, Hawaii

| Year | Project | Tenure | Typical Size (SF) | | Total Units Completed | Sales | | | | Sales as a Percent of Completions | Sales Price | | | |
|---------------|----------------------|-------------|-------------------|-------------|-----------------------|-------|-----|-----|-------|-----------------------------------|-------------|-----------|-----------------------------|--|
| | | | House | Lot | | 2br | 3br | 4br | Total | | Minimum | Maximum | Average | |
| 1978 | Palehua Vista (1-4) | Fee | 1,551 | 5,000 | 108 | 0 | 46 | 23 | 69 | 63.89 | \$82,600 | \$115,850 | Data Not Available For 1978 | |
| | Kapalei Neighborhood | Fee | 1,098 | 5,500 | 100 | 2 | 28 | 17 | 47 | 47.00 | \$68,400 | \$91,273 | | |
| | Puu Palehua (1-4) | Fee | 1,297 | 5,000 | 64 | 0 | 36 | 15 | 51 | 79.69 | \$76,280 | \$93,470 | | |
| | Waipahu Terrace | Fee | 1,200 | 5,000 | 85 | 0 | 0 | 55 | 27 | 57.89 | \$60,000 | \$100,000 | | |
| | Mililani Town 29A | Fee | 1,350 | 6,185 | 27 | 1 | 15 | 11 | 27 | 100.00 | \$74,025 | \$96,135 | | |
| | Mililani Town 37 | Fee | 1,350 | 6,500 | 87 | 8 | 30 | 7 | 45 | 51.72 | \$78,700 | \$88,535 | | |
| | Mililani Town 35 | Fee | 1,350 | 6,500 | 83 | 0 | 18 | 6 | 24 | 28.92 | \$76,600 | \$103,800 | | |
| | Mililani Town 38 | Fee | 1,350 | 6,520 | 93 | 13 | 57 | 23 | 93 | 100.00 | \$70,275 | \$109,865 | | |
| | Mililani Town 39 | Fee | 1,350 | 6,500 | 89 | 11 | 39 | 39 | 89 | 100.00 | \$73,315 | \$110,625 | | |
| | Mililani Town 40 | Fee | 1,350 | 6,500 | 55 | 2 | 31 | 22 | 55 | 100.00 | \$79,275 | \$120,228 | | |
| | Mililani Town 41 | Fee | 1,350 | 6,500 | 41 | 2 | 24 | 15 | 41 | 100.00 | \$82,230 | \$121,205 | | |
| | Mililani Town CL35 | Fee | 1,350 | 5,000 | 137 | 6 | 31 | 20 | 57 | 41.61 | \$89,310 | \$95,180 | | |
| | Mililani Town CL38 | Fee | 1,400 | 5,000 | 90 | 10 | 34 | 46 | 90 | 100.00 | \$75,605 | \$110,360 | | |
| | Momilani Villa 1 | Fee | 1,200 | 4,500 | 67 | - | - | - | 59 | 88.08 | \$72,000 | \$79,000 | | |
| | Harbor Terrace | Fee | 1,200 | 4,500 | 140 | 0 | 140 | 0 | 140 | 100.00 | \$86,500 | \$100,000 | | |
| | Newtown Estates IV | Fee | 1,500 | 6,000 | 210 | 0 | 184 | 16 | 210 | 100.00 | \$97,500 | \$138,000 | | |
| | Kehema | Fee | 1,200-1,945 | 3,093-6,650 | 40 | 0 | 0 | N/A | 40 | 100.00 | \$95,800 | \$122,800 | | |
| Leleupua I | Fee | 1,637-2,464 | 5,000-7,000 | 60 | 0 | 30 | 29 | 59 | 98.33 | \$114,400 | \$138,700 | | | |
| Leleupua II | Fee | 1,637-2,464 | 5,000-7,000 | 79 | 0 | N/A | N/A | 59 | 74.68 | \$114,400 | \$138,700 | | | |
| ANNUAL TOTALS | | | | | 1,665 | | | | 1,310 | 78.68 | | | | |
| 1979 | Palehua Heights | Fee | 1,350 | 5,500 | 70 | 0 | 52 | 11 | 63 | 90.00 | \$99,200 | \$163,500 | \$131,350 | |
| | Palehua Heights II | Fee | 1,350 | 5,500 | 172 | 0 | 11 | 31 | 42 | 24.42 | \$112,500 | \$174,000 | \$143,250 | |
| | Palehua Vista | Fee | 1,551 | 5,000 | 57 | 0 | 45 | 12 | 57 | 100.00 | \$82,800 | \$130,900 | \$106,750 | |
| | Waipio by Gentry I | Fee | 1,895 | 5,628 | 100 | 0 | 51 | 49 | 100 | 100.00 | \$111,400 | \$138,700 | \$123,216 | |
| | Waipio by Gentry II | Fee | 1,817 | 5,760 | 112 | 0 | 76 | 36 | 112 | 100.00 | \$120,500 | \$159,600 | \$148,215 | |
| | Waipio by Gentry III | Fee | 1,531 | 4,273 | 67 | 0 | 53 | 14 | 67 | 100.00 | \$93,900 | \$122,800 | \$109,883 | |
| | Mililani Town | Fee | 1,350 | 4,150 | 73 | 10 | 17 | 46 | 73 | 100.00 | \$65,565 | \$121,375 | \$92,500 | |
| | Mililani Town | Fee | 1,475 | 6,050 | 154 | 7 | 33 | 51 | 91 | 59.09 | \$96,600 | \$141,500 | \$123,900 | |
| | Mililani Town | Fee | 1,330 | 5,300 | 160 | 21 | 42 | 49 | 112 | 70.00 | \$74,440 | \$137,400 | \$108,000 | |
| | Village Park | Lease | 1,100 | 4,000 | 477 | 0 | 200 | 62 | 262 | 54.93 | N/A | N/A | \$120,000 | |
| | Village Park I | Lease | 1,100 | 4,000 | 130 | 0 | 97 | 33 | 130 | 100.00 | \$77,000 | \$86,000 | \$78,000 | |
| | Village Park II, IV | Lease | 1,100 | 4,000 | 113 | 0 | 50 | 27 | 77 | 68.14 | \$85,000 | \$100,000 | \$92,000 | |
| | Newtown Estates IV | Fee | 2,500 | 6,000 | 61 | 0 | 41 | 20 | 61 | 100.00 | \$94,000 | \$115,000 | \$104,000 | |
| | Newtown Villa I, II | Fee | 1,300 | 3,000 | 134 | 0 | 73 | 18 | 91 | 67.91 | \$112,000 | \$126,000 | \$122,000 | |
| | Harbor Terrace I-IV | Fee | 1,200 | 4,000 | 170 | 0 | 140 | 0 | 140 | 82.35 | \$86,600 | \$91,000 | \$88,000 | |
| | ANNUAL TOTALS | | | | | 2,050 | | | | 1,478 | 72.10 | | | |

TABLE 4
(continued)
SUMMARY OF SINGLE FAMILY HOUSING DEVELOPMENT AND ORIGINAL SALES IN THE CENTRAL OAHU & EWA / KAPOLEI REGIONS 1978 TO 1994
Market Study of the Proposed Royal Kunia Phase III Development
Kunia, Oahu, Hawaii

| Year | Project | Tenure | Typical Size (SF) | | Total Units Completed | Sales | | | | Sales as a Percent of Completions | Sales Price | | | |
|----------------------|------------------------|--------------------|-------------------|-------|-----------------------|-------|-----|-----|-------|-----------------------------------|-------------|------------|-----------|-----------|
| | | | House | Lot | | 2br | 3br | 4br | Total | | Minimum | Maximum | Average | |
| 1980 | Palehua Heights | Fee | 1,350 | 5,500 | 7 | 0 | 10 | 11 | 21 | (1) | \$99,200 | \$163,500 | \$131,350 | |
| | Palehua Heights II | Fee | 1,350 | 5,500 | 52 | 0 | 24 | 8 | 32 | 61.54 | \$112,500 | \$174,000 | \$143,250 | |
| | Mikiliana I | Fee | 1,400 | 3,000 | 70 | 38 | 32 | 0 | 68 | 97.14 | \$130,000 | \$160,000 | \$145,000 | |
| | Mikiliana II | Fee | 1,550 | 4,000 | 75 | 0 | 60 | 15 | 75 | 100.00 | \$130,000 | \$165,000 | \$145,000 | |
| | Village Park III | Lease | 1,100 | 4,000 | 190 | -- | -- | -- | 180 | 94.74 | \$112,500 | \$128,000 | \$120,000 | |
| | Waipahu Estates | Fee | 1,320 | 5,000 | 61 | 0 | 40 | 21 | 61 | 100.00 | \$112,500 | \$130,000 | \$121,000 | |
| | Mililani | Fee | 1,410 | 6,240 | 0 | 8 | 71 | 39 | 118 | (1) | \$115,000 | \$175,000 | \$143,000 | |
| | Newtown Villa II | Fee | 1,300 | 3,000 | 35 | -- | -- | -- | 35 | 100.00 | \$112,000 | \$127,000 | \$123,000 | |
| ANNUAL TOTALS | | | | | 490 | | | | | 590 | | 120.41 (1) | | |
| 1981 | Palehua Heights | Fee | 1,350 | 5,500 | 0 | 0 | 2 | 3 | 5 | (1) | \$139,000 | \$145,000 | \$140,850 | |
| | Palehua Heights II | Fee | 1,350 | 5,500 | 31 | 0 | 18 | 8 | 26 | 83.87 | \$130,000 | \$169,000 | \$141,895 | |
| | Puahi In Waipio | Fee | 1,700 | 5,000 | 20 | 0 | 27 | 8 | 35 | (1) | \$140,000 | \$180,000 | \$160,000 | |
| | Village Park | Lease | 1,250 | 4,500 | 40 | 0 | 27 | 7 | 34 | 85.00 | \$107,000 | \$145,000 | \$120,000 | |
| | Mililani | Fee | 1,410 | 6,240 | 207 | 18 | 85 | 66 | 169 | 81.64 | \$115,000 | \$175,000 | \$143,800 | |
| | ANNUAL TOTALS | | | | | 298 | | | | 269 | 90.27 | | | |
| | 1982 | Palehua Heights II | Fee | 1,350 | 5,500 | 5 | 0 | 3 | 5 | 8 | (1) | \$134,500 | \$150,000 | \$142,500 |
| | | Village Park | Lease | 1,000 | 4,500 | 35 | 0 | 69 | 9 | 78 | (1) | \$108,000 | \$145,000 | \$115,000 |
| Puahi In Waipio | | Fee | 1,280 | 3,500 | 50 | 0 | 40 | 10 | 50 | 100.00 | \$105,000 | \$145,000 | \$125,000 | |
| Mililani 48 | | Fee | 1,250 | 4,500 | 3 | 3 | 12 | 31 | 46 | (1) | \$97,200 | \$149,500 | \$115,700 | |
| Mililani 49 | | Fee | 1,300 | 6,100 | 2 | 5 | 48 | 31 | 84 | (1) | \$104,800 | \$178,200 | \$142,000 | |
| Mililani 50 | | Fee | 925 | 4,500 | 68 | 4 | 43 | 21 | 68 | 100.00 | \$100,800 | \$119,800 | \$111,700 | |
| Royal Summit | | Fee | 1,700 | 6,000 | 18 | 0 | 14 | 4 | 18 | 100.00 | \$225,000 | \$300,000 | \$250,000 | |
| Royal Summit | | Fee | N/A | 6,000 | 97 (2) | -- | -- | -- | 97 | 100.00 | \$67,500 | \$135,000 | \$85,000 | |
| ANNUAL TOTALS | | | | | 278 | | | | 449 | 161.51 (1) | | | | |
| 1983 | | Ahihioe 1 and 2 | Fee | 1,008 | 6,500 | 16 | 0 | 16 | 0 | 16 | 100.00 | \$122,847 | \$138,700 | \$128,487 |
| | | Palehua Heights II | Fee | 1,350 | 5,500 | 25 | 0 | 24 | 4 | 28 | (1) | \$117,000 | \$164,900 | \$150,733 |
| | Leulea, Nohea, Kaulana | Fee | 1,220 | 3,200 | 140 | 10 | 230 | 40 | 280 | (1) | \$115,000 | \$160,000 | \$135,000 | |
| | Village Park | Lease | 1,000 | 4,500 | 160 | 0 | 150 | 0 | 150 | 93.75 | \$112,000 | \$120,000 | \$116,000 | |
| | Mililani CL38 | Fee | 915 | 4,490 | 31 | 8 | 47 | 24 | 79 | (1) | \$104,200 | \$132,400 | \$120,000 | |
| | Mililani 47 | Fee | 1,360 | 5,920 | 0 | 3 | 12 | 10 | 25 | (1) | \$130,000 | \$189,000 | \$155,100 | |
| | Mililani 48 | Fee | 1,250 | 4,500 | 47 | 0 | 2 | 4 | 6 | 12.77 | \$105,000 | \$168,500 | \$156,200 | |
| | Mililani 49 | Fee | 1,300 | 6,100 | 97 | 1 | 10 | 12 | 23 | 23.71 | \$112,600 | \$174,500 | \$155,200 | |
| | Mililani 50 | Fee | 1,415 | 6,200 | 101 | 5 | 39 | 35 | 79 | 78.22 | \$120,900 | \$181,800 | \$155,100 | |
| | Royal Summit | Fee | 1,700 | 6,000 | 54 | 0 | 10 | 44 | 54 | 100.00 | \$168,500 | \$290,000 | \$210,000 | |
| | ANNUAL TOTALS | | | | | 671 | | | | 740 | 110.28 (1) | | | |

TABLE 4
(continued)
SUMMARY OF SINGLE FAMILY HOUSING DEVELOPMENT AND ORIGINAL
SALES IN THE CENTRAL OAHU & EWA / KAPOLEI REGIONS 1978 TO 1994
Market Study of the Proposed Royal Kunia Phase III Development
Kunua, Oahu, Hawaii

| Year | Project | Tenure | Typical Size (SF) | | Total
Units
Completed | Sales | | | | Sales as
a Percent of
Completions | Sales Price | | | | |
|---------------------|---------------------|----------------------|-------------------|-------|-----------------------------|-------|-----|-----|-------|---|-------------|-----------|-----------|-----------|-----------|
| | | | House | Lot | | 2br | 3br | 4br | Total | | Minimum | Maximum | Average | | |
| 1984 | Ahikoe | Fee | 1,350 | 6,500 | 26 | 0 | 10 | 0 | 0 | 10 | 38.46 | \$123,000 | \$135,639 | \$129,100 | |
| | Palehua Heights II | Fee | 1,350 | 5,500 | 12 | 0 | 6 | 0 | 0 | 6 | 50.00 | \$115,000 | \$200,218 | \$162,452 | |
| | Palehua Heights III | Fee | 1,350 | 5,600 | 0 | 0 | 3 | 0 | 1 | 4 | (1) | \$141,000 | \$170,000 | \$155,000 | |
| | Village Park | Lease | 1,000 | 5,000 | 147 | 0 | 149 | 0 | 0 | 149 | (1) | \$112,500 | \$134,000 | \$125,000 | |
| | Nohea | Fee | 1,200 | 3,100 | 0 | 10 | 130 | 14 | 154 | 154 | (1) | \$112,500 | \$160,000 | \$138,000 | |
| | Kaulana | Fee | 1,200 | 3,360 | 230 | 14 | 186 | 24 | 224 | 224 | 97.39 | \$117,000 | \$162,000 | \$140,000 | |
| | Luana | Fee | 1,200 | 3,300 | 0 | 4 | 42 | 7 | 53 | 53 | (1) | \$117,000 | \$162,000 | \$140,000 | |
| | Mililani | Fee | 1,300 | 5,810 | 154 | 24 | 169 | 122 | 315 | 315 | (1) | \$113,745 | \$188,900 | \$142,000 | |
| | Ke Kumulani | Fee | 1,205 | 3,600 | 58 | 0 | 42 | 0 | 42 | 42 | 72.41 | \$140,000 | \$180,000 | \$155,000 | |
| | Royal Summit | Fee | 1,500 | 6,000 | 38 | 0 | 38 | 10 | 48 | 48 | (1) | \$180,000 | \$280,000 | \$220,000 | |
| | Royal Summit | Fee | N/A | 6,000 | 77 (2) | -- | -- | -- | 77 | 77 | 100.00 | \$115,000 | \$115,000 | \$115,000 | |
| ANNUAL TOTALS | | | | | 742 | | | | 1,082 | 145.82 (1) | | | | | |
| 1985 | Palehua Heights II | Fee | 1,350 | 5,500 | 7 | 0 | 3 | 1 | 4 | 4 | 57.14 | \$153,000 | \$285,000 | \$188,000 | |
| | Palehua Heights III | Fee | 1,350 | 5,600 | 1 | 0 | 13 | 2 | 15 | 15 | (1) | \$141,800 | \$212,200 | \$164,700 | |
| | Ahikoe | Fee | 1,008 | 6,500 | 23 | 0 | 20 | 0 | 20 | 20 | 88.96 | \$123,000 | \$138,947 | \$130,000 | |
| | Village Park | Lease | 1,200 | 4,000 | 200 | 0 | 230 | 30 | 260 | 260 | (1) | \$120,000 | \$130,000 | \$125,000 | |
| | Mililani | Fee | 1,200 | 5,000 | 373 | 52 | 164 | 157 | 373 | 373 | 100.00 | \$113,745 | \$279,500 | \$154,562 | |
| | Ke Kumulani | Fee | 1,205 | 3,500 | 54 | 0 | 62 | 0 | 62 | 62 | (1) | \$140,000 | \$170,000 | \$152,258 | |
| | Heights at Waituna | Lease | 1,300 | 4,000 | 31 | 0 | 25 | 6 | 31 | 31 | 100.00 | \$149,000 | \$189,000 | \$165,000 | |
| | Royal Summit | Fee | N/A | 6,500 | 50 (2) | -- | -- | -- | 160 | 160 | (1) | \$97,500 | \$105,700 | \$102,500 | |
| | ANNUAL TOTALS | | | | | 739 | | | | 925 | 125.17 (1) | | | | |
| | 1986 | Ahikoe | Fee | 1,008 | 6,500 | 3 | 0 | 8 | 0 | 8 | 8 | (1) | \$127,500 | \$138,000 | \$131,433 |
| | | Colony Ridge 1 and 2 | Fee | 1,594 | 5,400 | 52 | 0 | 52 | 0 | 52 | 52 | 100.00 | \$140,600 | \$186,055 | \$154,720 |
| Palehua Heights II | | Fee | 1,350 | 5,500 | 8 | 0 | 7 | 2 | 9 | 9 | (1) | \$151,000 | \$273,892 | \$183,844 | |
| Palehua Heights III | | Fee | 1,350 | 5,600 | 15 | 0 | 15 | 7 | 22 | 22 | (1) | \$154,900 | \$188,581 | \$176,782 | |
| Village Park | | Lease | 1,300 | 4,500 | 310 | 0 | 250 | 60 | 310 | 310 | 100.00 | \$129,000 | \$144,000 | \$138,800 | |
| Mililani | | Fee | 1,000 | 4,800 | 434 | -- | -- | -- | 520 | 520 | (1) | \$118,700 | \$202,000 | \$158,000 | |
| Hookumu | | Fee | 1,100 | 4,500 | 12 | 0 | 12 | 0 | 12 | 12 | 100.00 | \$127,800 | \$130,000 | \$128,500 | |
| Ke Kumulani | | Fee | 1,200 | 3,600 | 65 | 0 | 65 | 0 | 65 | 65 | 100.00 | \$135,000 | \$170,000 | \$155,000 | |
| Heights at Waituna | | Lease | 1,300 | 3,500 | 66 | -- | -- | -- | 56 | 56 | 84.85 | \$153,000 | \$207,000 | \$175,000 | |
| Nahalekaha | | Fee | 1,598 | 6,500 | 29 | 5 | 24 | 0 | 29 | 29 | 100.00 | \$235,000 | \$315,000 | \$260,000 | |
| ANNUAL TOTALS | | | | | 994 | | | | 1,083 | 108.95 (1) | | | | | |

TABLE 4
(continued)

SUMMARY OF SINGLE FAMILY HOUSING DEVELOPMENT AND ORIGINAL SALES IN THE CENTRAL OAHU & EWA / KAPOLEI REGIONS 1978 TO 1994
Market Study of the Proposed Royal Kunia Phase III Development
Kunua, Oahu, Hawaii

| Year | Project | Tenure | Typical Size (SF) | | Total Units Completed | Sales | | | | Sales as a Percent of Completions | Sales Price | | | |
|-----------------------|-----------------------------|----------------------|-------------------|-------|-----------------------|--------------|-----------|------------|------------|-----------------------------------|-------------------|------------------|------------------|------------------|
| | | | House | Lot | | 2br | 3br | 4br | Total | | Minimum | Maximum | Average | |
| 1987 | Palehua Heights II | Fee | 1,350 | 5,500 | 4 | 0 | 11 | 1 | 12 | (1) | \$151,000 | \$273,892 | \$198,584 | |
| | Palehua Heights III | Fee | 1,350 | 5,600 | 26 | 0 | 8 | 14 | 22 | 84.62 | \$141,800 | \$198,250 | \$171,139 | |
| | Colony Ridge I | Fee | 1,594 | 5,400 | 28 | 0 | 27 | 0 | 27 | 96.43 | \$140,800 | \$180,800 | \$151,868 | |
| | Colony Ridge II and III | Fee | 1,594 | 5,400 | 30 | 0 | 13 | 0 | 13 | 43.33 | \$140,600 | \$188,905 | \$153,600 | |
| | Colony Ridge IV and V | Fee | 1,594 | 5,400 | 7 | 0 | 2 | 0 | 2 | 28.57 | \$140,600 | \$186,905 | \$153,600 | |
| | Village Park | Lease | 1,300 | 4,000 | 350 | 0 | 230 | 117 | 347 | 99.14 | \$130,000 | \$154,000 | \$142,000 | |
| | Mililani Pines | Fee | 1,500 | 6,500 | 46 | 0 | 46 | 0 | 46 | 100.00 | \$150,000 | \$300,000 | \$190,000 | |
| | Mililani 45 and 60 | Fee | 1,200 | 5,000 | 250 | 0 | 250 | 0 | 250 | 100.00 | \$120,000 | \$200,000 | \$150,000 | |
| | Heights at Wailuna | Lease | 1,742 | 3,500 | 12 | 0 | 29 | 6 | 35 | (1) | \$159,000 | \$212,000 | \$173,000 | |
| | Crest at Wailuna | Lease | 1,428 | 3,600 | 37 | 0 | 25 | 12 | 37 | 100.00 | \$148,000 | \$178,400 | \$159,700 | |
| | Fernandez Village (3) | Fee | 1,100 | 3,750 | 30 | 0 | 30 | 0 | 30 | 100.00 | \$65,000 | \$115,000 | \$80,000 | |
| ANNUAL TOTALS | | | | | 820 | 0 | 12 | 2 | 14 | 100.12 (1) | \$81,730 | \$110,000 | \$85,000 | |
| 1988 | Village Park | Lease | 1,250 | 5,000 | 209 | 0 | 209 | 0 | 209 | 100.00 | \$14,000 | \$180,000 | \$150,000 | |
| | Soda Creek | Fee | 1,300 | 3,200 | 210 | 49 | 263 | 77 | 389 | (1) | \$121,750 | \$160,000 | \$138,550 | |
| | Mililani | Fee | 1,300 | 5,000 | 359 | 39 | 280 | 40 | 359 | 100.00 | \$150,000 | \$350,000 | \$185,000 | |
| | Crest at Wailuna | Lease | 1,174 | 3,500 | 98 | 0 | 66 | 58 | 124 | (1) | \$155,700 | \$238,750 | \$187,389 | |
| | Colony Ridge | Fee | 1,500 | 5,000 | 60 | 0 | 60 | 0 | 60 | 100.00 | \$162,000 | \$190,000 | \$170,000 | |
| | Parkside | Fee | 1,000 | 4,000 | 50 | 0 | 50 | 0 | 50 | 100.00 | \$148,000 | \$185,000 | \$165,000 | |
| | Fernandez Village (3) | Fee | 1,100 | 3,750 | 14 | 0 | 12 | 2 | 14 | 100.00 | \$81,730 | \$110,000 | \$85,000 | |
| | ANNUAL TOTALS | | | | | 1,000 | 49 | 20 | 26 | 46 | 120.50 (1) | \$209,000 | \$340,000 | \$258,000 |
| | 1989 | Highlands @ Makakilo | Fee | 1,750 | 6,700 | 49 | 0 | 0 | 180 | 180 | 83.88 | \$121,000 | \$154,000 | \$140,000 |
| | | Soda Creek | Fee | 1,100 | 3,500 | 180 | 0 | 0 | 274 | 453 | (1) | \$167,000 | \$252,000 | \$213,000 |
| | | Royal Kunia | Fee | 1,300 | 5,000 | 274 | 0 | 179 | 274 | 453 | (1) | \$165,000 | \$380,000 | \$243,000 |
| Mililani Town | | Fee | 1,400 | 5,400 | 204 | 20 | 96 | 193 | 309 | (1) | \$185,000 | \$380,000 | \$243,000 | |
| Crest at Wailuna | | Lease | 1,174 | 3,500 | 35 | 0 | 21 | 42 | 63 | (1) | \$187,230 | \$314,000 | \$271,630 | |
| Parkside | | Fee | 999 | 4,200 | 50 | 0 | 50 | 9 | 50 | 100.00 | \$148,900 | \$184,350 | \$163,150 | |
| West Loch Estates (3) | | Fee | 1,400 | 5,000 | 0 | 8 | 81 | 24 | 113 | (1) | \$89,000 | \$270,000 | \$175,000 | |
| ANNUAL TOTALS | | | | | 792 | 8 | 81 | 24 | 113 | 153.28 (1) | \$89,000 | \$270,000 | \$175,000 | |
| 1990 | Mililani Makai | Fee | 1,400 | 5,000 | 175 | 0 | 115 | 60 | 175 | 100.00 | \$200,000 | \$410,000 | \$263,750 | |
| | Westcliff | Fee | 1,500 | 4,000 | 26 | 0 | 43 | 0 | 43 | (1) | \$355,000 | \$434,500 | \$370,750 | |
| | Villages of Kapelele I (3) | Fee | 1,500 | 5,000 | 68 | 0 | 0 | 0 | 61 | 89.71 | \$225,000 | \$425,000 | \$305,000 | |
| | Villages of Kapelele II (3) | Fee | 1,150 | 4,000 | 102 | 0 | 0 | 0 | 92 | 90.20 | \$225,000 | \$425,000 | \$305,000 | |
| | West Loch Estates I (3) | Fee | 1,550 | 4,500 | 168 | 0 | 129 | 39 | 168 | 100.00 | \$225,000 | \$425,000 | \$285,000 | |
| | West Loch Estates II (3) | Fee | 1,200 | 4,000 | 288 | 44 | 185 | 59 | 288 | 100.00 | \$109,000 | \$125,000 | \$115,000 | |
| | West Loch Fairways (3) | Fee | 1,800 | 5,500 | 10 | 0 | 0 | 0 | 0 | 0.00 | \$0 | \$0 | \$0 | |
| | ANNUAL TOTALS | | | | | 837 | 44 | 185 | 59 | 288 | 98.81 | \$200,000 | \$410,000 | \$263,750 |

TABLE 4
(continued)

SUMMARY OF SINGLE FAMILY HOUSING DEVELOPMENT AND ORIGINAL SALES IN THE CENTRAL OAHU & EWA / KAPOLEI REGIONS 1978 TO 1994
Market Study of the Proposed Royal Kunia Phase III Development
Kunua, Oahu, Hawaii

| Year | Project | Tenure | Typical Size (SF) | | Total Units Completed | Sales | | | Sales as a Percent of Completions | Sales Price | | Average |
|---------------|--|--------|-------------------|-------|-----------------------|-------|-----|-----|-----------------------------------|-------------|-----------|-----------|
| | | | House | Lot | | 2br | 3br | 4br | | Total | Minimum | |
| 1994 | Aiea Park Place | Fee | 1,700 | 4,000 | 26 | -- | 27 | 3 | 30 | \$350,000 | \$450,000 | \$380,000 |
| | Champions @ Waikole | Fee | 1,400 | 5,000 | 56 | -- | 56 | -- | 56 | \$325,000 | \$425,000 | \$380,000 |
| | Highland View Estates | Fee | 1,600 | 5,000 | 6 | -- | 2 | 3 | 5 | \$414,000 | \$448,000 | \$442,980 |
| | Miliani Mauka | Fee | 1,521 | 5,815 | 222 | 31 | 169 | 53 | 253 | \$258,550 | \$688,575 | \$379,026 |
| | Royal Kunia Phase I | Fee | 1,383 | 5,232 | 90 | 15 | 30 | 19 | 64 | \$256,000 | \$425,000 | \$325,700 |
| | Royal Pines at Waikole | Fee | 1,300 | 5,000 | 83 | -- | 50 | 33 | 83 | \$311,000 | \$413,000 | \$359,223 |
| | The Signatures at Waikole | Fee | 1,500 | 5,000 | 35 | -- | 18 | 13 | 31 | \$356,000 | \$425,000 | \$378,097 |
| | Royal Ridge-Phase I | Fee | 1,607 | 5,500 | 7 | -- | 3 | 4 | 7 | \$352,200 | \$401,800 | \$378,000 |
| | Summerhill | Fee | 1,310 | 4,234 | 32 | -- | 6 | -- | 6 | \$260,000 | \$285,000 | \$276,000 |
| | Sun Terra on the Park | Fee | 1,380 | 4,224 | 115 | 1 | 103 | 49 | 153 | \$260,000 | \$335,000 | \$298,000 |
| | Sun Terra South | Fee | 1,251 | 4,365 | 47 | 1 | 23 | 9 | 33 | \$259,000 | \$325,000 | \$280,000 |
| | Village Pokai Bay-Phase II | Fee | 1,100 | 4,000 | 36 | 9 | 16 | 2 | 27 | \$178,900 | \$290,000 | \$208,240 |
| | Westhills at Makakilo His | Fee | 1,645 | 5,800 | 13 | -- | 8 | 5 | 13 | \$338,800 | \$394,400 | \$355,800 |
| | Westpark at Makakilo His | Fee | 1,657 | 7,490 | 31 | -- | 24 | 7 | 31 | \$317,000 | \$389,200 | \$344,100 |
| | Matanai Village 3, Villages of Kapolei | Fee | 2,000 | 5,500 | 61 | 5 | 30 | 26 | 61 | \$265,000 | \$525,000 | \$355,000 |
| | Matanai Village 3, Villages of Kapolei | Fee | 1,185 | 4,500 | 39 | 5 | 34 | -- | 39 | \$145,000 | \$185,000 | \$175,000 |
| | Kekuilani, Villages of Kapolei | Fee | 1,238 | 3,188 | 135 | -- | 95 | -- | 95 | \$156,000 | \$197,600 | \$176,800 |
| | Kekuilani, Villages of Kapolei | Fee | 1,343 | 3,200 | 186 | -- | 83 | -- | 83 | \$239,000 | \$332,000 | \$285,500 |
| | West Loch Fairways | Fee | 1,750 | 5,654 | 29 | -- | 16 | 10 | 28 | \$280,000 | \$488,000 | \$372,884 |
| | West Loch Fairways | Fee | 1,100 | 4,268 | 15 | 4 | 21 | 6 | 31 | \$104,000 | \$153,652 | \$137,050 |
| ANNUAL TOTALS | | | | | 1,264 | | | | 1,127 | | | 89.16 |

(1) "Sales as a Percentage of Completions" figure is greater than 100 percent due to absorption of units in years subsequent to construction or due to pre-sales of units to be built in subsequent years.

(2) Lots only.

(3) government sponsored project.

Source: Bank of Hawaii, and The Hallstrom Group, Inc.

sales data has been retained by The Hallstrom Group, Inc. and is available for inspection.

Table 5 summarizes the average home size, lot size and selling prices for the Central Oahu and Ewa/Kapolei markets on an annual basis for the years 1978 through 1994. Graphic presentation of the data is shown in the addenda.

The average home size has increased by several percent over the study period, reaching 1,415 square feet in 1994; the third highest mark among the data. The move to larger houses in recent years is a recovery from the mid-1980's when homes averaged less than 1,200 square feet.

More importantly, the average lot size has shown continuing decline, falling to 4,627 square feet in 1994. In 12 of 16 years since 1979, the average lot size has fallen, with the most current figures 10 to 20 percent below levels of 15 years ago.

From our study's perspective, the critical indicator is the increasing "weight" of the development mass on the underlying land and the higher market acceptance of product having larger lots sizes. While the average living areas of finished homes increased by 31 percent in 1994 relative to 1984 (and 225 percent in price), finished lot sizes have decreased by 2.92 percent. Since the onset of the recession in 1991, 93 percent of the homes sited on lots larger than 5,500 square feet have been successfully sold, while only 72 percent of those on smaller lots have been absorbed.

The market evidence is indisputable. The revised Royal Kunia Phase II inventory offering larger lots would achieve higher absorption rates than were the homes sited on smaller, market average sized lots. The sales rate should particularly quicken relative to pre-revision estimates as no meaningful price increase for the larger lots are presently anticipated.

TABLE 5

SUMMARY OF MULTI-FAMILY HOUSING DEVELOPMENT AND ORIGINAL
SALES IN THE CENTRAL OAHU & EWA / KAPOLEI REGIONS 1978 TO 1984
Market Study of the Proposed Royal Kunia Phase III Development
Kunia, Oahu, Hawaii

| Year | Project | Tenure | Typical Unit
Size (SF) | Total
Units
Completed | Sales | | | | Sales as
a Percent of
Completions | Sales Price | | |
|----------------------|-----------------------|--------|---------------------------|-----------------------------|----------------|-----|-----|------------|---|-------------|-----------|-----------|
| | | | | | 2br
or Less | 3br | 4br | Total | | Minimum | Maximum | Average |
| 1978 | Palehua Gardens | Fee | 1,245 | 98 | 8 | 19 | 5 | 30 | 30.61 | \$47,200 | \$67,600 | Data |
| | Palehua Hale 1-3 | Fee | 1,230 | 87 | 7 | 51 | 24 | 82 | 94.25 | \$55,000 | \$80,600 | Not |
| | Mililani MF-28 | Fee | 1,100 | 62 | 24 | 38 | 0 | 62 | 100.00 | \$55,000 | \$69,900 | Available |
| | Mililani MF-33 | Fee | 1,000 | 90 | 62 | 28 | 0 | 90 | 100.00 | \$49,255 | \$61,230 | For 1978 |
| | Lilio | Fee | 1,000 | 88 | 44 | 44 | 0 | 88 | 100.00 | \$73,850 | \$81,750 | |
| | ANNUAL TOTALS | | | | 425 | | | | 352 | 82.82 | | |
| 1979 | Palehua Gardens | Fee | 1,245 | 0 | 16 | 41 | 11 | 68 | (1) | \$47,200 | \$87,600 | N/A |
| | Palehua Hale 1-3 | Fee | 1,230 | 0 | 0 | 4 | 1 | 5 | (1) | \$55,000 | \$80,600 | N/A |
| | Palehua Hillside | Fee | 1,330 | 96 | 0 | 21 | 4 | 25 | 26.04 | \$100,500 | \$127,500 | \$114,000 |
| | Waituna | Lease | 1,400 | 164 | 18 | 38 | 0 | 58 | 34.15 | \$92,000 | \$112,000 | \$102,000 |
| | Waipio by Genby | Fee | 1,072 | 88 | 36 | 52 | 0 | 88 | 100.00 | \$68,700 | \$86,350 | \$77,710 |
| | Waiau Garden Villa | Lease | 1,100 | 291 | 156 | 21 | 0 | 177 | 60.82 | \$77,000 | \$89,000 | \$84,000 |
| ANNUAL TOTALS | | | 639 | | | | 419 | 65.57 | | | | |
| 1980 | Palehua Hillside | Fee | 1,330 | 0 | 0 | 61 | 10 | 71 | (1) | \$100,500 | \$127,500 | \$114,000 |
| | Waiau Garden Villa | Lease | 1,100 | 64 | 53 | 52 | 0 | 105 | (1) | \$77,000 | \$89,000 | \$84,000 |
| | Lilio | Fee | 1,050 | 88 | 32 | 56 | 0 | 88 | 100.00 | \$74,000 | \$92,000 | \$84,000 |
| | Penakit | Fee | 1,050 | 50 | 24 | 26 | 0 | 50 | 100.00 | \$98,000 | \$104,000 | \$100,000 |
| | Waiau Garden Court | Lease | 980 | 177 | 158 | 21 | 0 | 177 | 100.00 | \$76,500 | \$103,000 | \$90,000 |
| | Waituna | Lease | 1,350 | 124 | 40 | 71 | 0 | 111 | 89.52 | \$102,000 | \$138,000 | \$120,000 |
| ANNUAL TOTALS | | | 503 | | | | 602 | 113.72 (1) | | | | |
| 1981 | Waiau Garden Villa | Lease | 1,100 | 165 | 91 | 70 | 0 | 161 | 97.58 | \$75,000 | \$104,500 | \$89,051 |
| | Waituna | Lease | 1,350 | 80 | 9 | 32 | 0 | 41 | 51.25 | \$108,000 | \$143,000 | \$125,000 |
| ANNUAL TOTALS | | | 245 | | | | 202 | 82.45 | | | | |
| 1982 | Waiau Garden Villa | Lease | 1,100 | 0 | 46 | 31 | 0 | 77 | (1) | \$75,000 | \$104,500 | \$89,051 |
| | Waituna | Lease | 1,350 | 0 | 13 | 35 | 0 | 48 | (1) | \$108,000 | \$145,000 | \$115,000 |
| | Kuola | Fee | 750 | 50 | 50 | 0 | 0 | 50 | 100.00 | \$79,000 | \$79,000 | \$79,000 |
| ANNUAL TOTALS | | | 50 | | | | 175 | 350.00 (1) | | | | |
| 1983 | Waituna | Lease | 1,350 | 0 | 32 | 80 | 0 | 112 | (1) | \$108,000 | \$145,000 | \$115,000 |
| | Waituna II | Lease | 1,400 | 24 | 6 | 18 | 0 | 24 | 100.00 | \$130,000 | \$159,000 | \$145,000 |
| | College Gardens | Lease | 840 | 105 | 0 | 105 | 0 | 105 | 100.00 | \$115,000 | \$160,000 | \$135,000 |
| | Kuola, Ithona, Hikano | Fee | 600 | 100 | 100 | 0 | 0 | 100 | 100.00 | \$49,000 | \$63,000 | \$70,000 |
| | Penaki II | Fee | 800 | 120 | 120 | 0 | 0 | 120 | 100.00 | \$78,250 | \$78,250 | \$78,250 |
| ANNUAL TOTALS | | | 349 | | | | 461 | 132.09 (1) | | | | |

TABLE 5
(continued)

SUMMARY OF MULTI-FAMILY HOUSING DEVELOPMENT AND ORIGINAL
SALES IN THE CENTRAL OAHU & EWA / KAPOLEI REGIONS 1978 TO 1984
Market Study of the Proposed Royal Kunia Phase III Development
Kunia, Oahu, Hawaii

| Year | Project | Tenure | Typical Unit Size (SF) | Total Units Completed | Sales | | | | Sales as a Percent of Completions | Sales Price | | | |
|----------------------|----------------------|----------------------|------------------------|-----------------------|-------------|-----|-----|-------|-----------------------------------|-------------|-----------|-----------|----------|
| | | | | | 2br or Less | 3br | 4br | Total | | Minimum | Maximum | Average | |
| 1984 | Palehua Villas | Fee | 800 | 22 | 22 | 0 | 0 | 0 | 100.00 | \$76,700 | \$104,200 | \$87,700 | |
| | Palehua Nani | Fee | 1,142 | 9 | 6 | 3 | 0 | 9 | 100.00 | \$95,400 | \$124,800 | \$113,200 | |
| | Ihona | Fee | 500 | 132 | 132 | 0 | 0 | 132 | 100.00 | \$50,000 | \$69,000 | \$80,000 | |
| | Hikono & Puhua | Lease | 700 | 124 | 124 | 0 | 0 | 124 | 100.00 | \$50,000 | \$88,000 | \$70,000 | |
| | Kuola | Fee | 750 | 18 | 18 | 0 | 0 | 18 | 100.00 | \$81,000 | \$88,000 | \$84,000 | |
| | Mililani Terrace | Lease | 537 | 60 | 60 | 0 | 0 | 60 | 100.00 | \$55,000 | \$68,400 | \$60,360 | |
| | Waituna II | Lease | 1,375 | 36 | 8 | 28 | 0 | 36 | 100.00 | \$132,000 | \$165,000 | \$147,000 | |
| | ANNUAL TOTALS | | | 401 | | | | 401 | 100.00 | | | | |
| 1985 | Palehua Nani | Fee | 1,142 | 6 | 5 | 1 | 0 | 6 | 100.00 | \$75,500 | \$124,800 | \$99,400 | |
| | Palehua Villas | Fee | 800 | 15 | 15 | 0 | 0 | 15 | 100.00 | \$78,700 | \$105,000 | \$91,000 | |
| | Mililani Terrace | Lease | 723 | 60 | 60 | 0 | 0 | 60 | 100.00 | \$55,000 | \$68,400 | \$62,800 | |
| | Alii Plantation | Lease | 800 | 152 | 105 | 0 | 0 | 105 | 69.08 | \$89,000 | \$102,900 | \$93,079 | |
| | | ANNUAL TOTALS | | | 233 | | | | 166 | 79.83 | | | |
| | 1986 | Alii Plantation | Lease | 800 | 0 | 47 | 0 | 0 | 47 | (1) | \$89,000 | \$102,900 | \$93,079 |
| Palehua Nani II, III | | Fee | 1,142 | 36 | 30 | 6 | 0 | 36 | 100.00 | \$75,700 | \$124,000 | \$99,400 | |
| Palehua Villas II-IV | | Fee | 800 | 42 | 26 | 6 | 0 | 32 | 76.19 | \$78,700 | \$110,600 | \$92,231 | |
| Mililani Terrace III | | Lease | 723 | 133 | 133 | 0 | 0 | 133 | 100.00 | \$56,500 | \$72,000 | \$65,400 | |
| Newtown Meadows | | Fee | 985 | 122 | 122 | 0 | 0 | 122 | 100.00 | \$105,500 | \$117,500 | \$111,700 | |
| Crosspointe | | Lease | 750 | 213 | -- | -- | -- | 213 | 100.00 | \$81,000 | \$130,000 | \$105,500 | |
| | | ANNUAL TOTALS | | | 546 | | | | 583 | 106.78 (1) | | | |
| 1987 | | Palehua Nani IV | Fee | 1,150 | 38 | 36 | 2 | 0 | 38 | 100.00 | \$75,500 | \$125,000 | \$91,220 |
| | Palehua Villas II-IV | Fee | 800 | 16 | 24 | 2 | 0 | 28 | (1) | \$79,700 | \$110,600 | \$88,355 | |
| | Cliffside Villages | Fee | 750 | 65 | 65 | 0 | 0 | 65 | 100.00 | \$96,900 | \$119,900 | \$108,900 | |
| | Newtown Meadows | Fee | 947 | 100 | 142 | 0 | 0 | 142 | (1) | \$105,000 | \$120,000 | \$112,500 | |
| | Crosspointe | Lease | 750 | 88 | 165 | 0 | 0 | 165 | (1) | \$81,000 | \$130,000 | \$105,500 | |
| | Sunpoint | Fee | 750 | 144 | -- | -- | -- | 144 | 100.00 | N/A | N/A | N/A | |
| | | ANNUAL TOTALS | | | 451 | | | | 580 | 128.60 (1) | | | |
| 1988 | Cliffside Villages | Fee | 750 | 184 | 119 | 0 | 0 | 119 | 64.67 | \$96,900 | \$125,900 | \$98,900 | |
| | Mililani | Fee | 700 | 11 | 11 | 0 | 0 | 11 | 100.00 | \$68,400 | \$68,400 | \$68,400 | |
| | Palehua Villas V | Fee | 790 | 30 | 21 | 9 | 0 | 30 | 100.00 | \$105,000 | \$120,000 | \$110,000 | |
| | | ANNUAL TOTALS | | | 225 | | | | 160 | 71.11 (1) | | | |

TABLE 5
(continued)

SUMMARY OF MULTI-FAMILY HOUSING DEVELOPMENT AND ORIGINAL SALES IN THE CENTRAL OAHU & EWA / KAPOLEI REGIONS 1978 TO 1994
Market Study of the Proposed Royal Kunia Phase III Development
Kunia, Oahu, Hawaii

| Year | Project | Tenure | Typical Unit Size (SF) | Total Units Completed | Sales | | | | Sales as a Percent of Completions | Sales Price | | |
|------|----------------------------|--------|------------------------|-----------------------|-------------|-----|-----|-------------------|-----------------------------------|-------------|-----------|-----------|
| | | | | | 2br or Less | 3br | 4br | Total | | Minimum | Maximum | Average |
| 1989 | Palm Villas | Fee | 716 | 218 | 218 | 0 | 0 | 0 | 100.00 | \$72,700 | \$117,125 | \$108,800 |
| | Palm Villas | Rental | 716 | 112 | 0 | 0 | 0 | 100.00 | \$450/mo. | \$850/mo. | \$114,760 | |
| | Palm Court | Fee | 824 | 32 | 0 | 32 | 0 | 100.00 | \$110,350 | \$116,940 | \$90,000 | |
| | Mililani | Fee | 800 | 226 | 140 | 8 | 0 | 65.49 | \$78,000 | \$225,000 | \$111,800 | |
| | Palehua Villas | Fee | 743 | 52 | 36 | 16 | 0 | 100.00 | \$93,000 | \$122,000 | \$87,400 | |
| | Palehua Nani | Fee | 638 | 25 | 0 | 25 | 0 | 100.00 | \$85,000 | \$90,500 | | |
| | ANNUAL TOTALS | | | 685 | | | | 88.27 | | | | |
| 1990 | Palm Court II | Fee | 845 | 282 | 324 | 0 | 0 | 100.00 | \$130,000 | \$164,400 | \$144,200 | |
| | Royal Kunia | Rental | 760 | 130 | 0 | 0 | 0 | (1) | \$480/mo. | \$775/mo. | \$202,000 | |
| | Mililani Makai | Fee | 1,050 | 48 | 0 | 0 | 0 | 100.00 | | | \$163,500 | |
| | Mililani Makai | Fee | 950 | 131 | 0 | 0 | 0 | 100.00 | | | \$128,700 | |
| | Waikole | Fee | 860 | 0 | 344 | 0 | 0 | (1) | \$101,000 | \$174,500 | | |
| | Cambridge Park | Rental | 675 | 112 | 0 | 0 | 0 | 100.00 | \$625/mo. | \$900/mo. | | |
| | ANNUAL TOTALS | | | 703 | | | | 154.91 (1) | | | | |
| 1991 | Hoomalu @ Waikole | Fee | 750 | 54 | 54 | 0 | 0 | 100.00 | \$125,000 | \$181,000 | \$159,000 | |
| | Hoomaka @ Waikole | Fee | 750 | 244 | 244 | 0 | 0 | 100.00 | \$79,500 | \$179,800 | \$135,000 | |
| | Palm Villas II | Fee | 653 | 338 | 338 | 0 | 0 | 100.00 | \$125,000 | \$184,000 | \$163,500 | |
| | Palm Court II | Fee | 842 | 27 | 27 | 0 | 0 | 100.00 | \$180,000 | \$188,000 | \$184,500 | |
| | Palm Court III | Fee | 842 | 176 | 164 | 0 | 0 | 83.18 | \$181,000 | \$186,500 | \$186,500 | |
| | Arbors at Ewa | Fee | 1,019 | 0 | 181 | 20 | 0 | (1) | \$215,000 | \$315,000 | \$260,000 | |
| | Makiki Cliffs | Fee | 717 | 112 | 81 | 0 | 0 | 72.32 | \$162,900 | \$198,900 | \$175,900 | |
| | ANNUAL TOTALS | | | 951 | | | | | 135.44 (1) | | | |
| 1992 | Fairway Village at Waikole | Fee | 1,100 | 25 | 25 | 0 | 0 | 100.00 | \$170,000 | \$197,000 | \$180,000 | |
| | Parkview at Waikole | Fee | 750 | 80 | 80 | 0 | 0 | 100.00 | \$79,000 | \$170,000 | \$148,000 | |
| | Ho'okumu at Waikole | Fee | 750 | 136 | 136 | 0 | 0 | 100.00 | \$79,000 | \$176,000 | \$140,000 | |
| | Evergreen Terrace | Fee | 1,130 | 130 | 85 | 0 | 0 | 65.38 | \$188,900 | \$240,000 | \$218,000 | |
| | Palm Villas I and II | Fee | 650 | 50 | 50 | 0 | 0 | 100.00 | \$124,000 | \$185,000 | \$161,000 | |
| | Arbors at Ewa | Fee | 1,150 | 251 | 190 | 61 | 0 | 251 | \$208,000 | \$296,000 | \$240,000 | |
| | Palm Court I and II | Fee | 840 | 12 | 12 | 0 | 0 | 100.00 | \$188,000 | \$197,000 | \$192,000 | |
| | West Loch Fairways | Fee | 1,200 | 20 | 0 | 20 | 0 | 100.00 | \$285,000 | \$322,000 | \$285,000 | |
| | ANNUAL TOTALS | | | 704 | | | | 93.61 | | | | |

TABLE 5
(continued)

SUMMARY OF MULTI-FAMILY HOUSING DEVELOPMENT AND ORIGINAL SALES IN THE CENTRAL OAHU & EWA / KAPOLEI REGIONS 1978 TO 1994
Market Study of the Proposed Royal Kunia Phase III Development
Kunia, Oahu, Hawaii

| Year | Project | Tenure | Typical Unit Size (SF) | Total Units Completed | Sales | | | | Sales as a Percent of Completions | Sales Price | | |
|---------------|----------------------------------|--------|------------------------|-----------------------|-------------|-----|-----|-------|-----------------------------------|-------------|-----------|-----------|
| | | | | | 2br or Less | 3br | 4br | Total | | Minimum | Maximum | Average |
| 1993 | Mahi Ko at Waikole | Fee | 795 | 228 | 228 | -- | -- | 228 | 100.00 | \$95,000 | \$182,000 | \$152,000 |
| | Mililani Mauka | Fee | 801 | 291 | 176 | 14 | -- | 190 | 65.29 | \$89,100 | \$215,000 | \$135,770 |
| | Mililani Mauka | Fee | 1,493 | 100 | 57 | 23 | -- | 80 | 80.00 | \$236,500 | \$370,400 | \$284,529 |
| | Sun Rise | Fee | 820 | 354 | 326 | -- | -- | 326 | 92.09 | \$124,000 | \$195,000 | \$173,000 |
| | Arbors at Ewa | Fee | 1,150 | 11 | 20 | 13 | -- | 33 | 300.00 | \$219,000 | \$285,000 | \$253,000 |
| | Malanai Iki, Villages of Kapolei | Fee | 712 | 88 | 14 | 7 | -- | 21 | 23.86 | \$110,000 | \$129,000 | \$116,381 |
| | West Loch Fairways | Fee | 1,200 | 98 | -- | 98 | -- | 98 | 100.00 | \$259,000 | \$327,000 | \$282,755 |
| ANNUAL TOTALS | | | | 1,170 | | | | 976 | 83.42 | | | |
| 1994 | The Crown at Waialua | Fee | 1,325 | 35 | -- | 15 | 15 | 30 | 85.71 | \$365,000 | \$450,000 | \$409,200 |
| | Mililani Mauka | Fee | 757 | 244 | 131 | 110 | -- | 241 | 98.77 | \$105,600 | \$216,000 | \$181,340 |
| | Royal Kunia--Phase I | Fee | 808 | 160 | 86 | 10 | -- | 96 | 60.00 | \$94,000 | \$203,500 | \$174,000 |
| | The Highlands at Waikole | Fee | 950 | 36 | 8 | 6 | -- | 14 | 38.89 | \$204,000 | \$245,000 | \$224,429 |
| | Parklign at Waikole | Fee | 950 | 204 | 201 | -- | -- | 201 | 98.53 | \$198,000 | \$243,000 | \$217,061 |
| | Sunrise | Fee | 820 | 54 | 78 | -- | -- | 78 | 144.44 | \$128,000 | \$200,000 | \$173,000 |
| | Coronado | Fee | 676 | 28 | 10 | -- | -- | 10 | 35.71 | \$90,000 | \$117,000 | \$104,000 |
| | Makakilo | Fee | 850 | 150 | 149 | -- | -- | 149 | 99.33 | \$105,000 | \$217,000 | \$183,088 |
| | Makakilo | Fee | 650 | 20 | 20 | -- | -- | 20 | 100.00 | \$105,000 | \$148,000 | \$132,000 |
| | Maile--Duplex | Fee | 1,100 | 40 | 30 | 50 | 22 | 102 | 255.00 | \$190,000 | \$251,384 | \$210,233 |
| | Malanai Iki, Villages of Kapolei | Fee | 690 | 67 | 58 | 9 | -- | 67 | 100.00 | \$85,000 | \$130,200 | \$110,000 |
| | Iwalaui, Villages of Kapolei | Fee | 806 | 128 | 77 | 20 | -- | 97 | 75.78 | \$93,000 | \$132,000 | \$112,500 |
| | Kekuilani, Villages of Kapolei | Fee | 907 | 112 | 101 | -- | -- | 101 | 90.18 | \$100,000 | \$152,000 | \$128,000 |
| | Kekuilani, Villages of Kapolei | Fee | 907 | 40 | 27 | -- | -- | 27 | 67.50 | \$169,900 | \$238,900 | \$202,416 |
| ANNUAL TOTALS | | | | 1,318 | | | | 1,233 | 93.55 | | | |

(1) "Sales as a Percentage of Completions" figure is greater than 100 percent due to absorption of units in years subsequent to construction or due to pre-sales of units to be built in subsequent years.

Source: Bank of Hawaii, and The Halstrom Group, Inc.

IDENTIFICATION OF PROPOSED CENTRAL OAHU INVENTORY ADDITIONS

At present there are 13,883 "approved" housing units proposed for Central Oahu according to the City and County of Honolulu Planning Department. Most are in projects already under construction.

A summary of these developments is displayed on Table 6.

Within the context of our assignment, and given the 2,000 subject units are already approved, the important insights to be drawn from the list are, the average lot size for the single-family components of the projects, and the overall competitiveness of the developments relative to Royal Kunia Phase II.

For the most part, the average density of the proposed single-family housing additions would range from 4.8 to 7.0 homes per acre. This equates to average lot sizes of 3,500 to 6,500 square feet. An estimated 82 percent of the inventory would have average lot sizes of 5,000 square feet or less, while only seven percent would have average sizes of 6,000 square feet or larger.

This ratio ensures the larger subject lots would be well-situated in a highly competitive environment, being a desirable commodity within limited alternative product. Based on representatives made by developer and market experience within the sector, we further believe the large majority of the "larger lot" product offered in other projects will sell at price levels marginally to significantly above the proposed Royal Kunia Phase II inventory.

Further, we believe the location of the subject project, and its community amenities places it among the leaders in the sector.

Additional information pertaining to the proposed Central Oahu (and to a lesser degree Ewa/Kapolei) housing inventory is maintained by The Hallstrom Group, Inc.

TABLE 6

**SUMMARY OF PROPOSED HOUSING INVENTORY ADDITIONS
APPROVED IN THE CENTRAL OAHU DEVELOPMENT PLAN AREA**
Market Study of the Proposed Royal Kunia Phase III Development
Kunia, Oahu, Hawaii

| Project Name | Approval Status | | Total Units | | | Anticipated Completion (2) | Planned Percentage Affordable |
|---------------------------|------------------|---------|---------------|--------------------|---------------|------------------------------------|-------------------------------|
| | Development Plan | Zoning | Proposed | Built Through 9/95 | To Be Built | | |
| Launani Valley (1) | Yes | Yes | 1,028 | 420 | 608 | 384 by 1997, rest not scheduled. | 14.98% |
| Mililani Mauka | Yes | Partial | 6,600 | 2,307 | 4,293 | Full build-out by 2005. | 49.62% |
| Royal Kunia, Phase I | Yes | Yes | 2,000 | 647 | 1,353 | Full build-out by 2000. | 37.40% |
| Royal Kunia, Phase II | Yes | Partial | 2,000 | 0 | 2,000 | Begin by 1998, extending past 200 | N/A |
| Waiawa Gentry, Phase I | Yes | Pending | 2,675 | 0 | 2,675 | Begin by 1998, finish by 2005. | N/A |
| Waikale | Yes | Yes | 2,935 | 1,855 | 1,080 | Full build-out by 2000. | 50.02% |
| Kolca Cove (3) | Yes | Pending | 262 | 0 | 262 | Not yet scheduled. | 19.08% |
| Crestview | Yes | Yes | 63 | 0 | 63 | Not yet scheduled. | N/A |
| Mililani | Yes | Yes | 14 | 0 | 14 | Not yet scheduled. | N/A |
| Wahiawa Development Corp. | On-Hold | On-Hold | 3,100 | 0 | 3,100 | Removed from current consideration | 60.00% |
| Wahiawa In-Fill | Partial | Partial | 455 | 0 | 455 | Various time frames. | N/A |
| Waipahu In-Fill | Partial | Partial | 420 | 0 | 420 | Various time frames. | N/A |
| Kauolu (4) | Yes | Yes | 443 | 221 | 222 | Full build-out by 2005. | 100.00% |
| Manager's Drive (5) | Yes | Pending | 400 | 0 | 400 | Full build-out by 2000. | 92.63% |
| Other In-Fill (6) | Partial | Partial | 322 | 0 | 322 | Various time frames. | N/A |
| TOTALS (7) | | | <u>22,717</u> | <u>5,450</u> | <u>17,267</u> | | |

(1) Previously known as Melemanu.

(2) Based on developer submitted forecasts.

(3) Formerly Waterfront Manor.

(4) State HFDC project.

(5) C&C of Honolulu-sponsored project.

(6) As identified by C&C Planning Department, unspecified locations.

(7) Does not include 402 on-base military housing units proposed for Schofield Barracks and Wheeler Army Airfield to be built over next five years.

Source: C&C of Honolulu Planning Department, Various, and The Hallstrom Group, Inc.

MARKET SURVEY, CAPTURE RATES, AND ABSORPTION ESTIMATES

In addition to analyzing the numerous data sources cited herein, we have also conducted a detailed survey of purchaser and interested party product preference by interviewing various project agents and reviewing developer-supplied promotional materials.

Generally, the survey data corresponds with the published materials. Sales are down, buyer traffic is off, and purchasers are both more price conscious and conservative in their perceived "affordable pricing criteria". The result has been to motivate developers to utilize aggressive promotional tools, such as the buying down of interest rates, meaningful price reductions, no-charge upgrades, and lessened premiums for choice units.

Given the status of the market, interviewed agents felt that larger lot sizes (if offered at a nominal price increase) presents one of, if not, the most desirable selling points a project can offer. It is a palpable commodity which can be immediately enjoyed and is perceived to provide a better long-term appreciation enhancement than a feature upgrade or other marketing options.

Further, in light of the high uniformity of product in Central Oahu and Ewa/Kapolei, it becomes a point of status, particularly given the tropical climate of Hawaii which lends itself to outdoor activities.

Almost without exception, sales of the larger lots within a given subdivision (due to a corner or cul-de-sac location or other factor) have sold more quickly than a standard-sized parcel. The perception of increased worth, as contributing to lifestyle enhancement, and value, as contributing to increased resale pricing, resulting from a larger lot is intrinsic in the marketplace.

Survey response indicates that larger lots, averaging 6,000 square feet, would increase the capture (or sales) rate above otherwise similar inventory on lots of 5,000 square feet or less, by a minimum of ten to 20 percent. Within the context of the overall Central Oahu market, the

larger lots would increase the capture rate of the Royal Kunia Phase II product by several points.

Beyond the buyer perception of increased value and appreciation potential, which most agents considered to be a primary concern for the younger, often first time buyers of Central Oahu and Ewa/Kapolei, they also cited the desirability of increased privacy, additional room for family recreation and socializing, and the possibilities for home expansion as the household grows either through children or multi-generational living.

During its first seven years of product offering, Royal Kunia has achieved a market capture rate of approximately 11.17 percent of the Central Oahu housing sector, having sold some 528 units within a total market sales figure of 4,728 units. This rate is about average relative to competitive projects, and reflects the difficulty of establishing a new development during a down cycle in the market.⁽²⁾

Standard market capture rates for major regional projects range from 10 to 28 percent, and it is believed that without the proposed master plan revision the subject should be able to achieve a stabilized capture rate of 12 to 14 percent as the development moves forward.

With the proposed master plan revision, we forecast the single-family component of Phase II will have a notably increased penetration into the market, and reach capture rates of 12 to 18 percent; or in line with the leading projects in the area. This will result in speeding the absorption of the Phase II product by two to five years over current estimates. To the extent the project contains a greater proportion of low-cost affordable units than in competing developments, the overall absorption should increase even more.

3715_R03

(2) An additional 152 rental apartment units in Phase I were quickly absorbed upon offering and are at full occupancy. These units have been omitted from the capture rate analysis, which depicts only properties being sold, not rented.

LIMITING CONDITIONS AND ASSUMPTIONS

The research, analysis, conclusions, and certification for valuation or market studies performed by The Hallstrom Group, Inc. are subject to and influenced by the following:

- The report expresses the opinion of the signers as of the date stated in the letter of transmittal, and in no way has been contingent upon the reporting of specified values or findings. It is based upon the then present condition of the national and local economy and the then purchasing power of the dollar.
- Legal descriptions used within the report are taken from official documents recorded with the State of Hawaii, Bureau of Conveyances, or have been furnished by the client, and are assumed to be correct. No survey is made for purposes of the report.
- Any sketches, maps, plot plans, and photographs included in the report are intended only to show spatial relationships and/or assist the reader in visualizing the property. They are not measured surveys or maps and we are not responsible for their accuracy or interpretive quality.
- It is assumed that the subject property is free and clear of any and all encumbrances other than those referred to herein, and no responsibility is assumed for matters of a legal nature. The report is not to be construed as rendering any opinion of title, which is assumed to be good and marketable. No title information or data regarding easements which might adversely affect the use, access, or development of the property, other than that referenced in the report, was found or provided. The property is analyzed as though under responsible ownership and competent management.
- Any architectural plans and/or specifications examined assume completion of the improvements in general conformance with those documents in a timely and workmanlike manner.

- Preparation for, attendance, or testimony at any court or administrative hearing in connection with this report shall not be required unless prior arrangements have been made therefor.
- If the report contains an allocation of value between land and improvements, such allocation applies only under the existing program of utilization. The separate valuations for land and building must not be used in conjunction with any other purpose and are invalid if so used.
- If the report contains a valuation relating to a geographical portion or tract of real estate, the value reported for such geographical portion relates to such portion only and should not be construed as applying with equal validity to other portions of the larger parcel or tract; and the value reported for such geographical portion plus the value of all other geographical portions may or may not equal the value of the entire parcel or tract considered as an entity.
- If the report contains a valuation relating to an estate in land that is less than the whole fee simple estate, the value reported for such estate relates to a fractional interest only in the real estate involved, and the value of this fractional interest plus the value of all other fractional interest may or may not equal the value of the entire fee simple estate considered as a whole.
- It is assumed that there are no hidden or inapparent conditions of the property, subsoil, or structures which would render it more or less valuable; we assume no responsibility for such conditions or for engineering which might be required to discover such factors.
- Nothing in the report should be deemed a certification or guaranty as to the structural and/or mechanical (electrical, heating, air-conditioning, and plumbing) soundness of the building(s) and associated mechanical systems, unless otherwise noted.
- Information, estimates, and opinions provided by third parties and contained in this report were obtained from sources considered reliable and believed to be true and correct.

However, no responsibility is assumed for possible misinformation.

- Possession of the report, or a copy thereof, does not carry with it the right of publication, and the report may not be used by any person or organization except the client without the previous written consent of the appraiser, and then only in its entirety. If the client releases or disseminates the reports to others without the consent of the appraiser, the client hereby agrees to hold the appraiser harmless, and to indemnify the analysts from any liability, damages, or losses which the analysts might suffer, for any reason whatsoever, by reason of dissemination of the report by the client. Further, if legal action is brought against the analyst by a party other than the client concerning the report or the opinions stated therein, the client agrees, in addition to indemnifying the analysts for any damages or losses, to defend said analysts in said action at client's expense. However, nothing herein shall prohibit the client or analysts from disclosing said report or opinions contained therein as may be required by applicable law.
- Disclosure of the contents of this report is governed by the By-Laws and Regulations of the Appraisal Institute. Neither all nor any part of the contents of this report (especially any conclusions as to value, the identity of the appraisers or the firm which they are connected, or any reference to the Appraisal Institute or to the MAI designation) shall be disseminated to the public through advertising media, public relations media, news media, sales media, or any public means of communication without the prior consent and approval of the appraisers.
- Unless otherwise stated in this report, the existence of hazardous material, which may or may not be present on the property, was not observed by the appraiser. The appraiser has no knowledge of the existence of such materials on or in the property. The appraiser, however, is not qualified to detect such substances. The presence of substances such as asbestos, urea-formaldehyde foam insulation, or other potentially hazardous materials may affect the value of the property. The value estimate is predicated on the assumption that there is no such material on or in the property that would cause a loss in value. No responsibility is assumed for any such conditions, or for any expertise or engineering knowledge required to discover

them. The client is urged to retain an expert in this field, if desired.

- The Americans with Disabilities Act (ADA) became effective January 26, 1992. We have not made a specific compliance survey and analysis of this property to determine whether or not it is in conformity with the various detailed requirements of the ADA. It is possible that a compliance survey together with a detailed analysis of the requirements of the ADA could reveal that the property is not in compliance with one or more of the requirements of the act. If so, this fact could have a negative effect upon the value of the property. We did not consider possible noncompliance with the requirements of ADA in estimating the value of the property.

CERTIFICATION

The undersigned do hereby certify that, to the best of our knowledge and belief, the statements of fact contained in this report are true and correct. It is further certified that the reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions, and are our personal, unbiased professional analyses, opinions, and conclusions. We further certify that we have no present or prospective interest in the property that is the subject of this report, and have no personal interest or bias with respect to the parties involved. Our compensation is not contingent on a predetermined value or direction in value that favors the client, the amount of the value estimate, the attainment of a stipulated result, or the occurrence of a subsequent event. The appraisal analyses, opinions, and conclusions were developed, and this report has been prepared, in conformity with the requirements of the Code of Professional Ethics and Standards of Professional Appraisal Practice of the Appraisal Institute and the Uniform Standards of Professional Appraisal Practice. The use of this report is subject to the requirements of the Appraisal Institute relating to review by duly authorized representatives. The undersigned certify that they have made personal inspections of the property that is the subject of this report. No other persons provided significant professional assistance other than the undersigned.

The Appraisal Institute conducts programs of continuing education for their designated members. The undersigned members have completed the requirements of the continuing education program of the Appraisal Institute.

APPENDIX C

**Air Quality Study For The Proposed
Royal Kunia, Phase II Project**
Prepared By: B. D. Neal & Associates

AIR QUALITY STUDY
FOR THE PROPOSED
ROYAL KUNIA PHASE II PROJECT (INCREMENTS 2 AND 3)

HOAEAE, EWA, OAHU

Prepared for:
Halekua Development Corporation

January 1996



B. D. NEAL & ASSOCIATES
Applied Meteorology • Air Quality • Computer Science
P.O. BOX 6239, OCEAN VIEW, HAWAII 96737-6239
TELEPHONE (808) 939-9317 • FAX (808) 939-7390

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1.0 SUMMARY

Halekua Development Corporation is proposing to develop both the second and third increments of the second phase of the Royal Kunia Project at Hoaeae, Ewa, Oahu. The 157-acre site for the project will be used for approximately 1100 single- and multi-family housing units. Completion and full occupancy of the project is expected to be achieved by the year 2005. This study examines the potential short- and long-term air quality impacts that could occur as a result of construction and use of the proposed facilities. Mitigative measures to lessen impacts from the project are suggested where possible and appropriate.

At the present time, air quality standards have been established by both federal and state governments which limit ambient concentrations of particulate matter, sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone and lead. In addition, a state standard has been established for hydrogen sulfide. Hawaii state air quality standards are more stringent than the comparable national limits except for the standards for sulfur dioxide, particulate matter and lead, which are set at the same levels.

Regional and local climate together with the amount and type of human activity generally dictate the air quality of a given location. The climate of the Ewa Plain area is very much affected by its leeward and coastal situation. Winds are predominantly trade winds from the east northeast except for occasional periods when Kona storms may generate strong winds from the south or when the trade winds are weak and landbreeze-seabreeze circulations may develop. Wind speeds typically vary between about 5 and 15 miles per hour providing relatively good ventilation much of the time. Temperatures in the leeward Oahu area are generally very moderate with average daily temperatures ranging from about 65°F to 84°F.

The extreme minimum temperature recorded at nearby Ewa Plantation is 47°F, while the extreme maximum temperature is 93°F. This area of Oahu is one of the drier locations in the state with rainfall often highly variable from one year to the next. Monthly rainfall has been measured to vary from as little as a trace to as much as 15 inches. Average annual rainfall amounts to about 21 inches with summer months being the driest.

The present air quality of the project area is relatively good and has probably improved recently with the discontinuation of sugar cane growing in the area. Air quality data from nearby monitoring stations operated by the state indicate that both state and national air quality standards are currently being met.

If the proposed project is given the necessary approvals to proceed, 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 will likely occur during the 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. Hence, an effective dust control plan should be implemented to ensure compliance with state regulations. Fugitive dust emissions can be controlled to a large extent by watering of active work areas, using wind screens, keeping adjacent paved roads clean, and by covering of open-bodied trucks. Other dust control measures could include limiting the area that can be disturbed at any given time and/or mulching or chemically stabilizing inactive areas that have been worked. Paving and landscaping of project areas early in the construction schedule will also reduce dust emissions. Exhaust emissions can be

mitigated by moving construction equipment and workers to and from the project site during off-peak traffic hours.

After construction, vehicles coming to and from the proposed project will use Kunia Road and the project collector road to access the project site. To assess the impact of emissions from these vehicles, an air quality modeling study was undertaken to estimate both current and future ambient concentrations of carbon monoxide along project collector road. Present carbon monoxide concentrations were estimated to be well within both state and national ambient air quality standards. In the year 2005 without the project, worst-case 1-hour concentrations were predicted to remain within the national standards but to potentially exceed the more stringent state standards within small hot-spot areas near the more heavily traveled intersections. For the same scenario, a potential exceedance of the national limit for an 8-hour averaging time was identified near the intersection of Kunia Road and the Phase II Collector Road. With the project, worst-case concentrations in the year 2005 were predicted to increase further and to continue to potentially exceed the state 1-hour and 8-hour limits and the national 8-hour limit at some locations in the project area. It should be noted, however, that with the state standards set at such stringent levels, it is likely that they are currently exceeded at many locations in the state that have even moderate traffic volumes. It should be further noted that the methodologies used to estimate these concentrations generally produce conservatively high estimates of worst-case values, particularly 8-hour estimates.

Options available to mitigate long-term, traffic-related air pollution are generally to further improve roadways, to reduce traffic or to reduce individual vehicular emissions. Aside from providing added roadway improvements, air pollution impacts from

vehicular emissions could conceivably be mitigated by reducing traffic volumes through the promotion of bus service and car pooling and/or by adjusting local school and business hours to begin and end during off-peak times. This mitigation measure, however, is generally considered only partially successful. Reduction of emissions from individual vehicles is generally beyond the control of any single development and would have to be achieved through the promulgation of county, state or federal air pollution control regulations. For example, Hawaii currently does not require annual inspections of motor vehicle air pollution control equipment. Although this has been proposed in past legislative sessions, there currently is no indication that the state is contemplating adopting such rules. Another potential traffic mitigation measure might be to provide added buffer zones between walkways and roadways where space is available and to exclude the public from these areas using vegetative barriers.

Depending on the demand levels, long-term impacts on air quality are also possible due to indirect emissions associated with a development's electrical power and solid waste disposal requirements. Quantitative estimates of these potential impacts were not made, but based on the estimated demand levels and emission rates involved, any significant impacts are unlikely. Nevertheless, incorporating energy conservation design features and promoting conservation and recycling programs within the proposed development could serve to further reduce any associated impacts.

2.0 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 adjacent to Kunia Road and the Royal Kunia

Phase I project. This study addresses Increments 2 and 3 of the proposed development which will include approximately 1100 single- and multi-family housing units on 157 acres. The development is expected to be completed and fully occupied by the year 2005.

The purpose of this study was to assess the potential short-term and long-term direct and indirect air quality impacts that could result from construction and use of the proposed facilities and to recommend measures to mitigate any project-related air quality impacts. Before examining the potential air quality impacts of the project, a discussion of ambient air quality standards is presented and background information concerning the regional and local climatology and the present air quality of the project area is provided.

3.0 AMBIENT AIR QUALITY STANDARDS

Ambient concentrations of air pollution are regulated by both national and state ambient air quality standards (AAQS). National AAQS are specified in Title 40, Part 50 of the Code of Federal Regulations, 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, national and state AAQS have been established for particulate matter, sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone and lead. The state has also set a standard for hydrogen sulfide. 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, the 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 air 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 air 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, and the state 1-hour limit for ozone is less than one-half of the federal standard.

Hawaii AAQS for sulfur dioxide were relaxed in 1986 to make the state standards essentially the same as the national limits. In 1993, the state also revised its particulate standards to follow those set by the federal government. 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.

4.0 REGIONAL AND LOCAL CLIMATOLOGY

Regional and local climatology significantly affect the air quality of a given location. Wind, temperature, atmospheric turbulence, mixing height and rainfall all influence air quality. Although the climate of Hawaii is relatively moderate throughout most of the state, significant differences in these parameters may occur from one location to another. Most differences in regional and local climates within the state are caused by the mountainous topography.

Hawaii lies well within the belt of northeasterly trade winds generated by the semi-permanent Pacific high pressure cell to the north and east. On the island of Oahu, the Koolau and Waianae Mountain Ranges are oriented almost perpendicular to the trade winds, which accounts for much of the variation in the local climatology of the island. The site of the proposed project is located in the transition zone between the broad Ewa Plain to the south, the Schofield Saddle to the north, and the eastern slope of the Waianae Mountains a few miles to the west.

The nearest long-term wind data available for the project area are collected at the Barbers Point Naval Air Station located about 8 miles to the southwest. Data available from the Honolulu International Airport, located about 10 miles to the southeast, may also be at least semi-representative. Wind frequency data given in Table 2 for Barbers Point show that the annual prevailing wind direction for this area of Oahu is east northeast (the same as at Honolulu International Airport). On an annual basis, 38.1 percent of the time the wind is from this direction, and more than 80 percent of the time the wind is in the northeast quadrant. Winds from the south are infrequent occurring only a few days during the year and mostly in winter in association with Kona storms. Wind

speeds average about 10 knots (12 mph) and mostly vary between about 5 and 15 knots (6 and 17 mph). Surface winds at the project site are likely similar to those recorded at Barbers Point.

Air pollution emissions from motor vehicles, the formation of photochemical smog and smoke plume rise all depend in part on air temperature. Colder temperatures tend to result in higher emissions of contaminants from automobiles but lower concentrations of photochemical smog and ground-level concentrations of air pollution from elevated plumes. In Hawaii, the annual and daily variation of temperature depend to a large degree on elevation above sea level, distance inland and exposure to the trade winds. Average temperatures at locations near sea level generally are warmer than those at higher elevations. Areas exposed to the trade winds tend to have the least temperature variation, while inland and leeward areas often have the most. At nearby Ewa Plantation, average annual daily minimum and maximum temperatures are 65°F and 84°F, respectively [1]. The extreme minimum temperature on record is 47°F, and the extreme maximum is 93°F. Temperatures at the project site are similar but likely show slightly larger daily and annual variations due to the more inland location.

Small scale, random motions in the atmosphere (turbulence) cause air pollutants to be dispersed as a function of distance or time from the point of emission. Turbulence is caused by both mechanical and thermal forces in the atmosphere. It is oftentimes measured and described in terms of Pasquill-Gifford stability class. Stability class 1 is the most turbulent and class 6 the least. Thus, air pollution dissipates the best during stability class 1 conditions and the worst when stability class 6 prevails. In the Ewa area, stability class 5 or 6 is generally the highest stability class that occurs, developing during clear, calm nighttime or early morning hours when temperature inversions form

due to radiational cooling. Stability classes 1 through 4 occur during the daytime, depending mainly on the amount of cloud cover and incoming solar radiation and the onset and extent of the sea breeze.

Mixing height is defined as the height above the surface through which relatively vigorous vertical mixing occurs. Low mixing heights can result in high ground-level air pollution concentrations because contaminants emitted from or near the surface can become trapped within the mixing layer. In Hawaii, minimum mixing heights tend to be high because of mechanical mixing caused by the trade winds and because of the temperature moderating effect of the surrounding ocean. Low mixing heights may sometimes occur, however, at inland locations and even at times along coastal areas early in the morning following a clear, cool, windless night. Coastal areas also may experience low mixing levels during sea breeze conditions when cooler ocean air rushes in over warmer land. Mixing heights in Hawaii typically are above 3000 feet (1000 meters).

Rainfall can have a beneficial affect on the air quality of an area in that it helps to suppress fugitive dust emissions, and it also may "washout" gaseous contaminants that are water soluble. Rainfall in Hawaii is highly variable depending on elevation and on location with respect to the trade wind. The Ewa Plain is one of the driest areas on Oahu due to its leeward and near sea level location. Average annual rainfall in this area of Oahu amounts to about 21 inches but may vary from about 10 inches during a dry year to more than 40 inches during a wet year [1]. Most of the rainfall usually occurs during the winter months. Monthly rainfall may vary from as little as a trace to as much as 15 inches or more. Rainfall amounts at the project site are probably similar but slightly higher.

5.0 PRESENT AIR QUALITY

Present air quality in the project area is mostly affected by air pollutants from vehicular, industrial, natural and/or agricultural sources. Table 3 presents an air pollutant emission summary for the City and County of Honolulu that was compiled in 1980. These are the latest data that are available. Emissions are undoubtedly higher at this time, but the proportional relationships may continue to be about the same. Also, these emission rates may provide a relative measure with which to assess the proposed project's emissions presented later in this study. As suggested in the table, 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.

Kunia Road, passing adjacent to the project site, is a major arterial roadway that presently carries moderate levels of vehicle traffic during peak traffic hours. Emissions from motor vehicles using this roadway, primarily nitrogen oxides and carbon monoxide, will tend to be carried away from the project site by the prevailing winds.

Several sources of industrial air pollution are located in the Campbell Industrial Park, which is located about 7 miles to the southwest at Barbers Point. Industries currently operating there include the Chevron and PRI refineries, Hawaiian Cement, H-Power, AES Ohana and others. Prevailing winds from the northeast will carry these emissions away from the site most of the time. As indicated in the previous section, winds from the southwest (which

will carry emissions toward the site) occur only a few percent of the time.

Natural sources of air pollution emissions that also could 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.

Until recently, air pollution in the area originating from agricultural sources could mainly be attributed to sugar cane operations to the west and southwest of the project site. Emissions from both the mill and the canefield operations in the area have now been eliminated with the closure of the Ewa Plantation. Although it is currently unclear how the former sugar cane lands will be utilized, it is expected that diversified agriculture will be promoted. Due to the prevailing wind pattern in the area, any air pollution emissions associated with diversified agricultural operations will occur downwind of the project site much of the time. Hence, any associated smoke and dust will mostly be carried away from the project site.

The State Department of Health operates a network of air quality monitoring stations at various locations on Oahu. Each station, however, typically does not monitor the full complement of air quality parameters. Table 4 shows an annual summary of air quality measurements that were made nearest to the project site for each of the regulated air pollutants for the period 1986 through 1990. These are the most recent data currently available.

Sulfur dioxide is monitored by the State Department of Health at an air quality station located in nearby Campbell Industrial Park.

Monitoring consisted of measurements of 24-hour average sulfur dioxide concentration every sixth day. There were no exceedances of the state/national 24-hour AAQS for sulfur dioxide during the 5-year period. Concentrations monitored during the last 5 years reported were consistently low with average daily values at or below 5 $\mu\text{g}/\text{m}^3$.

The closest monitoring station for particulate matter less than 10 microns in diameter (PM-10) is located in Campbell Industrial Park. Twenty-four hour average PM-10 concentrations monitored at this location ranged from 7 to 66 $\mu\text{g}/\text{m}^3$ between 1986 and 1990. Average daily concentrations were generally less than 25 $\mu\text{g}/\text{m}^3$. All values reported were within the national AAQS.

The nearest carbon monoxide measurements were made at the Department of Health building in downtown Honolulu. During the past 5 years, the average daily maximum 1-hour concentration measured at this location was about 2 mg/m^3 . During the most recent year reported, 1990, the daily maximum 1-hour concentration ranged from 0.1 to 7.1 mg/m^3 , and no exceedances of the state 1-hour AAQS were recorded. During previous years (1986-89), maximum 1-hour concentrations were higher, and five exceedances of the state 1-hour AAQS were measured. Daily maximum 8-hour values for 1988-90 have not been reported at this writing, but concentrations for the 1986-87 period ranged from 0.3 to 4.7 mg/m^3 . The average of the daily maximum 8-hour values was about 1.3 mg/m^3 . No exceedances of the state 8-hour AAQS were recorded. Present concentrations of carbon monoxide in the project area are estimated later in this study based on air quality modeling of vehicular emissions.

The nearest available ozone measurements were obtained at Sand Island (about 11 miles southeast of the project site). The maximum

1-hour concentration each year for the 1986-90 reporting period ranged from 84 to 116 $\mu\text{g}/\text{m}^3$ and showed a slight upward trend. Two exceedances of the state AAQS were recorded during 1990 while none were measured during the previous four years.

The closest measurements of ambient lead concentrations that have been reported were made at the downtown Honolulu monitoring station. 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 $\mu\text{g}/\text{m}^3$, safely inside the state and national AAQS.

Based on the data and discussion presented above, it appears likely that the State of Hawaii AAQS for sulfur dioxide, nitrogen dioxide and lead are currently being met at the project site. The ozone AAQS has not been exceeded during the past four 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.

6.0 SHORT-TERM IMPACTS OF PROJECT

Short-term direct and indirect impacts on air quality could potentially occur during project construction. For a project of this nature, there are two potential types of air pollution emissions that 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 also could 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 the grading and dirt-moving activities associated with site clearing and preparation work. The emission rate for fugitive dust emissions from construction activities is difficult to estimate accurately because of its elusive nature of emission 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 [2] 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 likely be somewhat higher due to the relatively dry climate and because the soil silt content in the area is probably greater than 30 percent. In any case, State of Hawaii Air Pollution Control Regulations [3] prohibit visible emissions of fugitive dust from construction activities at the property line. Thus, an effective dust control plan for the project construction phase is essential.

Adequate fugitive dust control can usually be accomplished by the establishment of a frequent watering program to keep bare-dirt surfaces in construction areas from becoming significant sources of dust. In dust-prone or dust-sensitive areas, other control measures such as limiting the area that can be disturbed at any given time, applying chemical soil stabilizers, mulching and/or using wind screens may be necessary. Control regulations further stipulate that open-bodied trucks be covered at all times when in motion if they are transporting materials that could be blown away. Haul trucks tracking dirt onto paved streets from unpaved areas is oftentimes a significant source of dust in construction areas. Some means to alleviate this problem, such as road cleaning or tire washing, may be appropriate. Paving of parking areas and/or establishment of landscaping as early in the construction schedule as possible can also lower the potential for fugitive dust emissions.

On-site mobile and stationary construction equipment also will emit air pollutants from 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 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 can be mitigated.

7.0 LONG-TERM IMPACTS OF PROJECT

7.1 Roadway Traffic

After construction is completed, use of the proposed facilities will result in increased motor vehicle traffic on nearby roadways, potentially causing long-term impacts on ambient air quality in the project vicinity. Motor vehicles with gasoline-powered engines are significant sources of carbon monoxide, and they also emit nitrogen oxides and other contaminants.

Federal air pollution control regulations require that new motor vehicles be equipped with emission control devices that reduce emissions significantly compared to a few years ago. In 1990, the President signed into law the Clean Air Act Amendments. This new legislation requires further emission reductions be phased in beginning in 1994. The combination of current and new restrictions on emissions from new motor vehicles will lower average emissions each year as more and more older vehicles leave the state's roadways. Carbon monoxide emissions, for example, will go down by about 15 percent on the average during the next 10 years due to the replacement of older vehicles with newer models.

To evaluate the potential long-term indirect ambient air quality impact of increased roadway traffic associated with a project such as this, computerized emission and atmospheric dispersion models can be used 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 pollutants generated by motor vehicles. Furthermore, carbon monoxide air pollution is generally considered to be a microscale problem that can be addressed locally to some extent, whereas nitrogen oxides air pollution most often is a regional issue that cannot be addressed by a single new development.

For this project, three scenarios were selected for the carbon monoxide modeling study: year 1995 with present conditions and year 2005 both with and without the project. (This is the expected project completion and full occupancy date.) To begin the 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 queuing. For this study, the five key intersections identified in the traffic study were also selected for air quality analysis. These included Kunia Road at the Phase II (project) collector road and four intersections within the project along the project collector road. Table 5 summarizes the existing traffic controls at the subject intersections and those that were assumed to exist in the future with and without the project. Other details of the intersection configurations and traffic conditions are given in the traffic impact assessment report for the project [4].

The main objective of the modeling study was to estimate maximum 1-hour average carbon monoxide concentrations for each of the three scenarios studied. To evaluate the significance of the estimated concentrations, a comparison of the predicted values for each scenario can be made. Comparison of the estimated values to the national and state AAQS will provide another measure of significance.

The EPA computer model MOBILE5A [5] was used to calculate vehicular carbon monoxide emissions for each year studied. MOBILE5A is the most recently released version of the EPA mobile emission models. Emission estimates provided by the MOBILE5A model have been updated based on EPA's recent testing of on-road vehicles. This latest series of tests has indicated that emission control equipment deteriorates more rapidly than had been previously thought. Hence, MOBILE5A emission estimates are higher (in some cases as much as twice as high) compared to emission estimates derived from earlier versions of the model, particularly in states like Hawaii that have no inspection and maintenance program for emission control equipment.

One of the key inputs to the MOBILE5A emission model is vehicle mix. 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, 5% light-duty gasoline-powered trucks and vans, 0.5% heavy-duty gasoline-powered vehicles, 0.6% light-duty diesel-powered vehicles, 1% heavy-duty diesel-powered trucks and buses, and 1% motorcycles.

Other key inputs to the MOBILE5A emission model are the cold/hot start fractions. Motor vehicles operating in a cold- or hot-start modes emit excess air pollution until reaching stabilized operating temperatures. Typically, motor vehicles reach stabilized operating temperatures after about 4 miles of driving. For traffic operating on surface streets around the project area, it was assumed that during both morning and afternoon peak traffic hours about 25 percent of all vehicles would be operating in the cold-start mode and that about 5 percent would be operating in the hot-start mode. These operational mode values were estimated based on a report from the California Department of Transportation [6] and taking into

consideration the likely origins of morning/afternoon traffic in the project area.

Ambient temperatures of 59 and 68 degrees Fahrenheit were used for morning and afternoon peak-hour emission computations, respectively. These are conservative assumptions since morning/afternoon ambient temperatures will generally be warmer than this and emission estimates given by MOBILE5A are inversely proportional to the ambient temperature.

After computing vehicular carbon monoxide emissions through the use of MOBILE5A, these data were then input to an atmospheric dispersion model. EPA air quality modeling guidelines [7] currently recommend that the computer model CAL3QHC [8] be used to assess carbon monoxide concentrations at roadway intersections, or in areas where its use has previously been established, CALINE4 [9]. CALINE4 has been used extensively in Hawaii to assess air quality impacts at roadway intersections. Each of these two computer models offers advantages and disadvantages. CAL3QHC has the capability to make vehicle queuing estimates, but it does not simulate modal emissions. CALINE4 has the capability to simulate modal emissions, but it does not have the capacity to make queuing estimates.

Since the use of CALINE4 has previously been established in Hawaii, CALINE4 was used to perform the analyses for the subject project. However, all vehicle queuing estimates involving signalized intersections were made based on the queuing algorithms included in the CAL3QHC model. This approach takes advantage of the best features of both models. Queuing estimates for unsignalized intersections were made based on capacity analysis procedures [10] and transportation queuing theory [11].

CALINE4 was developed by the California Transportation Department to simulate vehicular movement and atmospheric dispersion of vehicular emissions. This model 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 were obtained from the traffic study cited previously. Vehicles using Kunia Road were assumed to accelerate to 35 mph, while traffic on the project access roads was assumed to move at 25 mph. These are either the current posted speed limits or the limits that will likely exist in the future if the roadways are built. A deceleration/acceleration time of 11 seconds was assumed for vehicles traveling at 25 mph, whereas a value of 16 seconds was assumed for those traveling at 35 mph.

Model roadways were set up to reflect roadway geometry, physical dimensions and operating characteristics. Concentrations predicted by air quality models generally are not considered valid within the roadway mixing zone. The roadway mixing zone is taken to include 3 meters on either side of the traveled portion of the roadway and the turbulent area within 10 meters of a cross street. For this study, model receptor sites were located at the edges of the mixing zones where the maximum concentrations would likely occur, whether or not sidewalks currently exist. All receptor heights were placed at 1.8 meters above ground 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 for morning scenarios and stability category 4 was assumed for afternoon cases. These are the most conservative stability categories that can be used for estimating pollutant dispersion at suburban or undeveloped locations for these time periods. A surface roughness length of 100 cm was assumed and a mixing height of 300 meters was used in all cases. 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 carbon monoxide in the project vicinity are believed to be at relatively low levels. Hence, background contributions of carbon monoxide from sources or distant roadways not directly considered in the analysis were accounted for by adding a small background concentration of 0.5 ppm to all predicted concentrations for 1995. Although significant development and increased traffic are expected to occur within the project area within the next few years, background carbon monoxide concentrations may not change significantly since individual emissions from motor vehicles are forecast to decrease substantially. Hence, a background value of 0.5 ppm was assumed to persist for all 2005 scenarios.

Predicted Worst-Case 1-Hour Concentrations

Table 6 summarizes the final results of the modeling study in the form of the estimated worst-case 1-hour morning and afternoon ambient carbon monoxide concentrations for each of the three study scenarios. These results can be compared directly to the state and the national AAQS. The locations of these estimated worst-case 1-hour concentrations all occurred at or very near the indicated intersections.

As indicated in the table, the highest estimated 1-hour concentration within the study area for the present (1995) case was 2.5 mg/m³. This was projected to occur during the morning peak traffic hour near the location of the future intersection of Kunia Road and Phase II Collector Road. As noted in the table, the existing case assumes through traffic only on Kunia Road, i.e., no intersection was assumed to exist. Existing concentrations at the locations of intersections along the future Phase II Collector Road were assumed to be near the background level (0.5 mg/m³).

In the year 2005 without the proposed project, a worst-case 1-hour concentration of 20.9 mg/m³ was predicted to occur during the morning peak-traffic hour near the intersection of Kunia Road and the Phase II collector road. Worst-case values at the other locations studied for the 2005 without project scenario ranged between 2.6 and 18.4 mg/m³. Compared to the 1995 scenario, concentrations were estimated to increase substantially at most locations studied due to the creation of roadway intersections which would be built during Increment 1 of the project.

Predicted 1-hour worst-case concentrations for the 2005 with project scenario ranged downward from 22.8 mg/m³ during the morning at Kunia Road and the Phase II Collector Road to 3.8 mg/m³ during the afternoon at the Phase II Collector Road and the Western Road to Increment 2. Compared to both the without project case and the existing case, predicted worst-case concentrations with the project were substantially higher due to the added traffic and the construction of added roadway intersections.

All estimated worst-case 1-hour carbon monoxide levels for all scenarios were within the national AAQS of 40 mg/m³. All existing worst-case 1-hour concentrations were also within the more

stringent State of Hawaii standard of 10 mg/m³. However, with or without, the project future worst-case concentrations of carbon monoxide were predicted to exceed the state standard near the intersections of Kunia Road at the Phase II Collector Road and the Phase II Collector Road at both the western and eastern roads to the Industrial Park.

Predicted Worst-Case 8-Hour Concentrations

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 peak 1-hour values, and (2) meteorological dispersion conditions are more variable (and mean wind speeds are usually higher) 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 [12] concluded that 1-hour to 8-hour persistence factors could typically be expected to range from 0.4 to 0.5. EPA guidelines [13] 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 [14] suggest that this factor may range 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 will likely yield conservatively high estimates of worst-case 8-hour concentration.

The resulting estimated worst-case 8-hour concentrations are indicated in Table 7. For the 1995 scenario, the estimated worst-case 8-hour carbon monoxide concentration within the project area was 1.2 mg/m³ at the location of the proposed intersection of Kunia

Road and the Phase II Collector Road. This is within both the state standard of 5 mg/m³ and the national standard of 10 mg/m³. Other locations studied along the proposed collector road were assumed to be at background (0.5 mg/m³). The predicted maximum value for the year 2005 without project scenario was 10.5 mg/m³, occurring at the intersection of Kunia Road and the Phase II Collector Road. This exceeds both state and national standards. A worst-case concentration of 8.0 mg/m³ was predicted to occur near the intersection of the Phase II Collector Road and the western road to the Industrial Park, and a value of 7.4 mg/m³ was predicted near the intersection of the Phase II Collector Road and the eastern road to the Industrial Park. These concentrations are above the state limit but within the national standard. Worst-case concentrations at the two other locations studied were well within both state and national standards. With the project, the highest 8-hour concentration in the project area, 11.7 mg/m³, was again predicted to occur near the intersection of Kunia Road and the Phase II Collector Road. Similar to the without project case, this exceeds both state and national standards. Worst-case concentrations of 9.5 and 8.4 mg/m³, respectively, were predicted to occur near the intersections of the Phase II Collector Road with the western and eastern roads to the Industrial Park. These values are within the national standard but exceed the state limit. Worst-case concentrations at other locations studied were within both state and national standards.

Conservativeness of Estimates

In reviewing the results of this study, it should be emphasized that the predicted concentrations are based on worst-case assumptions concerning both traffic movement and worst-case meteorological conditions. One such assumption concerning worst-case meteorological conditions is that a wind speed of 1 meter per second with a steady direction for 1 hour will occur. A steady

wind of 1 meter per second blowing from the worst direction for an hour is not very likely, and it 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. It should also be noted that 8-hour concentration estimates are probably more conservative than 1-hour estimates due to the uncertainties and the methodologies involved.

7.2 Electrical Demand

The proposed project also will cause indirect air pollution emissions from power generating facilities as a consequence of electrical power usage. The annual electrical demand of the project when fully developed will likely not exceed about 11 million kilowatt-hours. Electrical power for the project will most probably be provided mainly by oil-fired generating facilities located on Oahu. However, with H-Power and the AES coal-fired power plant now online at Campbell Industrial Park, 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 will be required to burn more fuel and hence more air pollution will be emitted at these facilities. Given in Table 8 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 will likely be higher than the values given in the table.

7.3 Solid Waste Disposal

Solid waste generated by the development when fully completed is not expected to exceed about 4 tons per day. Most project refuse

will likely be hauled away and burned at the H-Power facility at Campbell Industrial Park to generate electricity. Burning of the waste to generate electricity will result in emissions of particulate, carbon monoxide and other contaminants, but these will be offset to some extent by reducing the amount of fuel oil that would be required to generate electricity for the project. Table 9 gives emission estimates assuming all project solid waste from residential components is burned at H-Power. With the high level of particulate emission control achieved at H-Power, emission quantities from the burning of project solid waste would be relatively small compared to emissions from other sources on the island.

8.0 CONCLUSIONS AND RECOMMENDATIONS

Air quality in the project area is currently relatively good and may have recently improved due to the discontinuance of sugar cane growing in the area. During construction of the proposed project, short-term impacts on air quality may occur due to fugitive dust emissions. Uncontrolled fugitive dust emissions from construction activities are estimated to amount to about 1.2 tons per acre per month or more, depending on rainfall. To control dust, active work areas and any temporary unpaved work roads should be watered at least twice daily on days without rainfall. Use of wind screens and/or limiting the area that is disturbed at any given time will also help to contain fugitive dust emissions. Wind erosion of inactive areas of the site that have been disturbed could be controlled by mulching. Dirt-hauling trucks should be covered when traveling on roadways to prevent windage. A routine road cleaning and/or tire washing program will also help to reduce fugitive dust emissions that may occur as a result of trucks tracking dirt onto paved roadways in the project area. Paving of parking areas and establishment of landscaping early in the construction schedule will also help to control dust.

During construction phases, emissions from engine exhausts (primarily consisting of carbon monoxide and nitrogen oxides) will also occur both from on-site construction equipment and from vehicles used by construction workers and from trucks traveling to and from the project. Increased vehicular emissions due to disruption of traffic by construction equipment and/or commuting construction workers can be alleviated by moving equipment and personnel to the site during off-peak traffic hours.

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, but the predicted increases in air pollution levels with the project compared to without it were relatively small. With or without the project, air quality model projections predict that air quality standards for carbon monoxide could be exceeded during worst-case conditions in small hot spot areas near intersections along the Phase II Collector Road. This is not particularly unusual, however, since many locations in the state with even moderate traffic volumes are predicted to potentially exceed the standards due to the conservativeness of the estimates.

Options available to mitigate long-term, traffic-related air pollution include improving roadways, reducing traffic or reducing individual vehicular emissions. Aside from further improving roadways, air pollution impacts from vehicular emissions could conceivably be mitigated by reducing traffic volumes through the promotion of bus service and car pooling and/or by adjusting local school and business hours to begin and end during off-peak times. However, this mitigation measure is generally considered only partially successful. Reduction of emissions from individual

vehicles is beyond the control of any single development and would have to be achieved through the promulgation of county, state or federal air pollution control regulations. For example, Hawaii currently does not require annual inspections of motor vehicle air pollution control equipment. At the present time, there is no indication that the state is contemplating adopting such rules.

Another potential mitigation measure might be to provide added buffer zones between walkways and roadways in areas where space is available. Technically, however, the public would have to be somehow excluded from the buffer zones, perhaps by vegetative barriers. The predicted worst-case concentrations in this report are based on a separation distance of 3 m (10 ft) between walkways and roadways. Doubling this distance to about 6 m (20 ft) would in many cases reduce maximum concentrations by about 10 to 15 percent.

Any long-term impacts on air quality due to indirect emissions from supplying the project with electricity and from the disposal of waste materials generated by the project will likely be relatively small based on the magnitudes of both the estimated demands and the indirect emissions. To further moderate any impacts, indirect emissions from project electrical demand could likely be reduced somewhat by incorporating energy-saving features into project design requirements. This might include the use of solar water heaters, water heater timers or possibly hot water on demand systems; designing building space so that window positions maximize indoor light without unduly increasing indoor heat; using landscaping where feasible to provide afternoon shade to cut down on the use of air conditioning; installation of insulation and double-glazed doors to reduce the effects of the sun and heat; movable, controlled openings for ventilation at opportune times; and possibly automated room occupancy sensors. Solid waste related air pollution could likely be reduced somewhat by the promotion of

conservation and recycling programs within the proposed development.

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Table 1
**SUMMARY OF STATE OF HAWAII AND NATIONAL
 AMBIENT AIR QUALITY STANDARDS**

| Pollutant | Units | Averaging Time | Maximum Allowable Concentration | | |
|---------------------------------|--------------------------|------------------|---------------------------------|--------------------|-------------------|
| | | | National Primary | National Secondary | State of Hawaii |
| Particulate Matter ^a | $\mu\text{g}/\text{m}^3$ | Annual | 50 | 50 | 50 |
| | | 24 Hours | 150 ^b | 150 ^b | 150 ^b |
| Sulfur Dioxide | $\mu\text{g}/\text{m}^3$ | Annual | 80 | - | 80 |
| | | 24 Hours | 365 ^b | - | 365 ^b |
| | | 3 Hours | - | 1300 ^b | 1300 ^b |
| Nitrogen Dioxide | $\mu\text{g}/\text{m}^3$ | Annual | 100 | 100 | 70 |
| Carbon Monoxide | mg/m^3 | 8 Hours | 10 ^b | - | 5 ^b |
| | | 1 Hour | 40 ^b | - | 10 ^b |
| Ozone | $\mu\text{g}/\text{m}^3$ | 1 Hour | 235 ^b | 235 ^b | 100 ^b |
| Lead | $\mu\text{g}/\text{m}^3$ | Calendar Quarter | 1.5 | 1.5 | 1.5 |
| Hydrogen Sulfide | $\mu\text{g}/\text{m}^3$ | 1 Hour | - | - | 35 ^b |

^a Particles less than or equal to 10 microns aerodynamic diameter

^b Not to be exceeded more than once per year

Table 2
ANNUAL WIND FREQUENCY FOR BARBERS POINT, OAHU (%)

| Wind Direction | Wind Speed (knots) | | | | | | Total |
|----------------|--------------------|------|------|-------|-------|-----|-------|
| | 0-3 | 4-6 | 7-10 | 11-16 | 17-21 | >21 | |
| N | 0.1 | 0.4 | 0.3 | 0.1 | 0.0 | 0.0 | 0.9 |
| NNE | 0.4 | 1.5 | 2.3 | 1.1 | 0.2 | 0.0 | 5.5 |
| NE | 1.2 | 7.9 | 5.8 | 2.6 | 0.2 | 0.0 | 17.8 |
| ENE | 2.7 | 16.2 | 12.0 | 7.0 | 0.2 | 0.0 | 38.1 |
| E | 0.8 | 6.2 | 8.3 | 4.4 | 0.1 | 0.0 | 19.8 |
| ESE | 0.2 | 0.4 | 1.2 | 0.7 | 0.0 | 0.0 | 2.5 |
| SE | 0.0 | 0.3 | 1.2 | 1.3 | 0.0 | 0.0 | 2.9 |
| SSE | 0.0 | 0.3 | 1.1 | 1.0 | 0.1 | 0.0 | 2.5 |
| S | 0.1 | 0.6 | 1.5 | 0.7 | 0.2 | 0.0 | 3.1 |
| SSW | 0.1 | 0.3 | 0.8 | 0.3 | 0.0 | 0.0 | 1.5 |
| SW | 0.0 | 0.2 | 0.5 | 0.3 | 0.0 | 0.0 | 1.1 |
| WSW | 0.0 | 0.1 | 0.5 | 0.3 | 0.0 | 0.0 | 1.0 |
| W | 0.1 | 0.2 | 0.5 | 0.4 | 0.0 | 0.0 | 1.2 |
| WNW | 0.0 | 0.1 | 0.4 | 0.4 | 0.0 | 0.0 | 0.9 |
| NW | 0.0 | 0.1 | 0.2 | 0.2 | 0.0 | 0.0 | 0.5 |
| NNW | 0.0 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.3 |
| CALM | 0.4 | | | | | | 0.4 |
| TOTAL | 6.1 | 35.0 | 36.8 | 20.8 | 1.2 | 0.1 | 100.0 |

Source: "Monthly and Annual Wind Distribution/Pasquill Stability Classes, STAR Program, Barbers Point Hawaii, 1/72-12/76, 8 Observations/Day", U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Environmental Data Service, National Climatic Center, Asheville, NC.

Table 3
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 4
ANNUAL SUMMARIES OF AIR QUALITY MEASUREMENTS FOR
MONITORING STATIONS NEAREST ROYAL KUNIA PHASE II PROJECT

| Parameter / Location | 1986 | 1987 | 1988 | 1989 | 1990 |
|--|----------|----------|----------|---------|---------|
| Sulfur Dioxide / Barbers Point | | | | | |
| No. of 24-Hr Samples | 57 | 53 | 60 | 54 | 57 |
| Range of 24-Hr Values ($\mu\text{g}/\text{m}^3$) | >5-10 | <5-13 | <5-19 | <5-20 | <5-<5 |
| Average Daily Value ($\mu\text{g}/\text{m}^3$) | <5 | 5 | <5 | <5 | <5 |
| No. of State AAQS Exceedances | 0 | 0 | 0 | 0 | 0 |
| PM-10 / Barbers Point | | | | | |
| No. of 24-Hr Samples | 52 | 46 | 56 | 58 | 60 |
| Range of 24-Hr Values ($\mu\text{g}/\text{m}^3$) | 7-66 | 10-40 | 10-48 | 10-44 | 12-60 |
| Average Daily Value ($\mu\text{g}/\text{m}^3$) | 26 | 21 | 24 | 26 | 28 |
| No. of State AAQS Exceedances | NA | NA | NA | NA | NA |
| Carbon Monoxide / Downtown Honolulu | | | | | |
| No. of Days of 1-Hr Samples | 348 | 345 | 328 | 323 | 362 |
| Range of Daily Max. 1-Hr Values (mg/m^3) | 0.2-13.5 | 0.3-11.1 | 0.2-10.3 | 0.3-9.7 | 0.1-7.1 |
| Avg. Daily Maximum 1-Hr Value (mg/m^3) | 2.2 | 1.7 | 1.7 | 1.9 | 1.5 |
| No. of State 1-Hr AAQS Exceedances | 3 | 1 | 1 | 0 | 0 |
| No. of Days of 8-Hr Samples | 213 | 228 | - | - | - |
| Range of Daily Max. 8-Hr Values (mg/m^3) | 0.3-4.7 | 0.3-3.9 | - | - | - |
| Avg. Daily Maximum 8-Hr Value (mg/m^3) | 1.4 | 1.2 | - | - | - |
| No. of State 8-Hr AAQS Exceedances | 0 | 0 | - | - | - |
| Ozone / Sand Island | | | | | |
| No. of Days of 1-Hr Samples | 346 | 342 | 362 | 342 | 340 |
| Range of Daily Max. 1-Hr Values ($\mu\text{g}/\text{m}^3$) | 10-88 | 4-84 | 0-92 | 0-94 | 4-116 |
| Avg. Daily Maximum 1-hr Value ($\mu\text{g}/\text{m}^3$) | 39 | 38 | 14 | 15 | 36 |
| No. of State AAQS Exceedances | 0 | 0 | 0 | 0 | 2 |
| Lead / Downtown Honolulu | | | | | |
| No. of 24-Hr Samples | 57 | 57 | 54 | 51 | 52 |
| Range of 24-Hr Values ($\mu\text{g}/\text{m}^3$) | 0.0-0.2 | 0.0-0.2 | 0.0-0.1 | 0.0-0.1 | 0.0-0.0 |
| Average Quarterly Value ($\mu\text{g}/\text{m}^3$) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| No. of State AAQS Exceedances | 0 | 0 | 0 | 0 | 0 |

Source: State of Hawaii Department of Health

Table 5

TRAFFIC CONTROLS ASSUMED AT INTERSECTIONS
NEAR INCREMENTS 2 AND 3 OF ROYAL KUNIA PHASE II PROJECT

| Roadway Intersection | Year/Scenario | | |
|---|------------------------|--------------------------|-----------------------|
| | 1995/
Existing Case | 2005/
Without Project | 2005/
With Project |
| Kunia Road at
Phase II Collector
Road | - | Signalized | Signalized |
| Phase II Collector
Road at Western Rd
to Industrial Park | - | Signalized | Signalized |
| Phase II Collector
Road at Eastern Rd
to Industrial Park | - | Signalized | Signalized |
| Phase II Collector
Road at Western Road
to Increment 2 | - | 2-Way Stop | 2-Way Stop |
| Phase II Collector
Road at Eastern Road
to Increments 2 and 3 | - | 2-Way Stop | 2-Way Stop |

Table 6
ESTIMATED WORST-CASE 1-HOUR CARBON MONOXIDE CONCENTRATIONS
ALONG ROADWAYS NEAR INCREMENTS 2 AND 3 OF ROYAL KUNIA PHASE II PROJECT
(milligrams per cubic meter)

| Roadway Intersection | Year/Scenario | | | | | |
|---|------------------------|------|--------------------------|------|-----------------------|------|
| | 1995/
Existing Case | | 2005/
Without Project | | 2005/
With Project | |
| | AM | PM | AM | PM | AM | PM |
| Kunia Road at
Phase II Collector
Road | 2.5' | 1.7' | 20.9 | 18.4 | 22.8 | 20.7 |
| Phase II Collector
Road at Western Rd
to Industrial Park | 0.5' | 0.5' | 16.0 | 13.3 | 18.9 | 13.5 |
| Phase II Collector
Road at Eastern Rd
to Industrial Park | 0.5' | 0.5' | 14.8 | 11.0 | 16.8 | 12.4 |
| Phase II Collector
Road at Western Rd
to Increment 2 | 0.5' | 0.5' | 3.9 | 3.5 | 4.3 | 3.8 |
| Phase II Collector
Road at Eastern Rd
to Increments 2 & 3 | 0.5' | 0.5' | 2.6 | 2.6 | 7.2 | 6.7 |

Hawaii State AAQS: 10
National AAQS: 40

*Assumes through traffic only on Kunia Road.

*Assumes background concentration only.

Table 7
ESTIMATED WORST-CASE 8-HOUR CARBON MONOXIDE CONCENTRATIONS
ALONG ROADWAYS NEAR INCREMENTS 2 AND 3 OF ROYAL KUNIA PHASE II PROJECT
(milligrams per cubic meter)

| Roadway Intersection | Year/Scenario | | |
|---|------------------------|--------------------------|-----------------------|
| | 1995/
Existing Case | 2005/
Without Project | 2005/
With Project |
| Kunia Road at
Phase II Collector
Road | 1.2' | 10.5 | 11.4 |
| Phase II Collector
Road at Western Rd
to Industrial Park | 0.5' | 8.0 | 9.5 |
| Phase II Collector
Road at Eastern Rd
to Industrial Park | 0.5' | 7.4 | 8.4 |
| Phase II Collector
Road at Western Road
to Increment 2 | 0.5' | 2.0 | 2.2 |
| Phase II Collector
Road at Eastern Road
to Increments 2 & 3 | 0.5' | 1.3 | 3.6 |

Hawaii State AAQS: 5
National AAQS: 10

*Assumes through traffic only on Kunia Road.

*Assumes background concentration only.

Table 8

ESTIMATED INDIRECT AIR POLLUTION EMISSIONS FROM
INCREMENTS 2 AND 3 OF ROYAL KUNIA PHASE II PROJECT
ELECTRICAL DEMAND*

| Air
Pollutant | Emission Rate
(tons/year) |
|-------------------|------------------------------|
| Particulate | 3 |
| Sulfur Dioxide | 30 |
| Carbon Monoxide | 2 |
| Volatile Organics | <1 |
| Nitrogen Oxides | 10 |

*Based on U.S. EPA emission factors for utility boilers [2].
Assumes electrical demand of 11 million kw-hrs per year and
low-sulfur oil used to generate power.

Table 9

ESTIMATED INDIRECT AIR POLLUTION EMISSIONS FROM
 INCREMENTS 2 AND 3 OF ROYAL KUNIA PHASE II PROJECT
 SOLID WASTE DISPOSAL DEMAND*

| Air
Pollutant | Emission Rate
(tons/year) |
|-------------------|------------------------------|
| Particulate | <1 |
| Lead | <1 |
| Sulfur Dioxide | 1 |
| Carbon Monoxide | 1 |
| Volatile Organics | <1 |
| Nitrogen Oxides | 2 |

*Based on U.S. EPA emission factors for municipal waste incinerators [2]. Assumes mass burn unit with 99 percent control of particulate emissions and solid waste disposal demand of 4 tons per day.

APPENDIX D

**Environmental Noise Assessment,
Royal Kunia, Phase II, Increment 3**
Prepared By: Darby & Associates

D.L. ADAMS ASSOCIATES, LTD.
dba



#95-21A

ENVIRONMENTAL NOISE ASSESSMENT
ROYAL KUNIA PHASE II
INCREMENT 3, ZONE CHANGE
EWA, OAHU, HAWAII

January, 1996

Prepared For:

WILLIAM E. WANKET, INC.
Kapolei Building, Suite 320
1001 Kamokila Blvd.
Kapolei, Hawaii 96707

PALI PALMS PLAZA • 970 NO. KALAHEO AVENUE • SUITE A-311
KAILUA, HAWAII 96734 • (808) 254-3318 • FAX (808) 254-5295

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1.0 SUMMARY

- 1.1 The proposed project site is currently exposed to low ambient noise levels of approximately 42 to 44 dBA which is typical of rural areas. The dominant noise sources include wind and occasional aircraft flyovers.
- 1.2 Nearby noise sensitive areas include the Royal Kunia Subdivision (Phase I) and the Village Park Subdivision which currently experience low ambient noise levels of approximately 42 to 44 dBA.
- 1.3 Traffic noise level increases along the Phase II Collector Road due to additional traffic generated by the project will be perceptible to some people at nearby noise sensitive areas along the Phase II Collector Road.
- 1.4 The dominant noise source during project construction will probably be earth moving equipment, such as bulldozers and diesel-powered trucks. Any noise impact from such activity on the Royal Kunia Subdivision (Phase I) and the Village Park Subdivision should, however, be relatively short-term.
- 1.5 The day-night average sound level, L_{dn} , at the project site due to aircraft operations is less than 60 dB, thus compatible with the State DOT residential land use guidelines. Although at times audible, infrequent aircraft operations associated with Honolulu International Airport, Barbers Point NAS, and Wheeler AFB should not significantly impact the proposed development.
- 1.6 The Royal Kunia Phase II, Increment 1 apartments nearest Kunia Road and the Phase II Collector Road may be exposed to future day-night average sound levels, L_{dn} , due to traffic noise greater than the HUD recommended limit of 65 dB if located too close to the roadways. Depending on the apartment unit setbacks from roadways, noise mitigation may be required for some units to conform with HUD noise exposure guidelines for housing.
- 1.7 Noise impact on the proposed development due to activities within the proposed Agricultural Park should be negligible.
- 1.8 If properly mitigated, noise associated with golf course operations should not significantly impact nearby homes. Additionally, ground maintenance activities are usually of short duration, transient and occur only during daytime hours; therefore, should not be objectionable.
- 1.9 Noise impact on the proposed development due to Waialeale Branch, Naval Magazine, Lualualei should be negligible.

- 1.10 Sugarcane agriculture of nearby lands is scheduled to cease after 1996, therefore, will not impact the proposed development.

2.0 PROJECT DESCRIPTION

The Royal Kunia Phase II Increment 3 project involves 156.8 acres of land in Central Oahu, Hawaii. The project site is approximately two miles north of Interstate H-1 on Kunia Road, as shown in Figure 1. Currently, the project area is used for agriculture, specifically sugarcane. The project site is currently bordered to the north, south and west by sugarcane fields and to the east by a naval military reservation. Future development of Royal Kunia Phase II Increment 2 will locate an agricultural park to the west and single-family dwelling units to the south and west. The project site will also border a golf course to the south.

The current development plan includes 581 single-family residential units. The Royal Kunia Phase II Increment 3 Development Plan is shown in Figure 2.

3.0 NOISE STANDARDS

Various local and federal agencies specify guidelines and standards in assessing environmental noise and set noise limits as a function of land use. A brief explanatory description of acoustic terminology is presented in Appendix A.

- 3.1 State Department of Health (DOH) - DOH specifies allowable property line noise levels that shall not be exceeded for more than 10% of the time during any 20-minute period [Reference 1]. These are enforced for any location at or beyond the property line. The specified noise limits vary depending on the land use and time of day as shown in Figure 3. DOH also specifies the following with respect to adjacent zoning and order of precedence.

"Where the allowable noise level between two adjacent zoning districts differ, the lower allowable noise level shall be used. For example, the allowable noise level for the residential district shall be used at the property line between residential and business districts.

The limits specified in the allowable noise levels table shall apply subject to the order of precedence with which uses were initiated after the effective date of this rule; provided that a new order of precedence is established when any use is discontinued. The initiation of use shall be measured by the date of rezoning. For example, if agricultural or industrial operations are conducted next to a lot used as residence, the agricultural or industrial limits would apply if the building permit for the

residence was obtained after agricultural or industrial operations had been initiated after the effective date of this rule. Residential limits would apply if the building permit for the residence was obtained before agricultural or industrial operations had been initiated."

- 3.2 City and County of Honolulu Land Use Ordinance (LUO) - The Department of Land Utilization specifies maximum allowable levels at the property line [Reference 2]. The LUO criteria differ from those of the DOH in that they use octave band sound levels instead of A-weighted levels and no temporal factor is involved. The specific octave band levels are shown in Figure 4. LUO noise regulations are theoretically enforced by the Building Department, however, since they do not have noise measurement capability, noise complaints are usually handled by the DOH.
- 3.3 State Department of Transportation, Airports Division - The Department of Transportation (DOT) specifies land use compatibility guidelines for aircraft noise exposure [Reference 3]. These guidelines are based on maximum allowable yearly day-night average sound levels, L_{dn} , for various specified land uses. A residential land use, which is specified as single-family homes, apartments, hotels, and resorts, is compatible with an aircraft generated L_{dn} less than or equal to 60 dB. However, DOT states,

"Where the community determines that these uses must be allowed, Noise Level Reduction (NLR) measures to achieve interior levels of 45 L_{dn} or less should be incorporated into building codes and be considered in individual approvals. Normal local construction employing natural ventilation can be expected to provide an average NLR of approximately 9 dB. Total closure, plus air conditioning, may be required to provide additional outdoor to indoor NLR, and will not eliminate outdoor noise problems."

The DOT guidelines also specify 60 dB as the maximum allowable L_{dn} level for school, day care centers, and church uses without any mitigation measures. Commercial uses such as retail shops, restaurants, shopping centers, etc. are compatible with L_{dn} levels up to 65 dB without any mitigation measures. With noise mitigation measures implemented, such commercial uses are allowed in areas exposed to an L_{dn} as high as 75 dB.

- 3.4 U.S. Federal Highway Administration - The Federal Highway Administration (FHWA) has established a set of design goals for traffic noise exposure [Reference 4]. The FHWA defines four land use categories and assigns corresponding maximum hourly equivalent sound levels, L_{eq} . For example, Category B, defined as picnic and recreation areas, parks, residences, motels, schools, churches, libraries, and hospitals,

has a corresponding maximum exterior L_{eq} of 67 dBA and a maximum interior L_{eq} of 52 dBA. These limits are viewed as design goals, and all projects which are developed to meet these limits are deemed in conformance with the FHWA noise standards.

- 3.5 U.S. Department of Housing and Urban Development (HUD) - The HUD has established Site Acceptability Standards for interior and exterior noise for housing [Reference 5]. These standards are based on day-night average sound levels, L_{dn} , and identify the need for noise abatement, either at the site property line or in the building construction. HUD Site Acceptability Criteria rank sites as Acceptable, Normally Unacceptable, or Unacceptable. "Acceptable" sites are those where noise levels do not exceed an L_{dn} of 65 dB. Housing on acceptable sites do not require additional noise attenuation other than that provided in customary building techniques. "Normally Unacceptable" sites are those where the L_{dn} is above 65, but does not exceed 75 dB. Housing on normally unacceptable sites requires some means of noise abatement, either at the property line or in the building construction, to assure the interior noise levels are acceptable. "Unacceptable" sites are those where the L_{dn} is 75 dB or higher. The term "unacceptable" does not necessarily mean that housing cannot be built on these sites, but rather that more sophisticated sound attenuation would likely be needed.

HUD also specifies minimum sound isolation standards for wall and floor/ceiling constructions separating living units from other living units, common service areas, or public spaces. For example, HUD specifies a minimum Sound Transmission Class (STC) of 45 for walls and floor/ceiling constructions separating living units, and a minimum Impact Isolation Class (IIC) of 45 for floor/ceiling construction separating living units.

- 3.6 U.S. Environmental Protection Agency (EPA) - The EPA has identified a range of yearly day-night average sound levels, L_{dn} , sufficient to protect public health and welfare from the effects of environmental noise [Reference 6]. The EPA has established a goal to reduce exterior environmental noise to an L_{dn} not exceeding 65 dB and a future goal to further reduce exterior environmental noise to an L_{dn} not exceeding 55 dB. Additionally, the EPA states that to protect against hearing damage, one's 24-hour equivalent sound level exposure, L_{eq} , at the ear should not exceed 70 dB. The EPA emphasizes that these goals are not intended as regulations as they have no authority to regulate noise levels, but rather these goals are intended to be viewed as levels below which the general population will not be at risk from any of the identified effects of noise.

4.0 EXISTING ACOUSTICAL ENVIRONMENT

- 4.1 General - Ambient noise level measurements were conducted on January 26, 1993 to assess the existing acoustical environment in the general vicinity of the project site.

These measurements were taken in conjunction with a previous study [Reference 7]. The noise measurement locations are shown in Figure 5. Noise level measurements were taken using a Larson-Davis Laboratories Model 800B Precision Integrating Sound Level Meter. The noise measurement results are expressed in terms of the 90-Percentile Exceedence Sound Level, L_{90} , which represents a measure of the residual or background noise minimally influenced by nearby discrete events. A brief description of statistical noise levels commonly used to describe environmental noise is presented in Appendix A.

- 4.2 Project Site - The proposed project site, which is currently sugarcane agriculture, experiences relatively low noise levels. The existing ambient noise level (L_{90}) is approximately 42 to 44 dBA within the project site, which is typical of rural areas. Presently, the dominant noise sources include wind, occasional aircraft fly-overs, and distant construction. An additional noise source within the project site is sugarcane agriculture, however, no sugarcane growing operations were experienced during the field measurements.
- 4.3 Project Vicinity - The sugarcane fields surrounding the project site experience an acoustical environment similar to the project site with wind and occasional aircraft being dominant noise sources. Presently, the nearest residential area is the Royal Kunia Subdivision (Phase I) south of the project site. The Royal Kunia Subdivision (Phase I) also experiences an ambient noise level (L_{90}) of approximately 42 to 44 dBA. The Village Park Subdivision, south of the Royal Kunia Subdivision (Phase I), experiences a similar acoustical environment.

5.0 POTENTIAL NOISE IMPACT DUE TO PROJECT

- 5.1 Additional Traffic Generated by the Project - Traffic noise levels using recent traffic counts [Reference 8] and predicted traffic volumes [Reference 9] were used in conjunction with the FHWA's Traffic Noise Prediction Model [Reference 10] to calculate the traffic noise increase as a result of the project. The traffic noise was predicted at the locations along Kunia Road and the Phase II Collector Road shown in Figure 6. The existing (1995) and projected future (2005) traffic noise levels during peak traffic hours are given in Table 1. Additionally, the projected future (2005) traffic noise level increases during peak traffic hours are summarized in Table 2. The predicted traffic noise level increases at the assessed locations due to additional traffic generated by the project are typically less than 3 dB, except at Location 5 where the predicted increase is 3.4 dB for the morning peak traffic hour and 3.9 dB for the afternoon peak traffic hour. The traffic noise level increase due to project generated traffic could be perceptible to some people at noise sensitive locations along the Phase II Collector Road, but the impact is not considered to be significant.

Future traffic noise levels along Kunia Road were based on an 82 ft. right-of-way (ROW) [Reference 11], a 45 mph posted speed limit and on the predicted peak hour traffic volumes with a 1.58 % medium truck mix and 0.8 % heavy truck mix for the mornings. The afternoon traffic mix was taken as 1.62% for both medium and heavy trucks. Results indicate that apartments in Royal Kunia Phase II, Increment 1, located between approximately 13 and 69 feet of the Kunia Road ROW, will be exposed to a range of L_{dn} levels from 70 to 75 dB. The Increment 1 apartments located between 69 and 191 feet will be exposed to L_{dn} levels ranging from 65 to 70 dBA.

Access to the project site from Kunia Road is proposed via the Phase II Collector Road. Future traffic noise levels along the Phase II Collector Road were based on an 80-foot ROW [Reference 11], a 35 mph posted speed limit, and a vehicle mix similar to that of Kunia Road for the western end, i.e., adjacent to the Industrial Area and a 0.5% medium truck mix and a 0% heavy truck mix for the eastern end [Reference 12]. Results indicate that the Phase II, Increment 1 apartments located between Kunia Road and the first intersection east of Kunia Road, will be exposed to L_{dn} levels of between 65 to 70 dB if they are located between 24 and 84 feet of the Phase II Collector Road ROW. The remainder of the Phase II, Increment I apartments located along the Phase II Collector Road will be exposed to L_{dn} levels ranging from 65 dB to 70 dB, if they are within 10 and 63 feet of the Phase II Collector Road ROW. The distances to the L_{dn} 65 to 75 contours along Kunia Road and the Phase II Collector Road are shown graphically in Figure 7 and Figure 8 for the conditions "with" and "without" the project, respectively.

As discussed in Section 3.5, HUD has established Site Acceptability Standards for interior and exterior noise exposure at housing areas. These standards are based on L_{dn} levels and identify the need for noise abatement. Housing areas exposed to L_{dn} levels between 65 and 75 dB require some means of noise abatement, either at the property line or in the building construction in order to meet HUD criteria and, thus, be eligible for HUD/FHA financing. Therefore, noise mitigation measures should be implemented to reduce the traffic noise exposure at the apartments adjacent to Kunia Road and the Phase II Collector Road. HUD standards for residential developments exposed to L_{dn} levels between 65 and 70 dB, require the building construction to provide a minimum of 5 dB attenuation in addition to "...attenuation provided by buildings as commonly constructed in the area, and requiring open windows for ventilation". Similarly, HUD standards require a minimum of 10 dB additional attenuation for residential developments exposed to L_{dn} levels between 70 and 75 dB.

- 5.2 Construction Noise - Development of the project will involve excavation, grading, and the construction of infrastructure and buildings. The various construction phases of the project may generate significant amounts of noise, which may impact the nearby residential areas south of the project site. The actual noise is dependent upon the

methods employed during each stage of the construction process. Typical ranges of construction equipment noise are shown in Figure 9. Earthmoving equipment, such as bulldozers and diesel-powered trucks, will probably be the loudest equipment used during construction.

In case, where construction noise exceeds, or is expected to exceed, the DOH's "allowable" property line limits, a permit must be obtained from the DOH to allow the operation of vehicles, construction equipment, power tools, etc. which emit noise levels in excess of the "allowable" limits [Reference 1]. Required permit conditions for construction activities are:

"No permit shall allow construction activities creating excessive noise...before 7:00 am and after 6:00 pm of the same day."

"No permit shall allow construction activities which emit noise in excess of ninety-five dB(A)...except between 9:00 am and 5:30 pm of the same day."

"No permit shall allow construction activities which exceed the allowable noise levels on Sundays and on...[certain] holidays. Activities exceeding ninety-five dB(A) shall [also] be prohibited on Saturdays.

In addition, construction equipment and on-site vehicles or devices requiring an exhaust of gas or air must be equipped with mufflers. Also, construction vehicles using traffic-ways must satisfy the DOH's vehicular noise requirements [Reference 13].

Blasting, if required, could also produce noise impacts. However, blasting at construction sites near populated areas is usually accomplished by using numerous small charges detonated with small time delays. Blast mats can also be used to assist in directing the explosive energy into the rock, controlling flying debris and muffling the noise. Thus, with the appropriate blast design techniques, the noise from blasting can be controlled within acceptable limits at the closest noise sensitive locations.

6.0 POTENTIAL NOISE IMPACT ON THE PROJECT

- 6.1 Aircraft - The proposed project site is within approximately four to seven miles of Honolulu International Airport HIA, including Hickam AFB, Barbers Point Naval Air Station (BPNAS), and Wheeler Air Force Base (WAFB), as shown in Figure 10. Due to the distance from the project site, the overall day-night average sound level, L_{dn} , due to air traffic associated with HIA, BPNAS, and WAFB will be less than 60 dB at the project site [Reference 14, 15 and 16], which is compatible with the State DOT residential guidelines. However, due to the vicinity of the project site to flight tracks

associated with HIA, BPNAS, and WAFB, infrequent aircraft fly-overs may, at times, be audible at the project site. As shown in Figure 11, the project site is approximately 1.5 miles from HIA arrival flight track 23 which conducts an average of approximately 74 general aviation aircraft operations per day (daytime only) [Reference 14]. As shown in Figure 12, BPNAS flight track 22RHA1/04LD1 which conducts an average of approximately 10 helicopter operations per day (daytime and nighttime) [Reference 15], passes to the west of the project site. As shown in Figure 13, the project site is approximately 0.5 miles from WAFB flight track 06F2 which conducts an average of approximately one or less helicopter operations per day (daytime only) [Reference 16]. Although these aircraft fly-overs may, at times, be audible, aircraft noise should not significantly impact the proposed development.

- 6.2 Agricultural Park - One hundred fifty acres of land west of Increment 3 is devoted to diversified agricultural including crop, floriculture, foliage, and orchard production [Reference 17]. Noise sources, such as large farm machinery associated with large scale single crop production, would not be employed and commercial livestock and related activities are to be restricted.
- 6.3 Golf Course - A golf course is included in the Royal Kunia Phase I project, south of Phase II Increment 3. Potential noise sources at the golf course include the mechanical equipment at the clubhouse, the public address system, and ground maintenance activities. If noise sources at and near the clubhouse, e.g., golf cart chargers, pumps, refrigeration and air-conditioning equipment, exhaust fans, and other stationary equipment are not controlled properly, they could impact the closest proposed homes. Additionally, a public address system near the clubhouse could also impact nearby residential areas. Equipment associated with ground maintenance activities, (e.g., tractors, lawn mowers, leaf blowers, etc.), may also impact nearby residential areas; however, such activities are transient about the golf course, for short periods of time and only during the daytime hours. Therefore, they should not be objectionable.
- 6.4 Military Activities - The Waikale Branch, Naval Magazine, Lualualei is located east of the proposed project site. Due to the nature of the activities at the Naval Magazine (predominantly storage facilities), the noise impact on the project site due to this facility should be negligible [Reference 18].

7.0 NOISE MITIGATION

- 7.1 Kunia Road Traffic-generated Noise - Mitigation of traffic noise along Kunia Road would include properly constructing a sound barrier along the roadway, such as a wall or a landscaped earthen berm, which clearly blocks the line-of-sight to the traffic. While a noise barrier along the roadway may provide adequate traffic noise attenuation at the first level of naturally ventilated multi-story apartments, it may be impractical to construct a barrier tall enough to afford noise reduction at the upper levels of the

multi-story apartments. Therefore, by HUD requirements, the upper-level units of the apartment buildings exposed to L_{dn} levels between 70 and 75 dB, must provide an additional 10 dB interior attenuation. The critical spaces of the upper-level units of the apartments, e.g., living rooms and bedrooms, within the L_{dn} 70 to 75 zone should be air-conditioned to allow closed windows for noise reduction purposes. Similarly, by HUD requirements, the apartment buildings exposed to L_{dn} levels between 65 to 70 dB, must provide an additional 5 dB room attenuation. Additional room attenuation is commonly achieved in naturally ventilated living spaces by installing carpeting with pad, louvered closet doors, and absorptive ceiling tiles, as opposed to hard tile floors, solid closet doors, and hard-surface ceilings, respectively.

- 7.2 Phase II Collector Road Traffic-generated Noise - Apartments along the Phase II Collector Road, which are exposed to L_{dn} levels greater than 65 dB, should be treated as discussed above for the apartments along Kunia Road. However, if all industrial traffic were required to access the industrial area directly from Kunia Road, rather than from the Phase II Collector Road, the volume of traffic, particularly truck traffic, would decrease. Such a reduction in traffic volume and especially that of truck traffic, as well as a decrease in the posted speed limit, would considerably decrease the traffic noise levels along the Phase II Collector Road and, thus, reduce the distances to the L_{dn} noise contours along the Phase II Collector Road ROW.

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16. *Air Installation Compatible Use Zone (AICUZ) Plan for Wheeler Air Force Base*, Oahu, Hawaii, Department of the Army, U.S. Army Support Command, Hawaii (USASCH), Fort Shafter, Oahu, Hawaii, February, 1986.
17. Memorandum of Understanding between Hawaii Department of Agriculture and Halekua Development Corporation, March 30, 1993.
18. Letter from W. K. Liu, Department of the Navy, to W. E. Wanket, William E. Wanket, Inc., March 2, 1992, Received February 4, 1993.

APPENDIX A

ACOUSTICAL TERMINOLOGY

Sound Pressure Level

Sound or noise consists of minute fluctuations in atmospheric pressure capable of evoking the sense of hearing. It is measured in terms of decibels (dB) using precision instruments known as sound level meters. Noise is defined as "unwanted" sound.

Technically, sound pressure level (SPL) is defined as:

$$\text{SPL} = 20 \log (P/\text{Pref}) \text{ dB}$$

where P is the sound pressure fluctuation (above or below atmospheric pressure) and Pref is the reference pressure, 20 micropascals, which is approximately the lowest sound pressure that can be detected by the human ear. For example, if P is 20 micropascals, then SPL = 0 dB. or if P is 200 micropascals, then SPL = 20 dB. The relation between sound pressure in micropascals and sound pressure level in decibels (dB) is shown in Figure A-1.

The sound pressure level that results from a combination of noise sources is not the arithmetic sum of the individual sound levels, but rather the logarithmic sum. For example, two sound levels of 50 dB produce a combined level of 53 dB, not 100 dB; two sound levels of 40 and 50 dB produce a combined level of 50.4 dB.

Human sensitivity to changes in sound pressure level is highly individualized. Sensitivity to sound depends on frequency content, time of occurrence, duration, and psychological factors such as emotions and expectations. However, in general, a change of 1 or 2 dB in the level of a sound is difficult for most people to detect. A 3 dB change is commonly taken as the smallest perceptible change and a 5 dB change corresponds to a noticeable change in loudness. A 10 dB increase or decrease in sound level corresponds to an approximate doubling or halving of loudness, respectively.

A-Weighted Sound Level

The human ear is more sensitive to sound in the frequency range of 250 Hertz (Hz) and higher, than in frequencies below 250 Hz. Due to this type of frequency response, a frequency weighting system, was developed to emulate the frequency response of the human ear. This system expresses sound levels in units of A-weighted decibels (dBA). A-weighted sound levels de-emphasizes the low frequency portion of the spectrum of a signal. The A-weighted level of a sound is a good measure of the loudness of that sound. Different sounds having the same A-weighted sound level are perceived as being about equally loud. Typical values of the A-weighted sound level of various noise sources are shown in Figure A-1.

Statistical Sound Levels

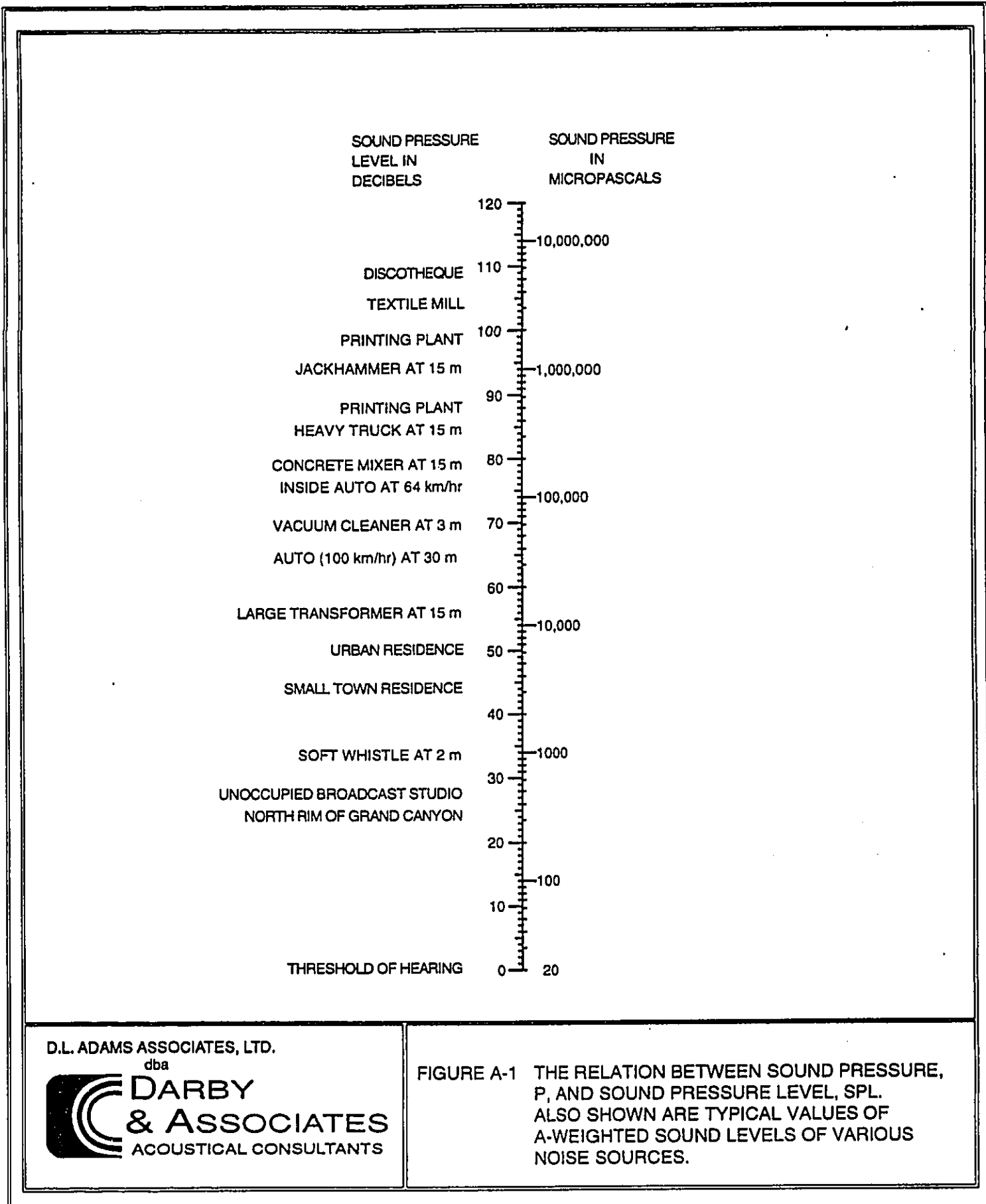
The sound levels of long-term noise producing activities, such as traffic movement, aircraft operations, etc., can vary considerably with time. In order to obtain a single number rating of such a noise source, a statistically-based method of expressing sound or noise levels developed. It is known as the Exceedence Level, L_n . The Exceedence Level, L_n , represents the sound level which is exceeded for n% of the measurement time period. For example, $L_{10} = 60$ dBA indicates that for the duration at the measurement period, the sound level exceeded 60 dBA 10% of the time. Commonly used Exceedence Levels include L_1 , L_{10} , L_{50} , and L_{90} , which are widely used to assess community and environmental noise. Figure A-2 illustrates the relationship between selected statistical noise levels.

Equivalent Sound Level

The Equivalent Sound Level, L_{eq} , represents a constant level of sound having the same total acoustic energy as that contained in the actual time-varying sound being measured over a specific time period. L_{eq} is commonly used to describe community noise, traffic noise, and hearing damage potential. It has units of dBA and is illustrated in Figure A-2.

Day-Night Equivalent Sound Level

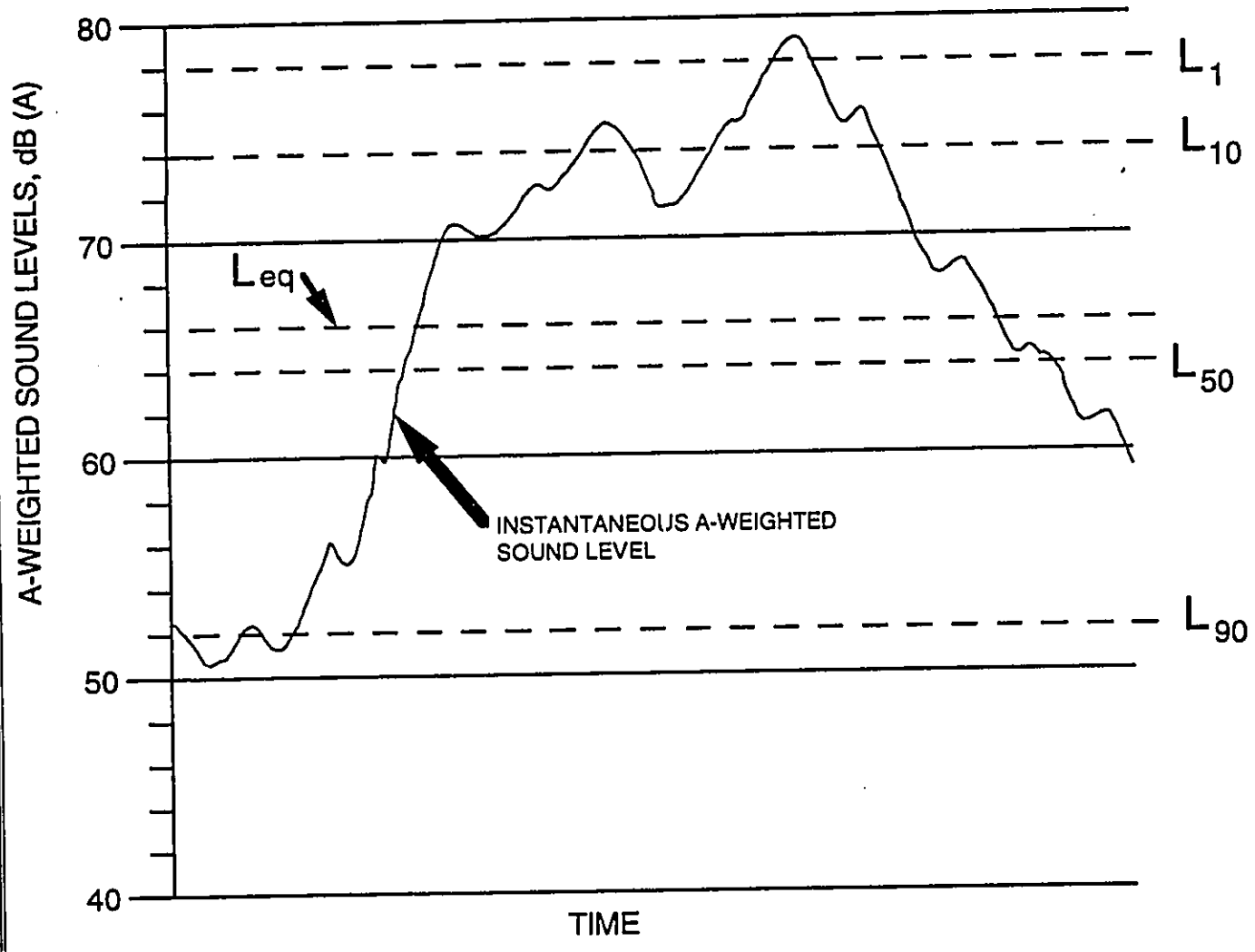
The Day-Night Equivalent Sound Level, L_{dn} , is the Equivalent Sound Level, L_{eq} , measured over a 24-hour period. However, a 10 dB penalty is added to the noise levels recorded between 10 pm and 7 am to account for people's higher sensitivity to noise at night when the background noise level is typically lower. The L_{dn} is a commonly used noise descriptor in assessing land use compatibility, and is widely used by federal and local agencies and standards organizations. Qualitative descriptions, as well as local examples of L_{dn} , are shown in Figure A-3.



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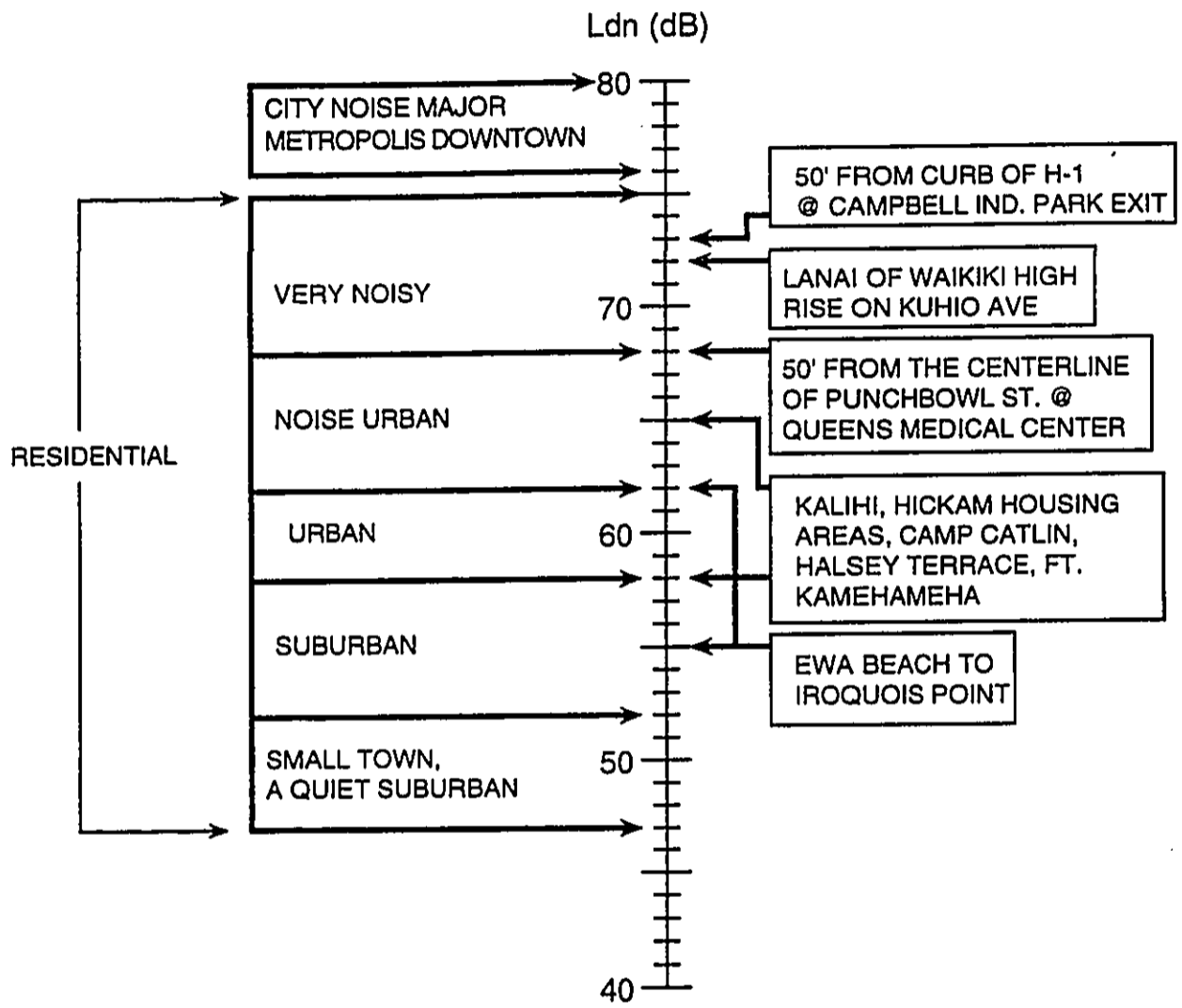


FIGURE A-1 THE RELATION BETWEEN SOUND PRESSURE, P, AND SOUND PRESSURE LEVEL, SPL. ALSO SHOWN ARE TYPICAL VALUES OF A-WEIGHTED SOUND LEVELS OF VARIOUS NOISE SOURCES.



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FIGURE A-2 COMPARISON OF AN INSTANTANEOUS SOUND LEVEL AND THE CORRESPONDING STATISTICAL SOUND LEVELS



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FIGURE A-3 QUALITATIVE DESCRIPTION OF THE DAY-NIGHT SOUND LEVELS (Ldn) AND EXAMPLE Ldn's AT SELECTED LOCATIONS ON OAHU

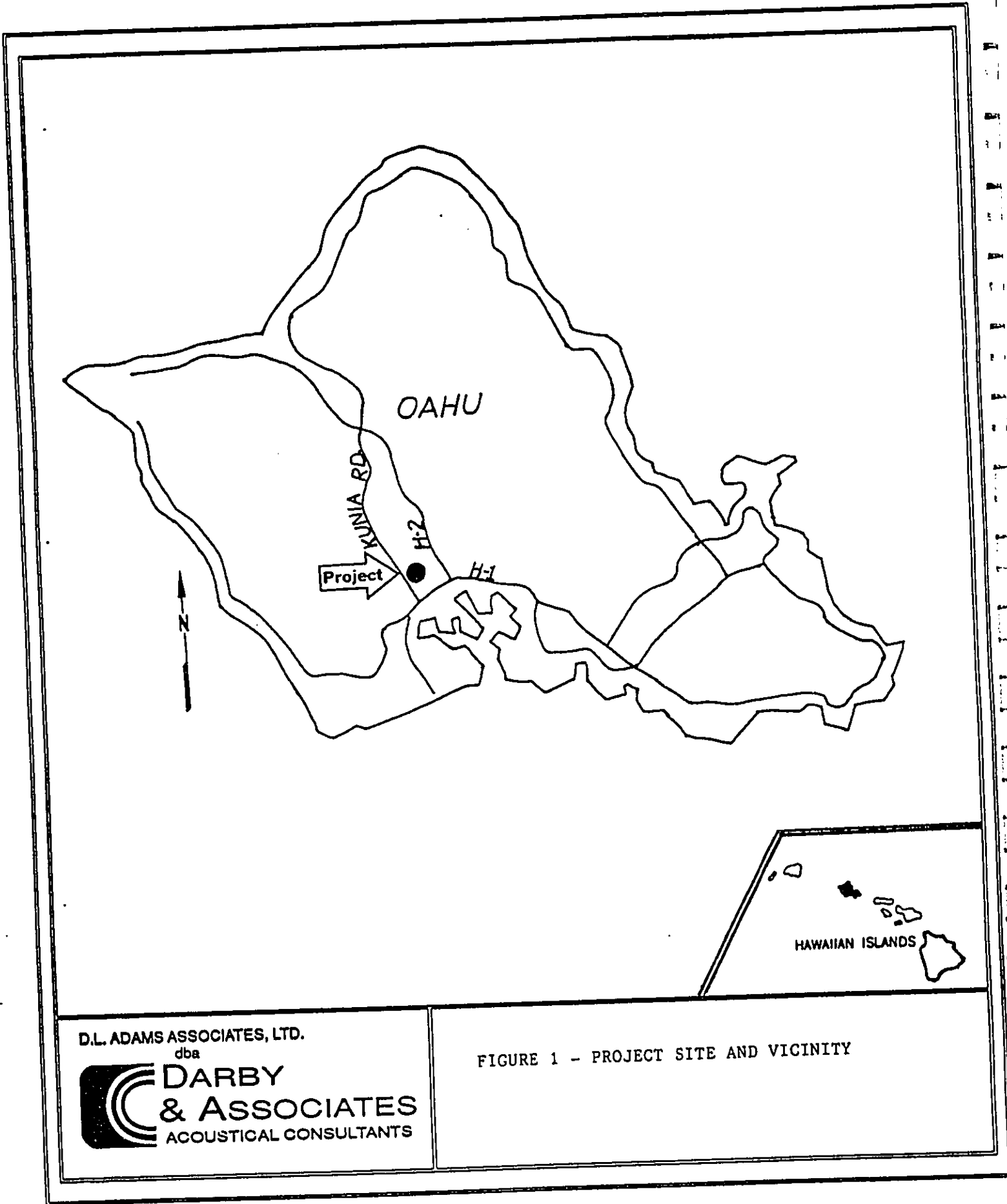
TABLE 1
 EXISTING (1995) AND PROJECTED FUTURE (2005)
 TRAFFIC NOISE LEVELS* DURING PEAK TRAFFIC HOURS

| Time of Day | Locations | | | | |
|-----------------------------|-----------|------|------|------|------|
| | 1 | 2 | 3 | 4 | 5 |
| <u>Current</u> | | | | | |
| AM | 61.5 | -- | -- | -- | -- |
| PM | 62.0 | -- | -- | -- | -- |
| <u>2005 Without Project</u> | | | | | |
| AM | 66.6 | 61.4 | 59.7 | 54.4 | 51.7 |
| PM | 67.8 | 63.1 | 61.5 | 56.4 | 52.5 |
| <u>2005 With Project</u> | | | | | |
| AM | 66.9 | 62.0 | 60.5 | 56.3 | 55.1 |
| PM | 68.3 | 64.2 | 62.9 | 58.6 | 56.4 |

* Noise levels are equivalent continuous noise levels (L_{eq}) in dBA at an arbitrary 100 ft. reference distance.

TABLE 2
 INCREASE IN FUTURE PEAK HOUR TRAFFIC
 NOISE LEVELS (in dB) DUE TO PROJECT

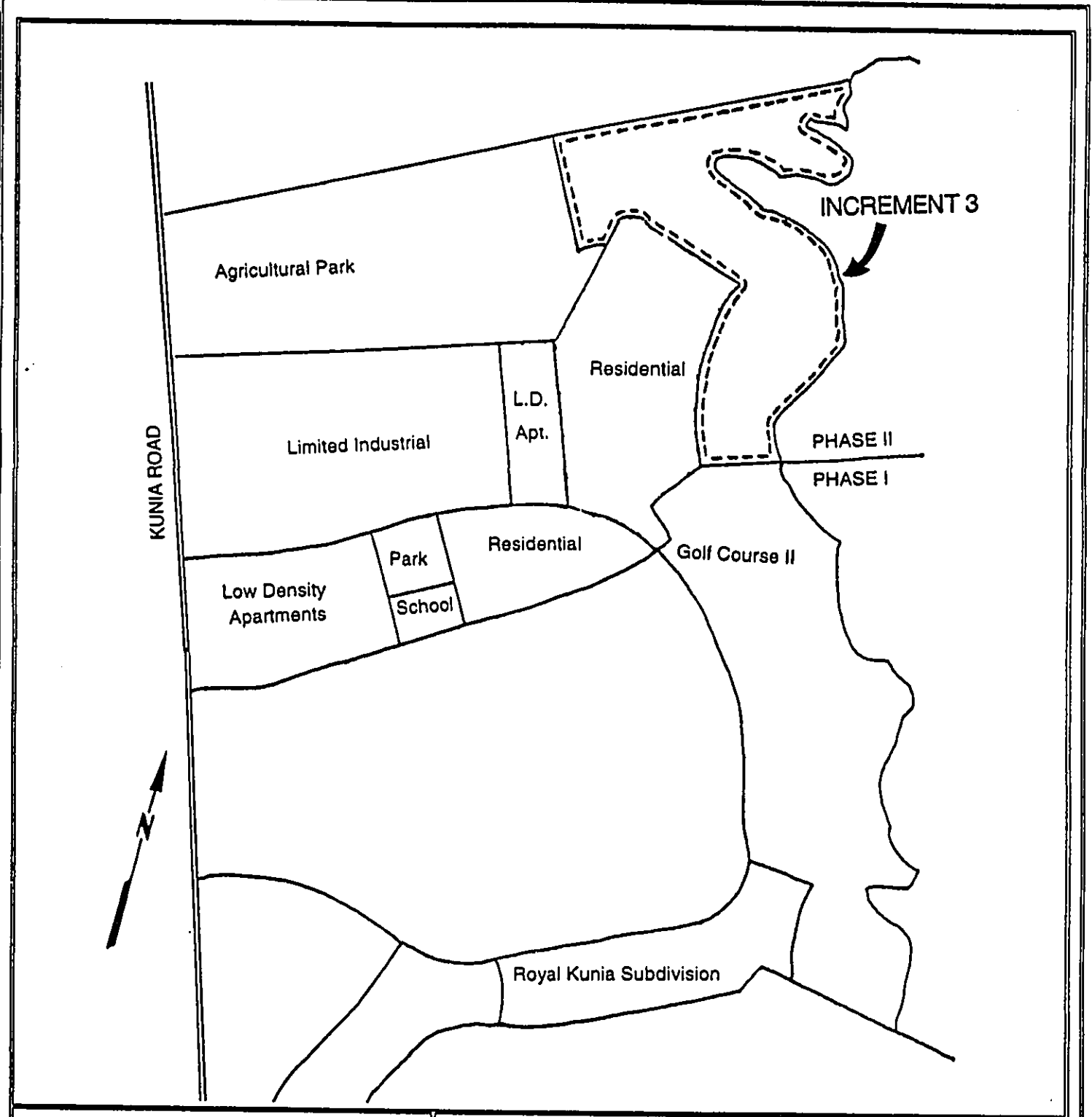
| Time of Day | Locations | | | | |
|-------------|-----------|-----|-----|-----|-----|
| | 1 | 2 | 3 | 4 | 5 |
| AM | 0.3 | 0.6 | 0.8 | 1.9 | 3.4 |
| PM | 0.5 | 1.1 | 1.4 | 2.2 | 3.9 |



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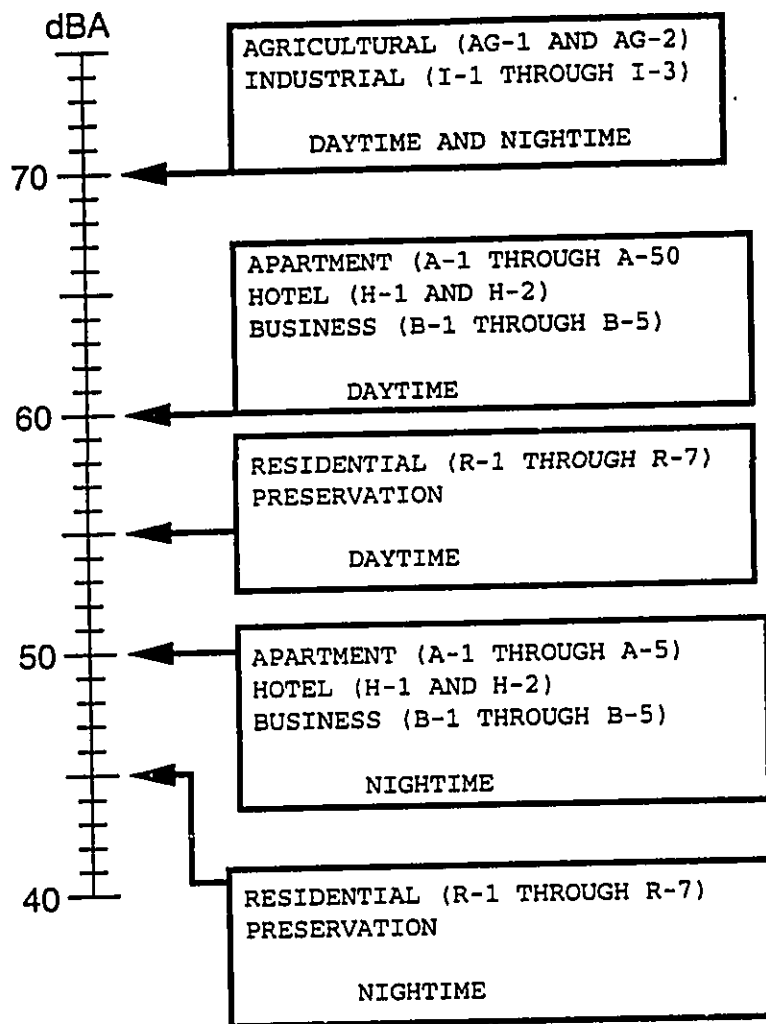
FIGURE 1 - PROJECT SITE AND VICINITY



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FIGURE 2 - ROYAL KUNIA PHASE II INCREMENT 3 DEVELOPMENT PLAN

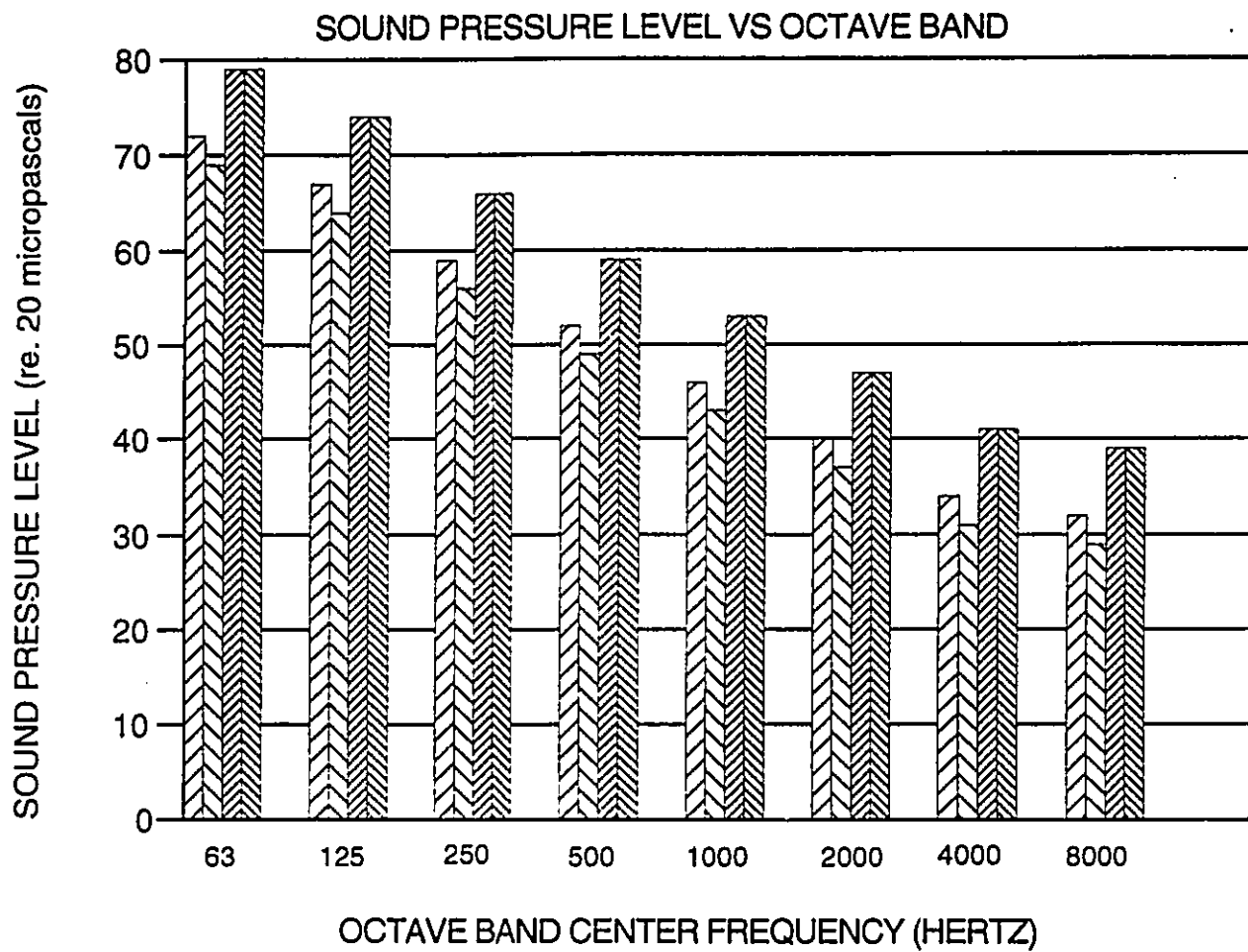


NOTE: THE REGULATION STATES THAT THE ALLOWABLE LEVELS SHALL NOT BE EXCEEDED FOR TEN PERCENT OF THE TIME WITHIN ANY TWENTY MINUTE PERIOD.

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FIGURE 3 - ALLOWABLE NOISE LEVELS FOR VARIOUS DISTRICTS [REFERENCE 1]

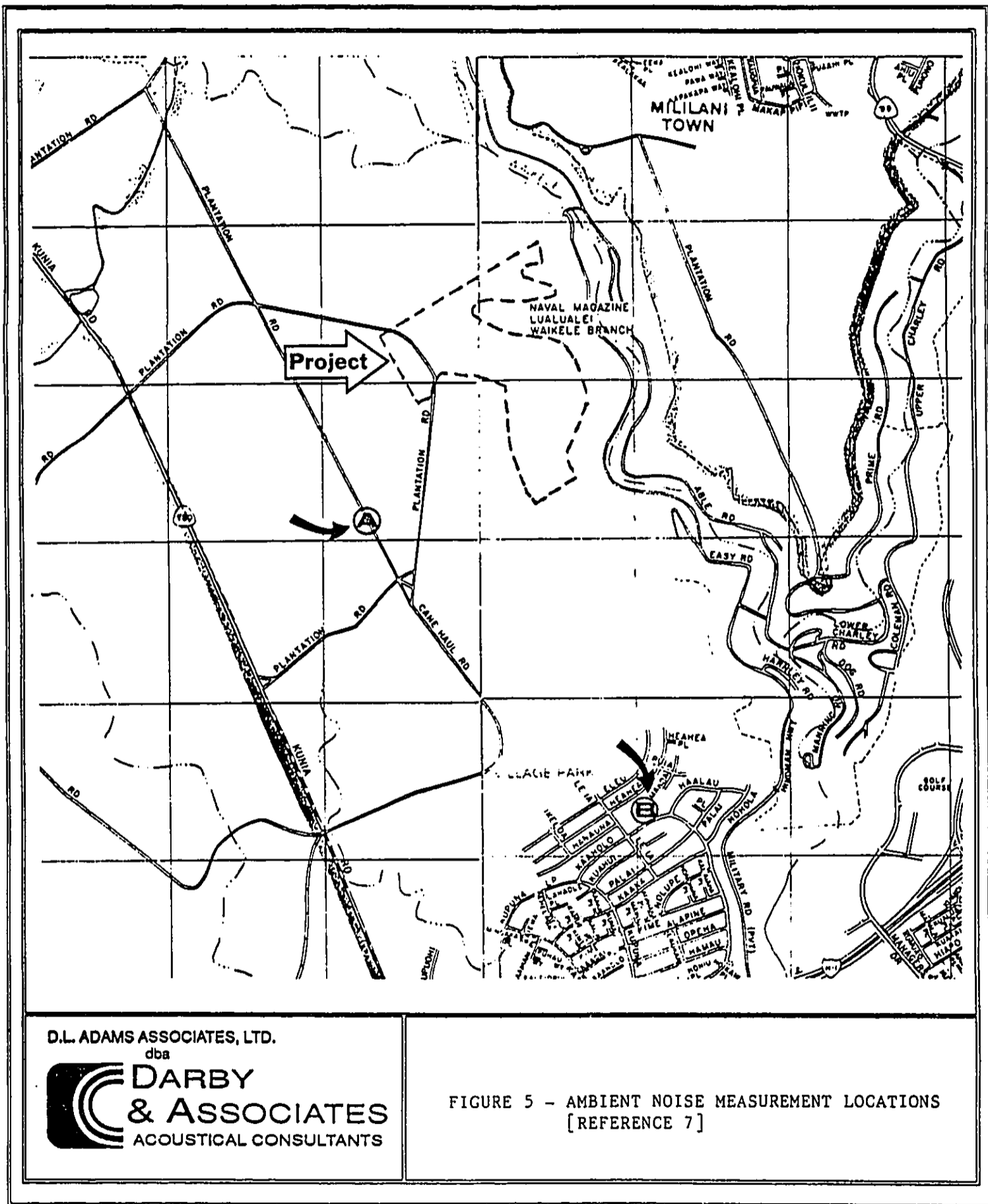


- | | | | |
|---|------------------------|--|----------------------------|
|  | RESIDENTIAL, DAYTIME |  | NON-RESIDENTIAL, DAYTIME |
|  | RESIDENTIAL, NIGHTTIME |  | NON-RESIDENTIAL, NIGHTTIME |

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FIGURE 4 - MAXIMUM ALLOWABLE NOISE LEVELS VS OCTAVE BAND CENTER FREQUENCIES; CITY AND COUNTY OF HONOLULU LAND USE ORDINANCE



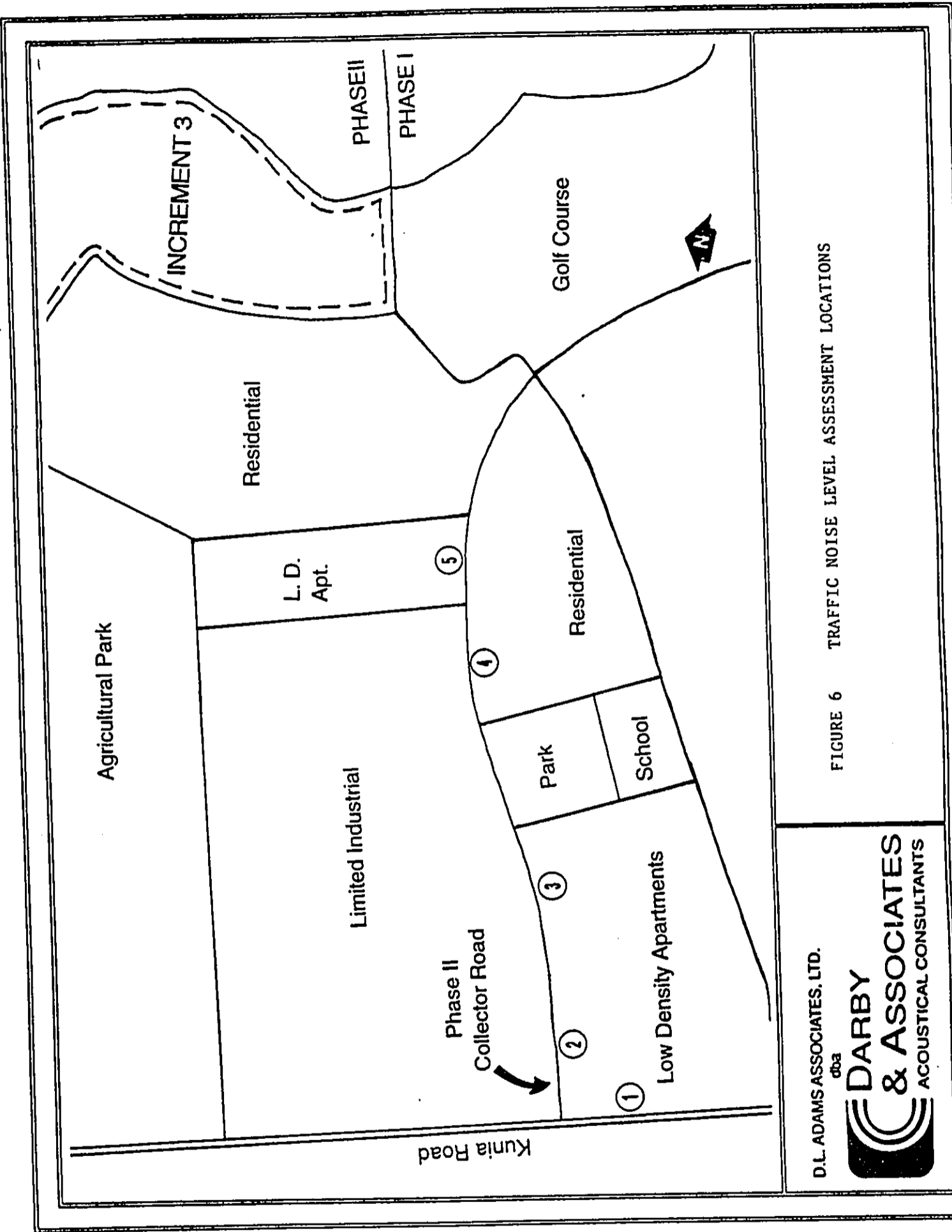
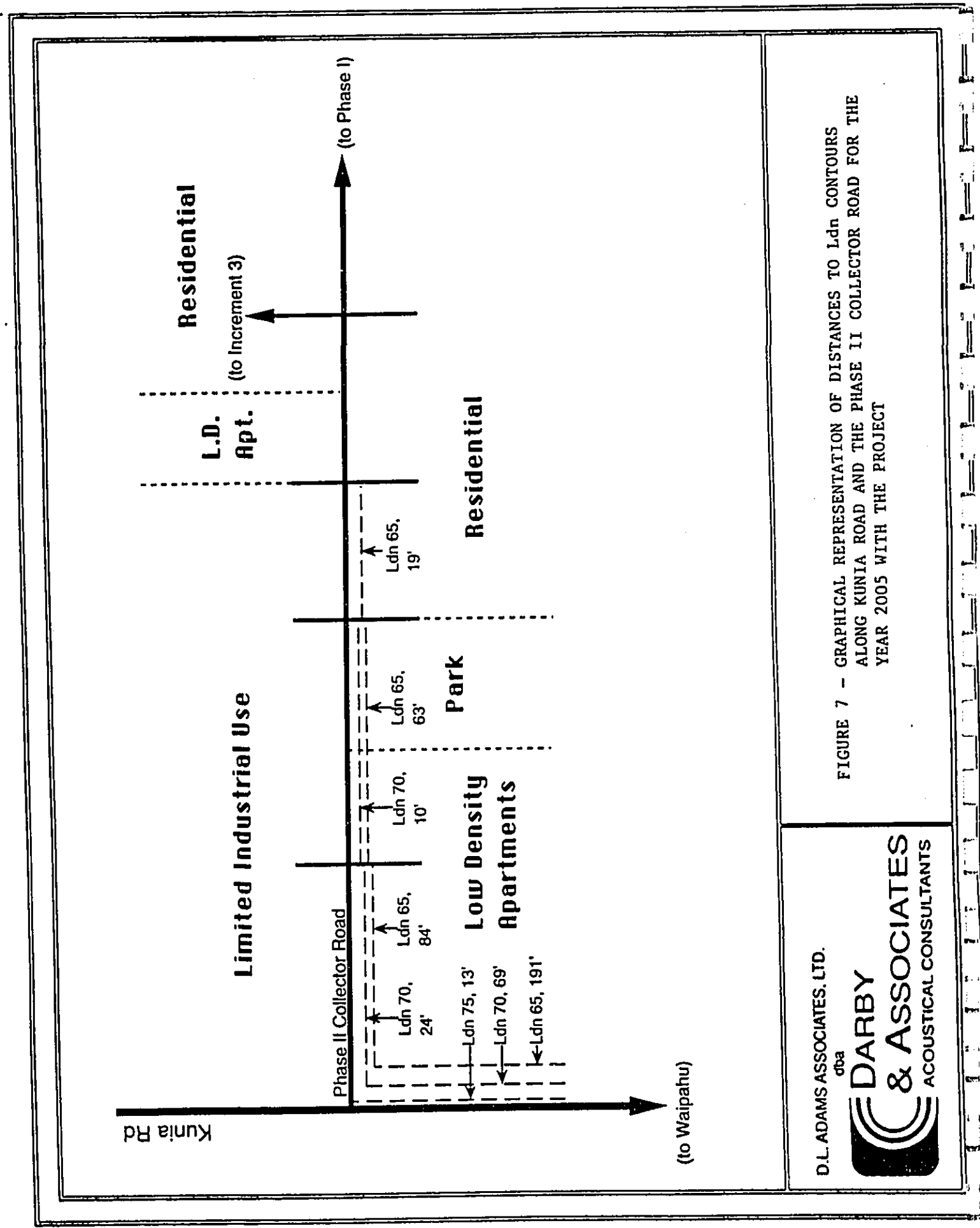


FIGURE 6 TRAFFIC NOISE LEVEL ASSESSMENT LOCATIONS

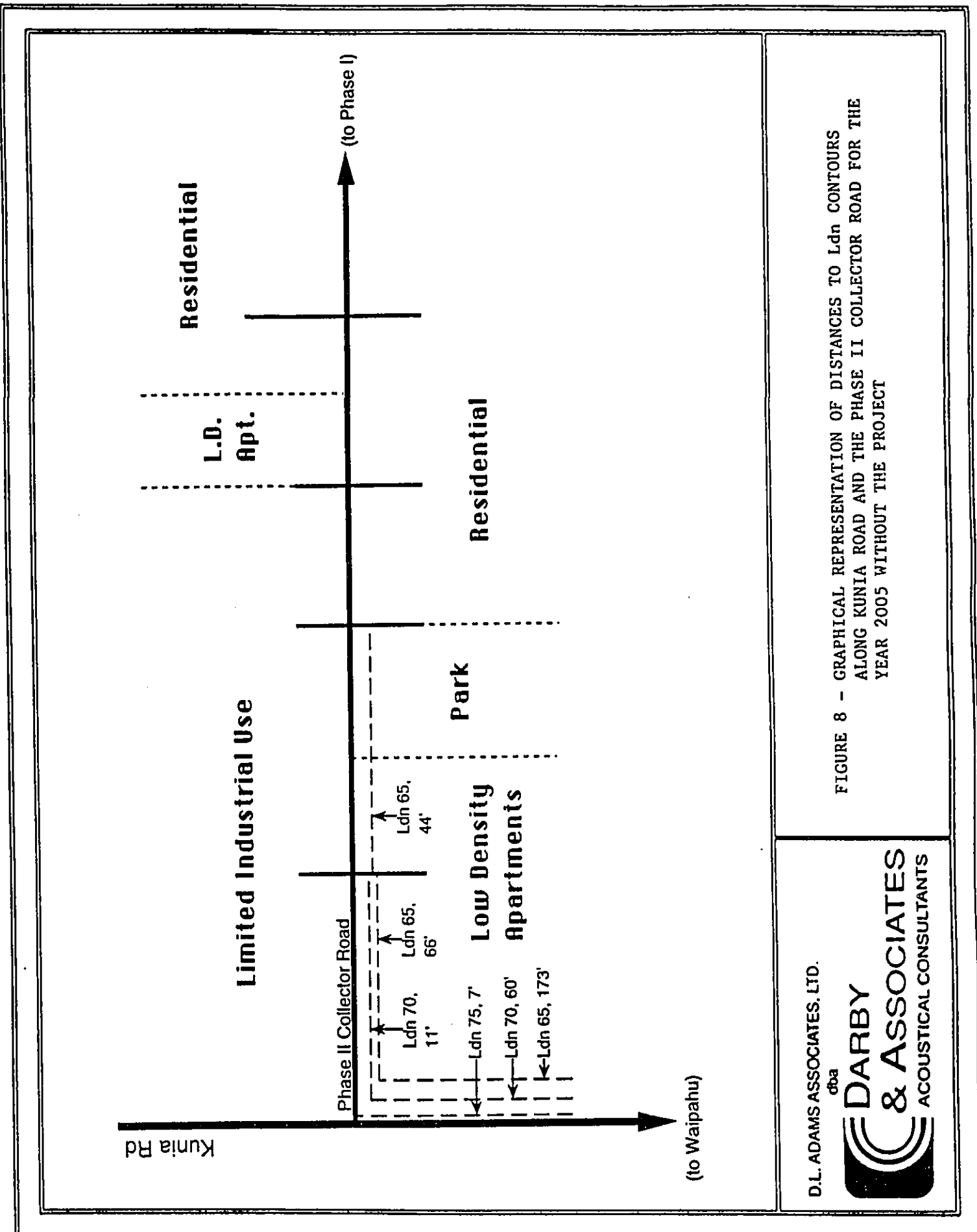
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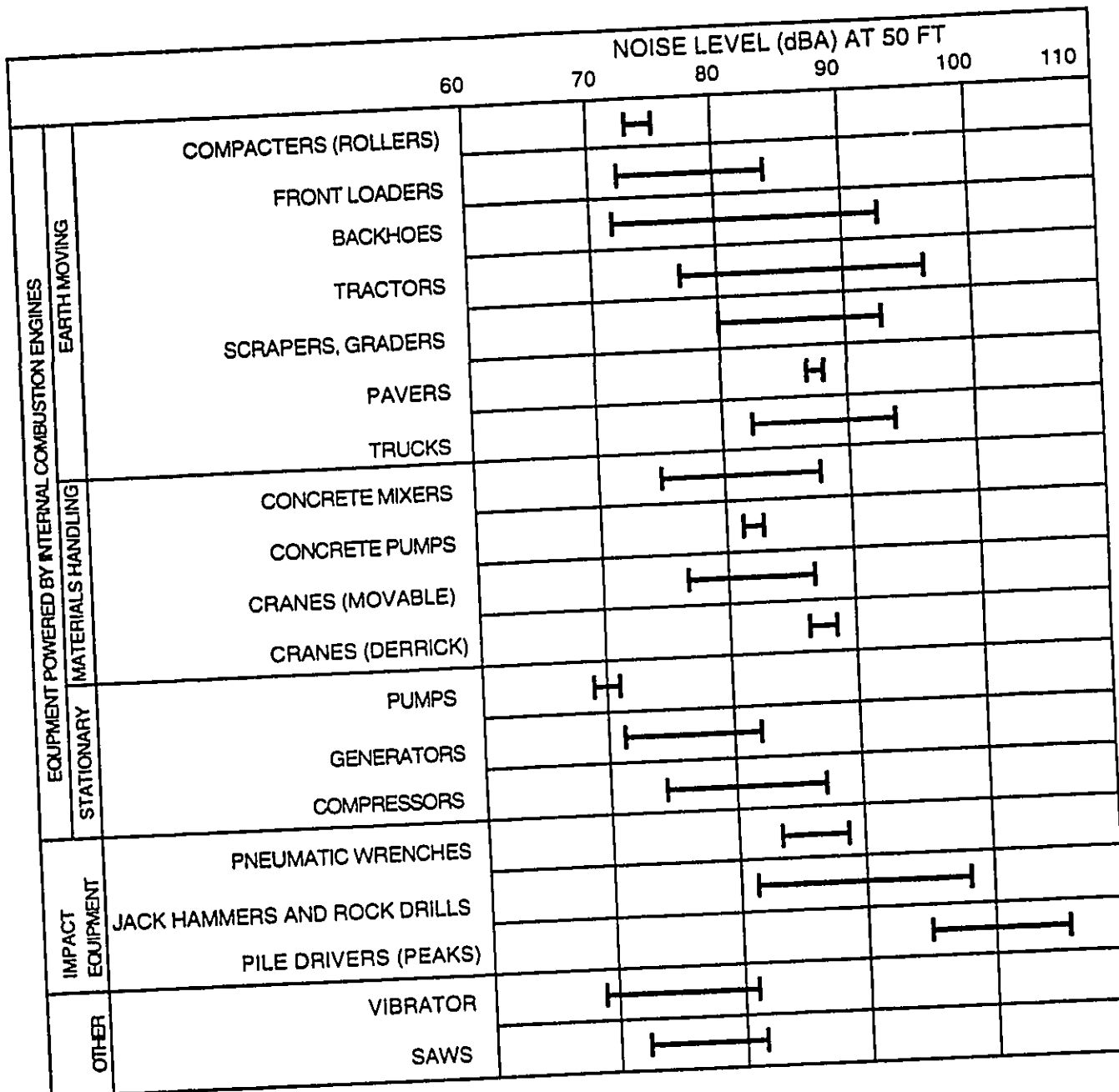
FIGURE 7 - GRAPHICAL REPRESENTATION OF DISTANCES TO Ldn CONTOURS ALONG KUNIA ROAD AND THE PHASE II COLLECTOR ROAD FOR THE YEAR 2005 WITH THE PROJECT



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FIGURE 8 - GRAPHICAL REPRESENTATION OF DISTANCES TO Ldn CONTOURS ALONG KUNIA ROAD AND THE PHASE II COLLECTOR ROAD FOR THE YEAR 2005 WITHOUT THE PROJECT



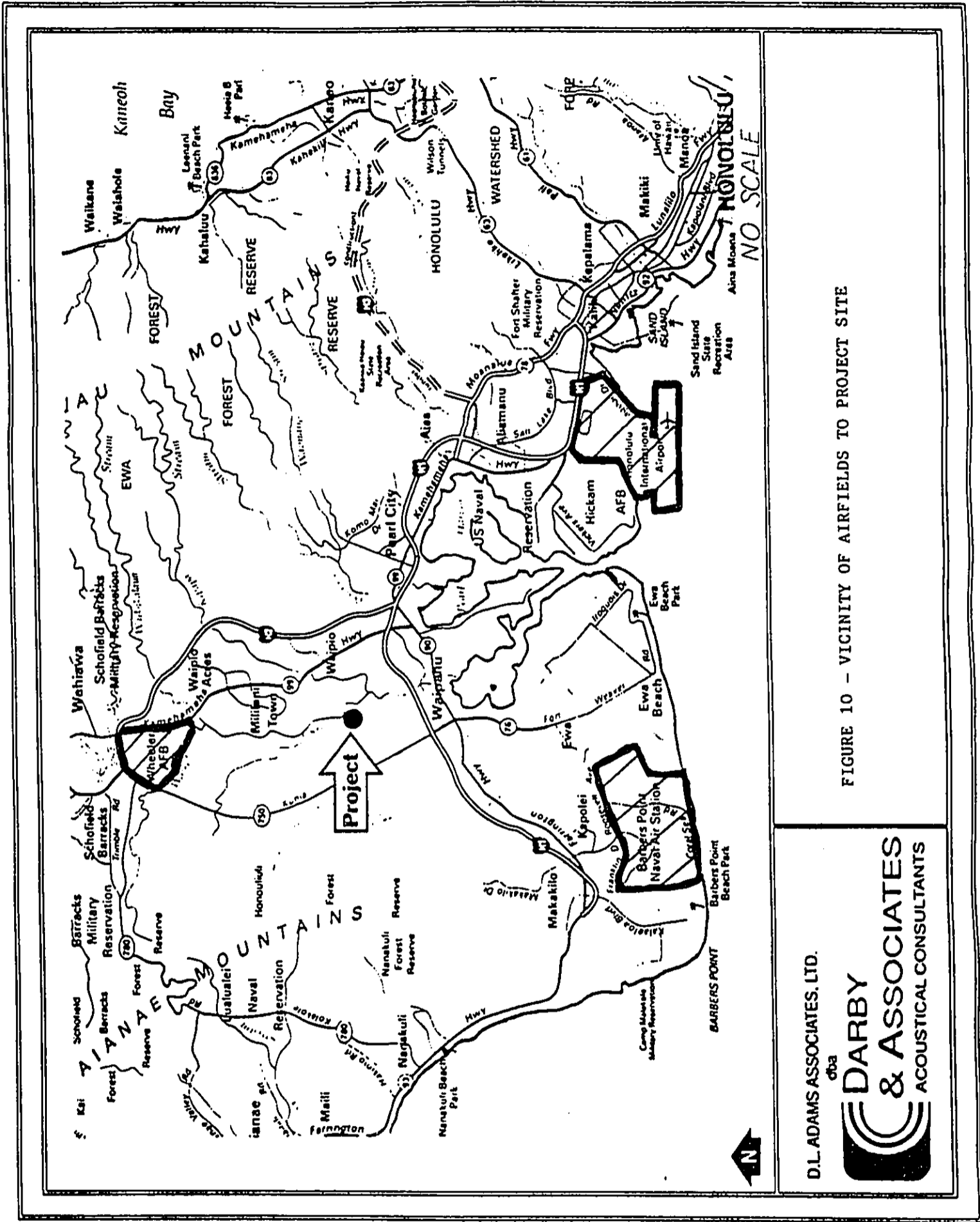
Note: Based on Limited Available Data Samples

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FIGURE 9 - TYPICAL SOUND PRESSURE LEVELS FROM CONSTRUCTION EQUIPMENT

SOURCE: U.S. ENVIRONMENTAL PROTECTION AGENCY 1972



NO SCALE

FIGURE 10 - VICINITY OF AIRFIELDS TO PROJECT SITE

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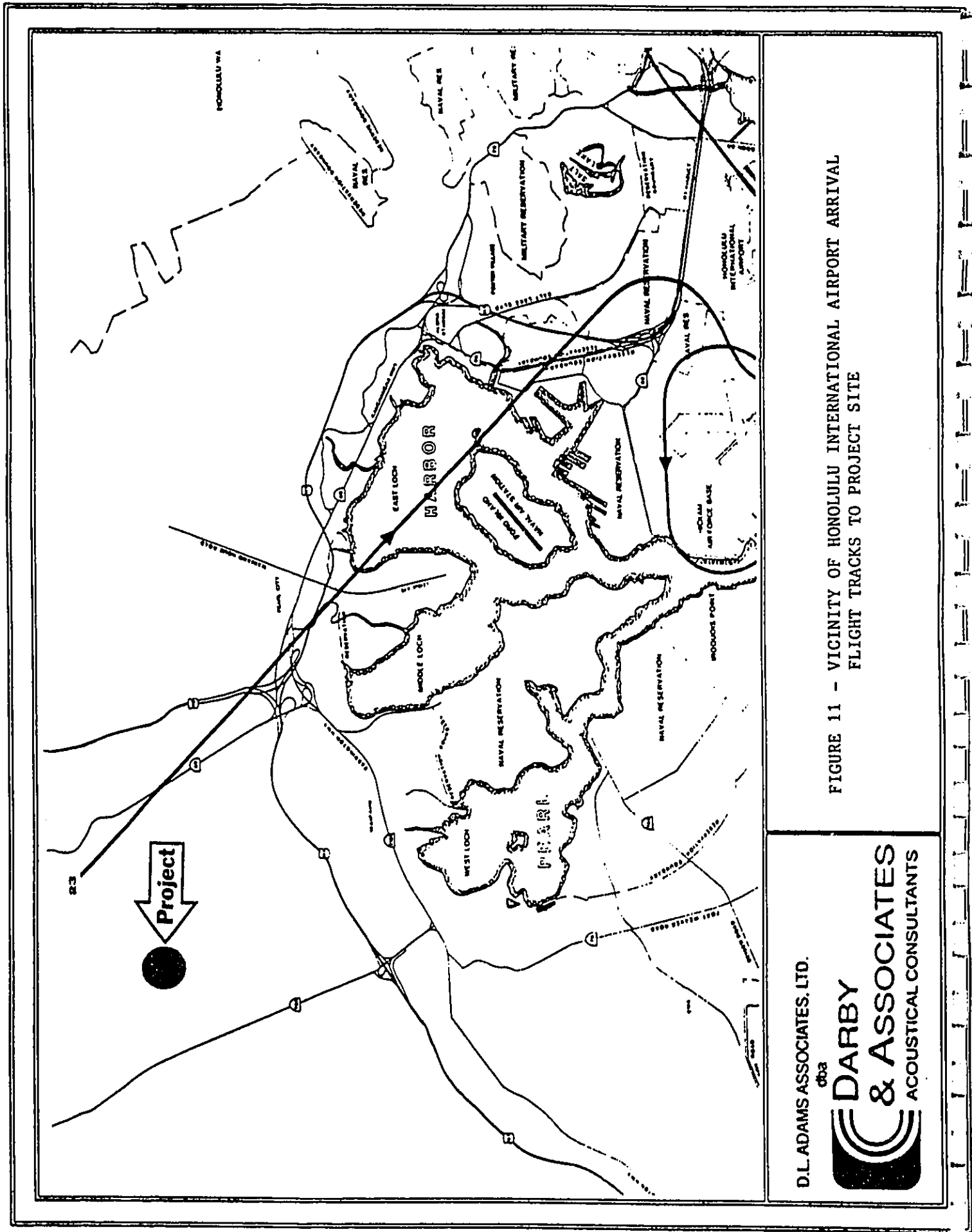
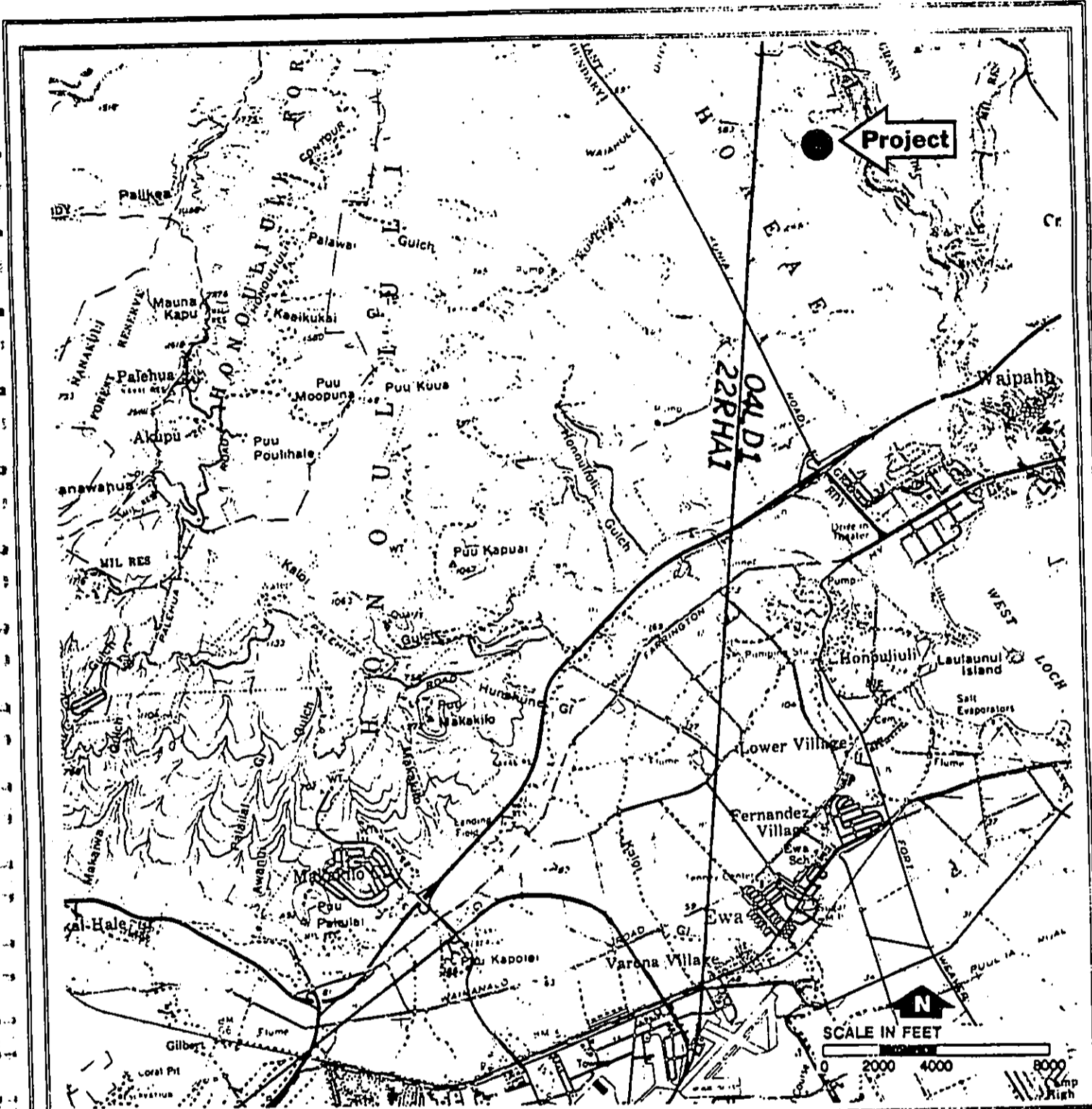


FIGURE 11 - VICINITY OF HONOLULU INTERNATIONAL AIRPORT ARRIVAL
FLIGHT TRACKS TO PROJECT SITE

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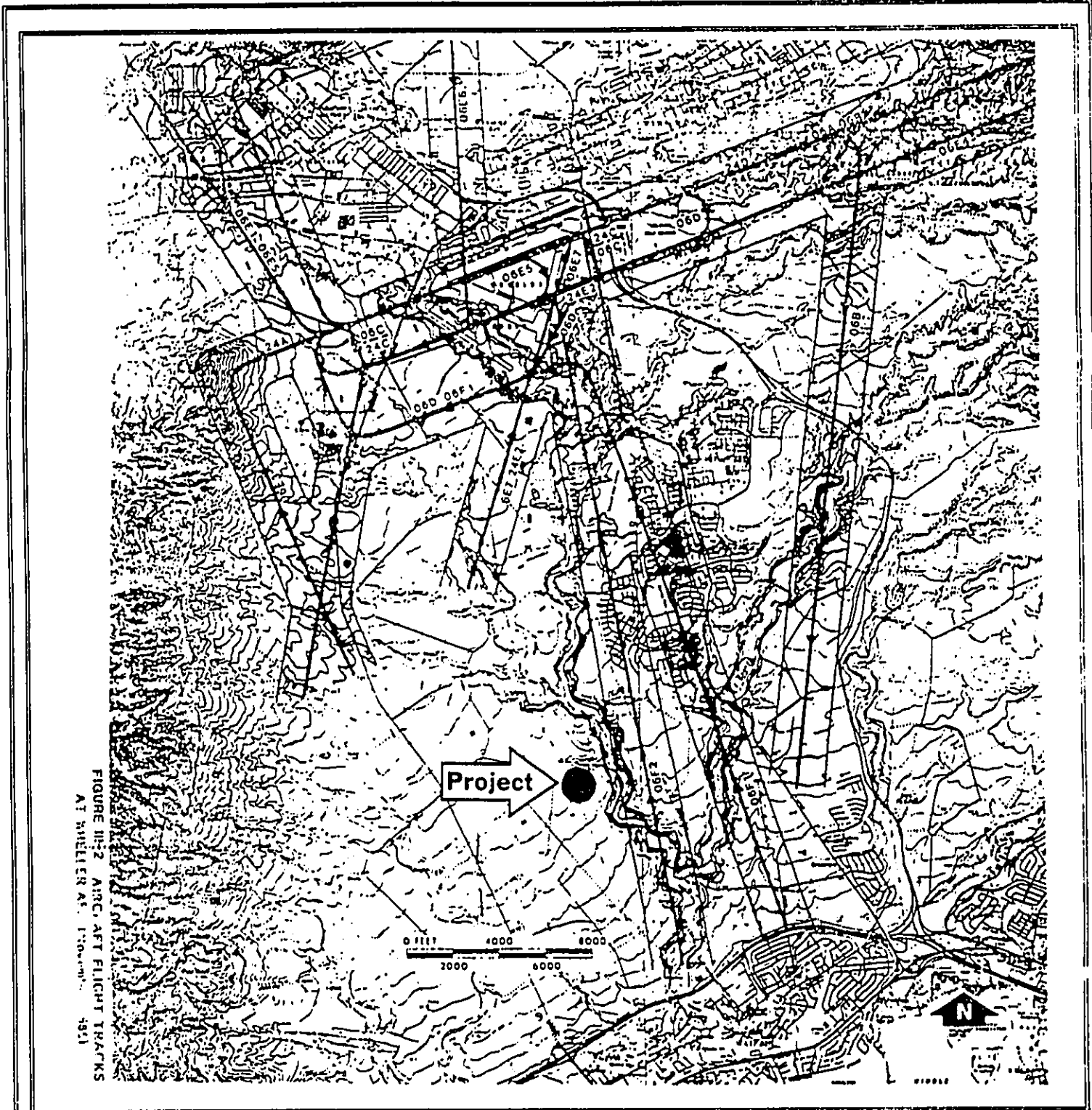
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FIGURE 12 - VICINITY OF BARBERS POINT NAS
 HELICOPTER FLIGHT TRACKS TO
 PROJECT SITE



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FIGURE 13 - VICINITY OF WHEELER AIR FORCE
BASE FLIGHT TRACKS TO PROJECT
SITE

APPENDIX E

**Traffic Impact Report
Royal Kunia Phase II, Increment 3
Prepared By: Julian Ng, Inc.**

TRAFFIC IMPACT REPORT

**ROYAL KUNIA PHASE II
INCREMENT 3**

Waipahu, Oahu, Hawaii

January 1996

Prepared For:

Halekua Development Corporation

Prepared By:

Julian Ng, Inc.

P.O. Box 816

Kaneohe, Hawaii 96744

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TRAFFIC IMPACT REPORT
ROYAL KUNIA PHASE II - INCREMENT 3
January 1996

INTRODUCTION

Halekua Development Corporation has proposed to change the limits of the Royal Kunia Phase II project, by adding lands that have been designated as Increment 3. The project, located north of the Royal Kunia Phase I project which is currently being developed, has previously received State land use and City Development Plan approvals for 2,000 dwelling units in Increments 1 and 2; the Increment 3 area was retained in the "Preservation" designation (see Exhibit 1). The proposed change would extend the physical limits of the project to include the Increment 3 area, while maintaining the number of dwelling units. Although Halekua Development Corporation will be applying for zoning in Increments 1 and 2 based on previously approved plans, the plans described herein represent the latest development ideas for the area.

The Royal Kunia Phase II project will include 2,000 dwelling units, of which 750 would be in multi-family structures located in two areas already approved for low-density apartment use and 1,250 would be single-family dwellings spread out over portions of Increments 1, 2, and 3. Sites for a park and elementary school have been modified as a result of coordination with the City Department of Parks and Recreation and the State Department of Education. A light industrial area of is located within the Increment 1 site.

A separate Roadway Master Plan report is being prepared to guide development of the roadway system within the residential area of Royal Kunia Phase II. This Traffic Impact Report compares the future peak hour traffic conditions with the proposed development should urbanization of and development within Increment 3 be approved and without development in Increment 3. The latter case, which considers only the 1,420 dwelling units that are located within the Increments 1 and 2 area in the latest plan, should be considered the lower range of "without project" conditions because higher densities and consequently more units (up to the previously approved 2,000 dwelling units) could be developed if Increment 3 is not approved for development.

Access to the project would be provided by the Phase II Collector Road, which is an extension of the Phase I Collector Road ("Road D") into the Phase II site that loops back to intersect again with Kunia Road. Much of the traffic generated by Phase II is expected to travel between the project site and the H-1 Freeway, about two miles to the south, using the Collector Road to Kunia Road, and passing on Kunia Road in front of Royal Kunia Phase I and Village Park. Earlier traffic studies^{1,2} have recommended widening of Kunia Road through this area to provide adequate access to Royal Kunia. Other recommendations for regional improvements were made in a separate report³ prepared by others for the Ewa Region Highway Master Plan Working Group, of which Halekua Development Corporation is a member (the Working Group is presently participating in a study to update the findings of that report).

This report includes estimates of future peak hour traffic volumes at the major intersections along the Collector Road. These estimates, or traffic assignments, were evaluated using methods described in the *Highway Capacity Manual*^{4,5}. Levels of service are used to describe traffic conditions and are defined in an appendix to this report. Recommendations are provided for intersection spacing and improvements to serve the projected traffic demand.

EXISTING CONDITIONS

The proposed Royal Kunia Phase II project is on a site located east of Kunia Road, adjacent to and directly north of Royal Kunia Phase I. A collector road within an eighty-foot right-of-way will be built as part of Phase II - Increment 1 to connect the Increment 2 project to Kunia Road. The Phase II Collector will intersect Kunia Road, which is currently a two-lane highway oriented in a north-south direction, approximately two miles north of the east-west H-1 Freeway (Interstate Route H-1).

Kunia Road is a State highway (Route 750) connecting Waipahu, south of the project, and Wahiawa, approximately seven miles to the north. For most of its length, Kunia Road is a two-lane highway, with 11-foot lanes and four-foot shoulders. In the vicinity of Village Park, Kunia Road has been widened to four lanes (undivided) and two connections at signalized intersections (Kupuna Loop, north and south) provide access to the existing Village Park community.

- ¹ Julian Ng, Incorporated, *Traffic Impact Analysis Report - Royal Kunia Phase II*, April 1992.
- ² Julian Ng, Incorporated, *Traffic Impact Analysis Report - Royal Kunia Phase II - Increment One*, March 1993.
- ³ Pacific Planning & Engineering, Inc., *Ewa Region Highway Transportation Plan - 1997 and 2005 Roadway Concepts*, February 1992.
- ⁴ Transportation Research Board, National Research Council, *Highway Capacity Manual*, Special Report 209, Washington, D.C., 1985.
- ⁵ Transportation Research Board, National Research Council, *Highway Capacity Manual - Third Edition*, Washington, D.C., 1994.

Existing traffic conditions described herein are for years 1993 and 1994. Estimates⁶ of daily and peak hour traffic from the State Highways Division are used in the following description. The latest published traffic count data⁷ (Oahu Count Station C-9-D, Kunia Road 2.8 miles northwest of H-1 Freeway, opposite Waiahole Reservoir) are also presented.

Kunia Road north of Village Park, fronting the proposed project, served an average daily traffic (ADT) of 9,400 vehicles in 1993. Total, two-way volumes were estimated to be 750 vehicles per hour (vph) in the AM (morning) peak hour and 840 vph in the PM (afternoon) peak hour. Peak hour, peak direction traffic volumes were estimated to be 420 vph. In August 1994, a 24-hour count showed a volume of 9,600 vehicles per day, with the AM Peak Hour occurring between 6:15 and 7:15 AM (896 vph) and the PM Peak Hour occurring between 3:30 and 4:30 PM (894 vph). Levels of service on two-lane highways, which are based on potential for delay and affected by traffic volumes in both directions, were determined for the counted traffic volumes. Existing peak hour highway conditions on Kunia Road are described by Level of Service (LOS) D.

FUTURE CONDITIONS - BASE CASE

A future condition without the proposed Royal Kunia Phase II project was analyzed to provide a baseline to which the project traffic was added. On Kunia Road north of the collector road, traffic has increased 63% between 1985 and 1994. A regression of the 24-hour traffic counts taken by State Highways Division in 1985, 1986, 1987, 1989, 1992, 1993, and 1994 showed an average annual growth rate of 5.87%. This rate was applied to the latest peak hour counts, increasing the 9,600 vpd counted in 1994 to 18,900 vpd in 2005. For a similar proportionate increase in hourly traffic, peak hour conditions on the two-lane Kunia Road north of the Phase II Collector Road would be described by LOS E, with volumes being 71% of capacities during both the AM and PM peak hours.

Halekua Development Corporation has received planning approvals to develop Increment 1 of the Royal Kunia Phase II project and will be applying for zoning for 1,000 dwelling units, a park site, and a site for an elementary school. However, Halekua Development Corporation, in reevaluating the project, has developed plans to redistribute some of these units over the entire Phase II area. This new plan, while not increasing the previous total of 2,000 dwelling units in Royal Kunia Phase II, will affect traffic volumes on the collector road and is the basis for the traffic estimates made herein.

⁶ State of Hawaii, Department of Transportation, Highways Division, *Traffic Summary Island of Oahu 1993*.

⁷ State of Hawaii, Department of Transportation, Highways Division, *Traffic Survey Data (Individual Stations) - Island of Oahu, 1994*.

As part of the highway improvements required for Increment 1 of the Royal Kunia Phase II project, the developer will widen Kunia Road along the Increment 1 frontage to four through lanes and add a left turn lane for southbound traffic turning from the highway into the Phase II Collector Road. Increment 1 will also construct the collector road within an 80-foot right-of-way, extending from a signalized T-intersection with Kunia Road in an easterly direction and connecting to the collector road (Road "D") presently being constructed as part of Royal Kunia Phase I.

PROPOSED PROJECT

The proposed project is to implement the revised plan for Royal Kunia Phase II, which will extend the single family development into the previously designated Increment 3 area located in the northeast corner of the site. A conceptual roadway plan was developed for the single family areas (Exhibit 2). The Phase II Collector Road which will provide access into the site from Kunia Road will be a standard City and County of Honolulu 80-foot roadway. Secondary streets off of the collector will be standard 56-foot streets in the residential areas and standard 60-foot streets in the industrial area. The main roadway into the single family subdivisions north of the Collector Road (Increments 2 and 3 area) is proposed to be a divided roadway with a landscaped median within a 90-foot right-of-way. Portions of other streets in this area which serve as the only access for more than 100 dwelling units will be 56 feet wide. Other streets will be local streets; local streets are proposed to be standard 44-foot streets. The secondary and larger streets are shaded in Exhibit 2; Exhibit 3 shows the typical cross-sections of the proposed streets.

Exhibit 4 shows the proposed striping of the Collector Road. Two lanes would be provided in each direction for through traffic and right turns; a fifth median lane would be used for left turns. The exact lane widths and the method of handling bikeways will be determined in the design of the roadway; two possible alternatives are: 1) designation of the Collector Road as a bike route with 14-foot curb lanes (other lanes would be 12 feet wide), and 2) separate bike lanes, each 6 feet wide, with adjacent 11-foot lanes on each side and three 10-foot wide lanes.

At the Kunia Road intersection, high volumes of right turns are expected from northbound Kunia Road to the Collector Road and a separate right turn only lane would be provided. Two lanes would depart the intersection on the Collector Road in the eastbound direction. The westbound approach would consist of three lanes: a separate lane for right turns and two left turn lanes (the second lane to be opened with the activation of traffic signals when warranted).

The next intersection with the Collector Road would be located approximately 900 feet east of Kunia Road. To the north, a 60-foot secondary street would provide one of two entries into the light industrial area. A 56-foot secondary street would be opposite, providing access to the Increment 1 low-density apartment area, in which 630 dwelling units are proposed. This intersection is expected to meet the peak hour warrants for traffic signals with full development of the low-density apartment area. When signalized, each roadway would approach the Collector Road with two lanes; one will be a separate turn lane toward Kunia Road, the other will be a shared lane for the other movements.

The second intersection within the site is located another 1,400 feet to the east. To the north, a 60-foot secondary street would be the second entry into the light industrial area. A 56-foot secondary street located directly opposite will serve the park, elementary school, and single family areas. This street will be aligned to be an extension of a secondary street from a subdivision that is part of the Royal Kunia Phase I project ("Site 12"). As in the first intersection, traffic signals are expected at full development and the side street approaches would be striped similarly.

The third intersection will be approximately 900 feet to the east. The north leg would be a 56-foot secondary street serving the low-density apartment area in Increment 2 and a portion of the single family area beyond; a street providing access to residential units within a proposed agricultural park also connects to this secondary street (agricultural activities would have a separate access to Kunia Road). The south leg of this intersection would serve a part of the Increment 1 single family area. Stop sign control of the side streets at this intersection would be adequate; a separate lane for right turns could be provided, with a single lane serving left turns and through movements from the side streets.

The next intersection would be located 800 feet farther east. To the north, the street would provide the main access to the single family area in Increments 2 and 3. A 90-foot parkway is proposed. Two lanes for through traffic would be provided on each side of a grassed median; separate left turn lanes would typically be cut into the median at intersections. Stop controls on the parkway and the opposite street are expected to be adequate; the wider approach on the north side would be striped with a separate lane for each movement while a shared lane for left turns and through movements will be supplemented by a single lane for right turns from the south leg.

TRAFFIC ESTIMATES

Traffic generation analyses were used to estimate the peak hour traffic volumes on the street system at full development of the Royal Kunia Phase II project and for development of only the Increments 1 and 2 areas.

Trip estimation procedures based on the Institute of Transportation Engineers' informational report *Trip Generation*⁸ were used to estimate the number of vehicular trips generated by the proposed project. Driveway volumes were estimated by applying average rates to the number of units. Rates reported for apartments were used for multi-family dwelling units; traffic due to the smaller generators such as parks and the golf school were estimated from rates published for similar activities. Table 1 summarizes the trip rates and directional distributions used.

Table 1

TRIP GENERATION RATES

| Trip
Parameter | Average
Weekday | AM Peak Hour | | PM Peak Hour | |
|-----------------------------|--------------------|--------------|------|--------------|------|
| | | Total | % In | Total | % In |
| single family dwelling unit | 9.55 | 0.74 | 26% | 1.01 | 65% |
| multi-family dwelling unit | 6.47 | 0.51 | 17% | 0.63 | 68% |
| light industrial acre | 51.80 | 7.51 | 83% | 7.26 | 12% |
| park acre | 50 | 1.00 | 75% | 6.50 | 55% |
| elementary school acre | 120 | 35.00 | 60% | 3.50 | 15% |
| golf school acre | 40 | 0.21 | 88% | 3.95 | 61% |

Internal trips between residential generators (single family or multi-family dwellings) were estimated by deducting the net traffic generation of the project that had been estimated using the equations provided in *Trip Generation*. For example, for 750 multi-family units and 871 single family units (the case without Increment 3), the total trip ends at residential driveways total 1,027 in the AM Peak Hour; application of the equations indicate that a net 899 trips would be generated. Internal trips between residential units, therefore, were estimated at one-half of the difference of the total trip ends, or 64 trips. This total is deducted from the driveway volumes in determining the net traffic out of the project. A portion (10%) of the traffic generated in the industrial site was estimated to originate or end within the residential portions of the project. Larger portions of the traffic generated by the school, parks, and other uses were also expected to be related to the residential development. Table 2 shows the trip generation calculation.

⁸ Institute of Transportation Engineers, *Trip Generation - An Informational Report, 5th Edition*, Washington, D.C., 1991.

Table 2

TRIP GENERATION

| Trip Parameter | Average Weekday | AM Peak Hour | | PM Peak Hour | |
|--|-----------------|--------------|-------|--------------|-------|
| | | Enter | Exit | Enter | Exit |
| Increment 1 multi-family | 630 | 55 | 266 | 270 | 127 |
| Increment 1 single family | 219 | 42 | 120 | 144 | 77 |
| Phase I Site 12 single family | 201 | 39 | 110 | 132 | 71 |
| Increment 2 multi-family | 120 | 10 | 51 | 51 | 25 |
| Increment 2 single family | 451 | 87 | 247 | 296 | 160 |
| Increment 3 single family | 580 | 111 | 318 | 381 | 204 |
| Other generators considered: | | | | | |
| Light Industrial | 123.7 | 6,410 | 158 | 108 | 790 |
| Major park (Increment 1) | 11.1 | 560 | 3 | 40 | 32 |
| Elementary School (Increment 1) | 8.0 | 960 | 113 | 4 | 24 |
| Agricultural park residences | 50 | 480 | 27 | 33 | 18 |
| Golf School (Increment 2) | 15.0 | 600 | 0 | 36 | 23 |
| Major park (Increment 3) | 10.0 | 500 | 2 | 36 | 29 |
| TOTAL: Without Increment 3 | | | | | |
| Total residential vehicle trip ends | | 13,180 | 794 | 893 | 460 |
| internal trips among residential areas | | | (64) | (89) | (89) |
| Total other vehicle trip ends | | 9,010 | 301 | 221 | 887 |
| internal trips (10% of industrial) | | | (77) | (11) | (79) |
| internal trips (parks, school, etc.) | | | (123) | (22) | (11) |
| internal trips between residential and other areas | | | (39) | (90) | (33) |
| Net traffic | | | 890 | 902 | 1,135 |
| TOTAL: With Increment 3 | | | | | |
| Total residential vehicle trip ends | | 18,720 | 1,112 | 1,274 | 664 |
| internal trips among residential areas | | | (132) | (160) | (160) |
| Total other vehicle trip ends | | 9,510 | 303 | 257 | 916 |
| internal trips (10% of industrial) | | | (16) | (11) | (79) |
| internal trips (parks, school, etc.) | | | (23) | (22) | (11) |
| internal trips between residential and other areas | | | (200) | (90) | (33) |
| Net traffic | | | 1,044 | 1,248 | 1,297 |

Trip distribution was based on analyses done for prior traffic studies and provides an estimate of the origins or destinations of these trips. The net traffic generated by the study area would use Kunia Road to travel to or from other areas on Oahu. Factors used for the trip distribution are shown in Table 3.

Table 3

TRIP DISTRIBUTION

| Direction of Travel | AM Peak Hour | | PM Peak Hour | |
|---------------------------------------|--------------|------|--------------|------|
| | Enter | Exit | Enter | Exit |
| North on Kunia Road (from/to Wahiawa) | 8% | 10% | 8% | 8% |
| South on Kunia Road (from/to Waipahu) | 92% | 90% | 92% | 92% |

Traffic assignment refers to the exercise of locating the trips generated onto the roadway system, using the trip distribution factors. All of the traffic generated by the project leaving the area and using Kunia Road would use the Collector Road. The western secondary road into the industrial area was estimated to serve 55% of the industrial traffic; all of the Increment 1 multi-family dwellings would be served by the secondary road opposite this road. The eastern secondary road into the industrial area would serve the remainder of the traffic generated out of industrial area; opposite it, traffic will include all of the traffic from the adjacent park and the elementary school, plus a portion of the traffic from the single family area of Increment 1 and an estimated 75% of the traffic from Phase I - Site 12. All of the traffic the multi-family dwelling in Increment 2, a small portion of the traffic from the Increment 2 single family area, and the traffic generated by the residences in the agricultural park were assigned to the secondary roadway that passes through the multi-family area in Increment 2; approximately half of the traffic generated by the Increment 1 single family area was assigned to the local street directly opposite. The remainder of the traffic generated in the project was assigned to the Increment 2 Parkway and the local street opposite the parkway.

In addition, the traffic estimates account for trips generated in parts of Royal Kunia Phase I (other than Site 12) that arrive from or are destined to the north by increasing the turning movements from or to the north by 40% and assigning these as through traffic on the Collector Road. The traffic assignments for year 2005 with and without the proposed project are shown in Exhibits 5, 6, and 7.

TRAFFIC ANALYSES

The traffic generated by the Royal Kunia project were added to an extrapolation of recent traffic data for Kunia Road north of the project site. The extrapolated volumes are estimated to be nearly 85% higher than the volumes counted in 1994; LOS E would describe conditions on the two-lane highway. The addition of traffic from the Collector Road further increases the volumes, but capacity is not reached and LOS E continues to describe the peak hour conditions on the two-lane highway. Table 4 summarizes the two-lane highway analysis findings.

Table 4

TWO-LANE HIGHWAY ANALYSIS

| Condition | AM Peak Hour | | PM Peak Hour | |
|-------------------------------|--------------|-----|--------------|-----|
| | V/C | LOS | V/C | LOS |
| Existing (1994 counts) | 0.39 | D | 0.39 | D |
| Future (2005), extrapolated | 0.71 | E | 0.71 | E |
| Future (2005) without project | 0.78 | E | 0.78 | E |
| Future (2005) with project | 0.79 | E | 0.80 | E |

The intersection of Kunia Road and the Phase II Collector Road would be signalized when warranted by national standards⁹; with signalization, a second left turn lane from the Collector to a widened Kunia Road would be possible. Using a critical movement analysis similar to the "Planning Analysis" from the 1985 *Highway Capacity Manual*, the peak hour volumes with or without Increment 3 (Exhibit 5) were found to be at "under" capacity conditions for the AM Peak Hour. (The finding of "under" capacity for the AM Peak Hour from this simple analysis indicates that the intersection is likely to operate well without excessive delays to any movements. Any "near" capacity findings would indicate that the flow may be unstable, with a wide range of delays.) In the PM Peak Hour, "under" capacity conditions without the project would change to "near" capacity conditions at the Kunia Road intersection. If right turns are allowed from the right through lane of the northbound approach on Kunia Road as indicated in Exhibit 4, the analysis would show "under" capacity conditions.

⁹ U.S. Department of Transportation, Federal Highway Administration, *Manual on Uniform Traffic Control Devices for Streets and Highways*, Washington, D.C., 1988 and as revised.

The intersections shown in Exhibit 7 would be unsignalized intersections. Traffic on the Collector Road would have priority, with the side street approaches being controlled by stop signs. These intersections were analyzed using the unsignalized intersection analysis procedure described in the 1994 update of the *Highway Capacity Manual*. The updated procedure was revised from the one presented in the 1985 manual in two ways: the calculations for capacities were revised to better reflect actual conditions and the determination of level of service was changed from the difference between capacity and volume to the use of estimated delay, which conforms closer to the method of determining levels of service for signalized intersections. Left turns from the Increment 1 single family subdivision would have the most delay; however, the alternative of exiting to the secondary street near the park and turning left at the signalized intersection is expected to mitigate any undesirable conditions. The results of the unsignalized intersection analyses are shown in Table 6.

Table 6
UNSIGNALIZED INTERSECTION ANALYSES

| Collector Road at: | Year 2005 Without Project | | Year 2005 With Project | |
|--------------------------------------|---------------------------|-----|------------------------|-----|
| | AM Peak Hour
delay | LOS | PM Peak Hour
delay | LOS |
| <u>Increment 2 LDA Road</u> | | | | |
| Sidestreet southbound right turn | 3 | A | 4 | A |
| Sidestreet southbound left/through | 6 | B | 9 | A |
| Collector westbound left turn | 3 | A | 3 | A |
| Collector eastbound left turn | 3 | A | 4 | A |
| Local Street northbound left/through | 9 | B | 18 | C |
| Local Street northbound right turn | 3 | A | 3 | A |
| <u>Increment 2/3 Parkway</u> | | | | |
| Parkway southbound right turn | 3 | A | 4 | A |
| Parkway southbound through lane | 4 | A | 5 | B |
| Parkway southbound left turn | 4 | A | 5 | B |
| Collector westbound left turn | 2 | A | 2 | A |
| Collector eastbound left turn | 2 | A | 2 | A |
| Local Street northbound left/through | 5 | B | 7 | B |
| Local Street northbound right turn | 3 | A | 3 | A |

delay = average delay (seconds/vehicle); LOS = Level of Service

CONCLUSIONS AND RECOMMENDATIONS

The proposed project would allow for the development of the previously approved 2,000 dwelling units in Royal Kunia Phase II with a mix of units at a density which the developer presently desires. The traffic analyses indicate that the major intersections along the Phase II Collector Road will operate at acceptable levels of service during peak hours with the project.

The proposed roadways in the residential areas of Royal Kunia Phase II will consist of the major Collector Road within an 80-foot right-of-way, a parkway (90-foot right-of-way), 56-foot secondary streets, and 44-foot local streets. The proposed layout will be suitable for the peak hour traffic expected to be generated by the proposed development of 2,000 dwelling units. At full development, three signalized intersections along the Collector Road would operate at acceptable levels with or without development of the proposed Increment 3. Other intersections would be unsignalized (stop-controlled) and will adequately serve the peak hour traffic demands.

Without the proposed project, the total number of units may be lower; for the purpose of comparison, the number of units proposed on the lands within Increments 1 and 2 (1,420 dwelling units) was used to represent the without project case. Because the roadways have been planned for 2,000 units, the differences in traffic conditions between the without project and with project cases are slight.

The intersections of the Collector Road with Kunia Road and with the roads into the industrial area are expected to be signalized prior to full development of Increment 1; however, because development and occupancy will be gradual, traffic signals should not be placed in service until such time that traffic volumes or other conditions warrant signalization. Conduits should be provided with the initial construction of these intersections for the future signal system in order to minimize disruption to future traffic.

Conduits for future signal systems should also be placed at the other major intersections along the Collector Road. Although the analyses show that peak hour warrants will not be met even at full development, other factors may require that improvement of these intersections be done and other warrants, such as those for four-hour or eight-hour volumes, may satisfy warrants in the future.

APPENDIX - LEVELS OF SERVICE

A qualitative measure used by traffic engineers to describe traffic operational conditions is the level of service (LOS). Six levels have been defined, from LOS A (best operating condition) to LOS F (worst). The *Highway Capacity Manual* describes analysis procedures for different types of facilities. For uninterrupted flow facilities such as freeways, other divided highways, and two-lane rural highways, factors such as speed and travel time, freedom to maneuver, comfort and safety, and continuity of flow are used to determine levels of service.

On multi-lane highways, levels of service are related to maneuverability within the traffic stream travelling in the same direction; directional volume and traffic density are used to determine capacities and levels of service. On two-lane highways, levels of service are affected by a driver's ability to pass slow-moving vehicles; opposing volume is also a factor. Descriptions of the levels of service for two-lane rural highways are:

LOS A represents free flow. Travel at desired speeds is unimpeded, as passing of any slow-moving vehicles is infrequent and can be done easily. Platoons of vehicles would be three or less.

LOS B describes stable flow. Passing to maintain desired speed becomes significant and platooning of vehicles increases.

LOS C also describes stable flow. Platooning and restrictions to passing become noticeable and while flow remains stable, some congestion may occur because of slow-moving vehicles or turning movements.

LOS D is characterized by opposing traffic flows operating separately. Passing is extremely difficult as opportunities are very limited.

LOS E describes unstable operation at or near capacity levels. There are no usable gaps in the traffic stream and any disruption to flow causes congestion. Flow is unstable as slow-moving vehicles and other interruptions cause intense platooning and congestion; passing is virtually impossible.

LOS F represents a forced or breakdown flow caused by traffic demand volume exceeding capacity; actual volume served will drop as speed decreases and congestion increases. LOS F is used to identify bottlenecks, or points of congestion, and operations within the queue behind these bottlenecks.

Levels of service are also identified for signalized intersections and for the controlled movements at unsignalized intersections. These levels of service are based on average delays, which in turn are based on volumes and capacities. For signalized intersections, an operational analysis is used to determine these delays for each lane group of each approach. For unsignalized intersections, the procedures from the *Highway Capacity Manual - Third Edition* were used to calculate delays. Criteria for levels of service are:

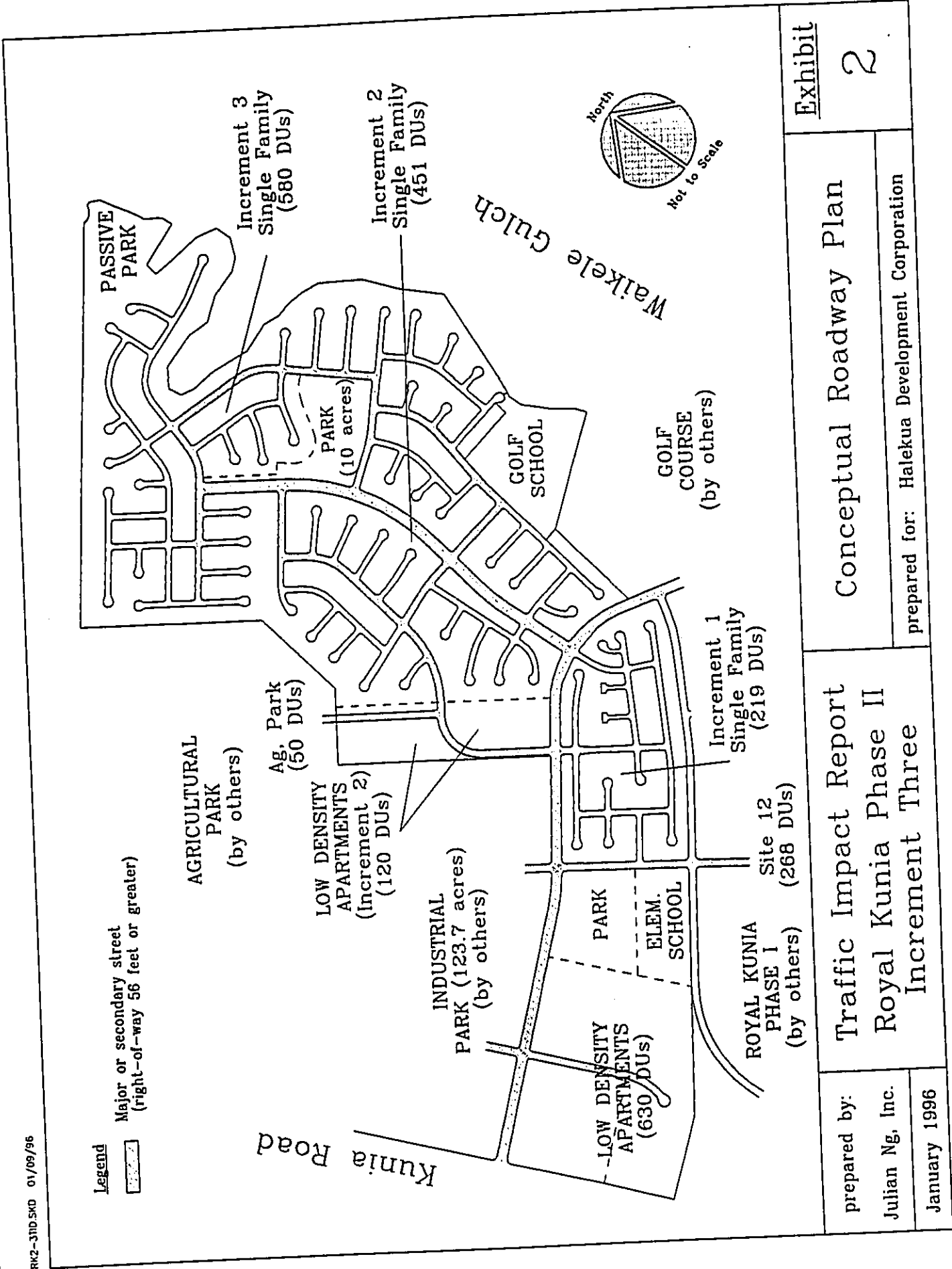
| LOS | General Description of Estimated Delay | Signalized Intersection
(≤ 5 seconds) | Unsignalized Intersection
(≤ 5 seconds) |
|-----|--|--|--|
| A | Little or no delay | (> 5 and ≤ 15 seconds) | (> 5 and ≤ 10 seconds) |
| B | Short traffic delays | (> 15 and ≤ 25 seconds) | (> 10 and ≤ 20 seconds) |
| C | Average traffic delays | (> 25 and ≤ 40 seconds) | (> 20 and ≤ 30 seconds) |
| D | Long traffic delays | (> 40 and ≤ 60 seconds) | (> 30 and ≤ 45 seconds) |
| E | Very long traffic delays | | |
| F | Very long traffic delays | | |

References: Transportation Research Board, National Research Council, *Highway Capacity Manual*, Special Report 209, Washington, D.C., 1985
 Transportation Research Board, National Research Council, *Highway Capacity Manual - Third Edition*, Updated 1994, Special Report 209, Washington, D.C., 1994

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Legend

Major or secondary street
(right-of-way 56 feet or greater)



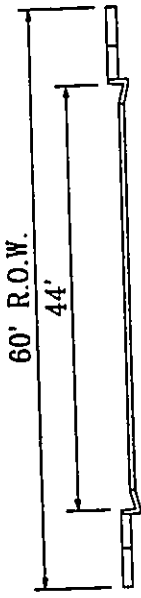
prepared by:
Julian Ng, Inc.
January 1996

Traffic Impact Report
Royal Kunia Phase II
Increment Three

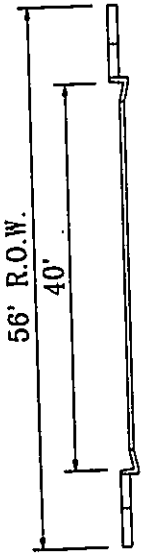
Conceptual Roadway Plan
prepared for: Halekua Development Corporation

Exhibit
2

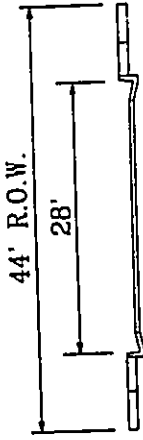
RK2-3TID.SKD 01/09/96



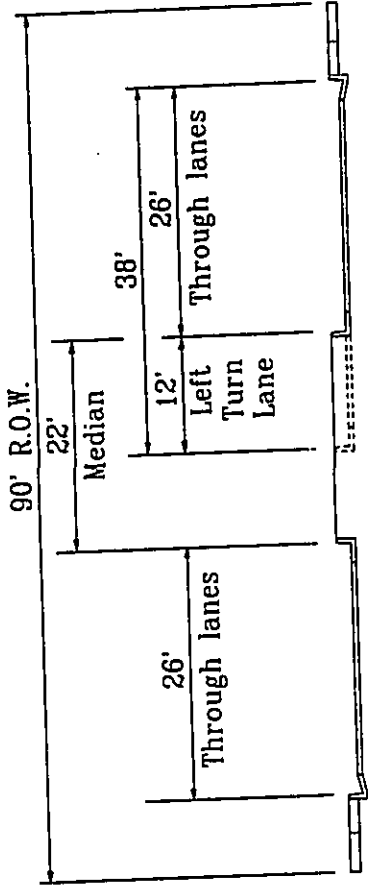
Secondary Street (Industrial area)



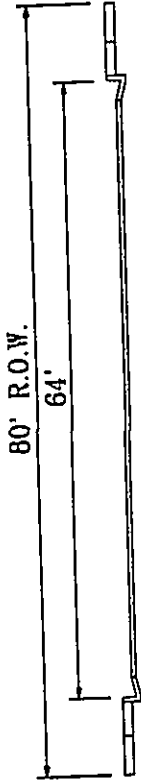
Secondary Street (Residential area)



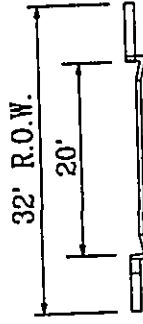
Local Street



Increment 2-3 Parkway



Collector Street



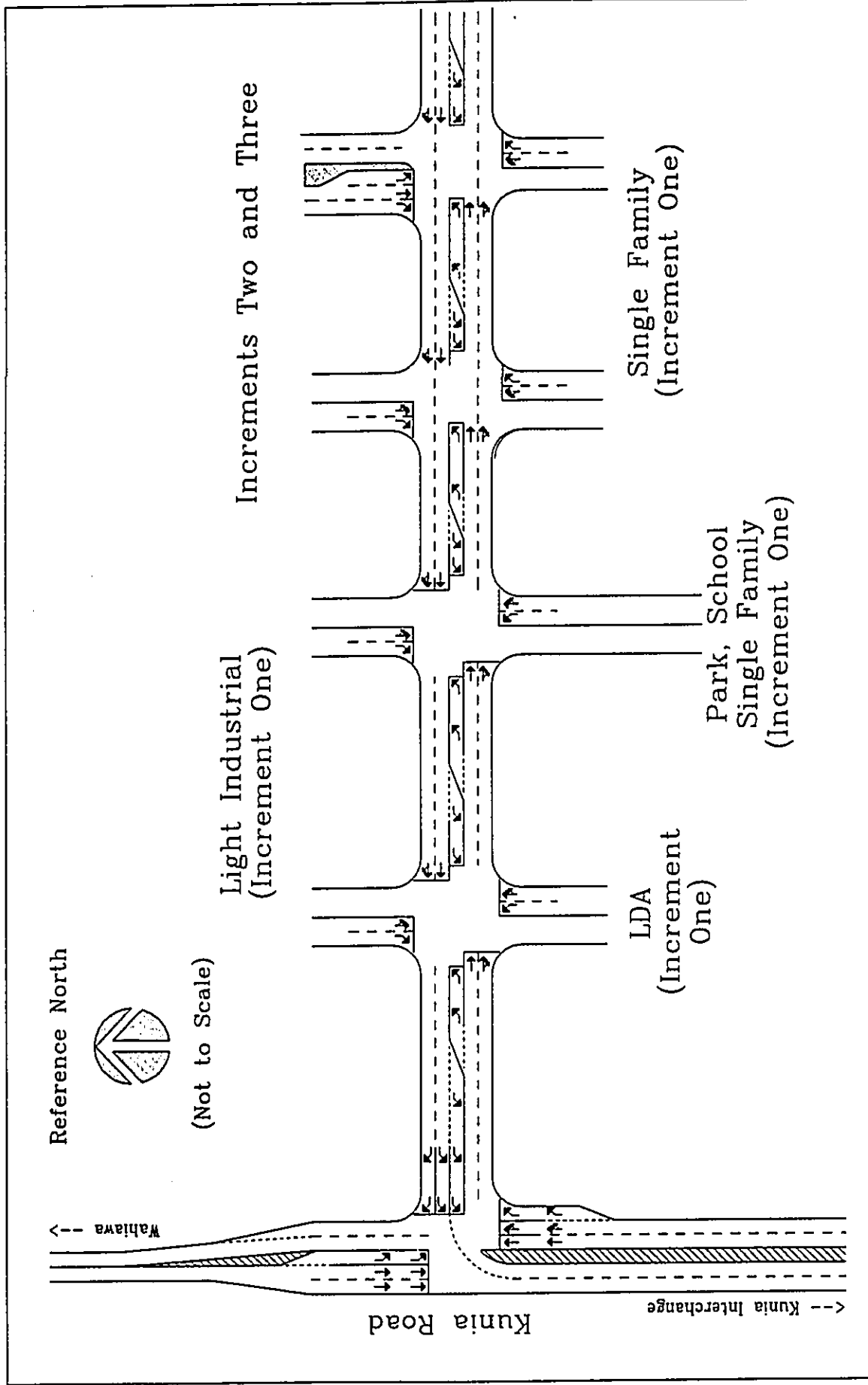
Cul-de-sac

Note: Not to Scale

| | | | |
|---|--|---|--------------|
| prepared by:
Julian Ng, Inc.
January 1996 | Traffic Impact Report
Royal Kunia Phase II
Increment Three | Typical Roadway Sections
prepared for: Halekua Development Corporation | Exhibit
3 |
| | | | |

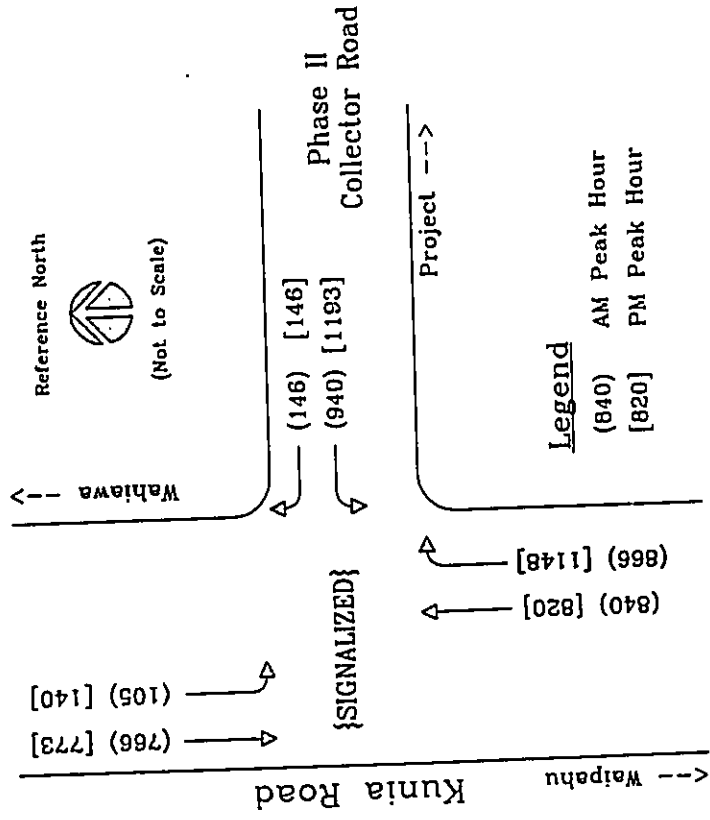
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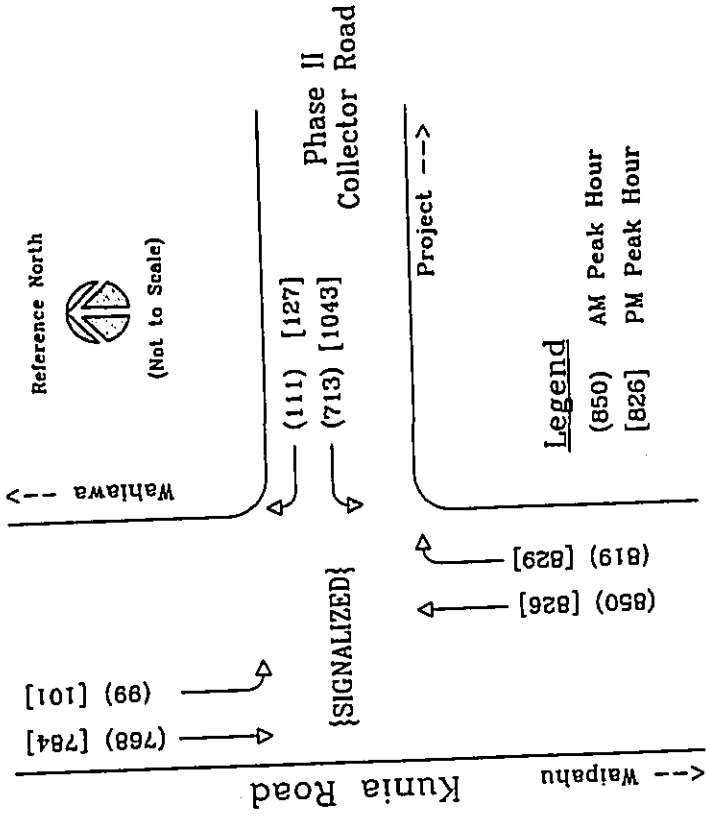


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|---------------------------------|--|---|--------------|
| prepared by:
Julian Ng, Inc. | Traffic Impact Report
Royal Kunia Phase II
Increment Three | Phase II Collector Road
Traffic Laneage | Exhibit
4 |
| January 1996 | | prepared for: Halekua Development Corporation | |

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With the Proposed Change
(2,000 Dwelling Units)



Without the Proposed Change
(1,420 Dwelling Units)

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Julian Ng, Inc.
January 1996

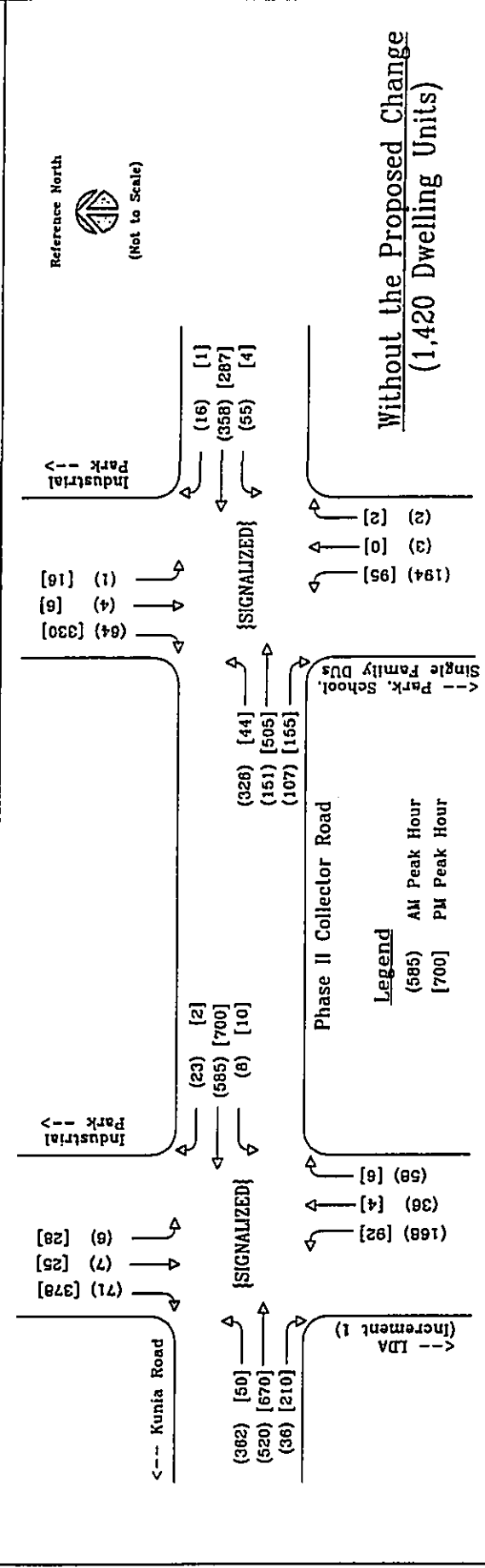
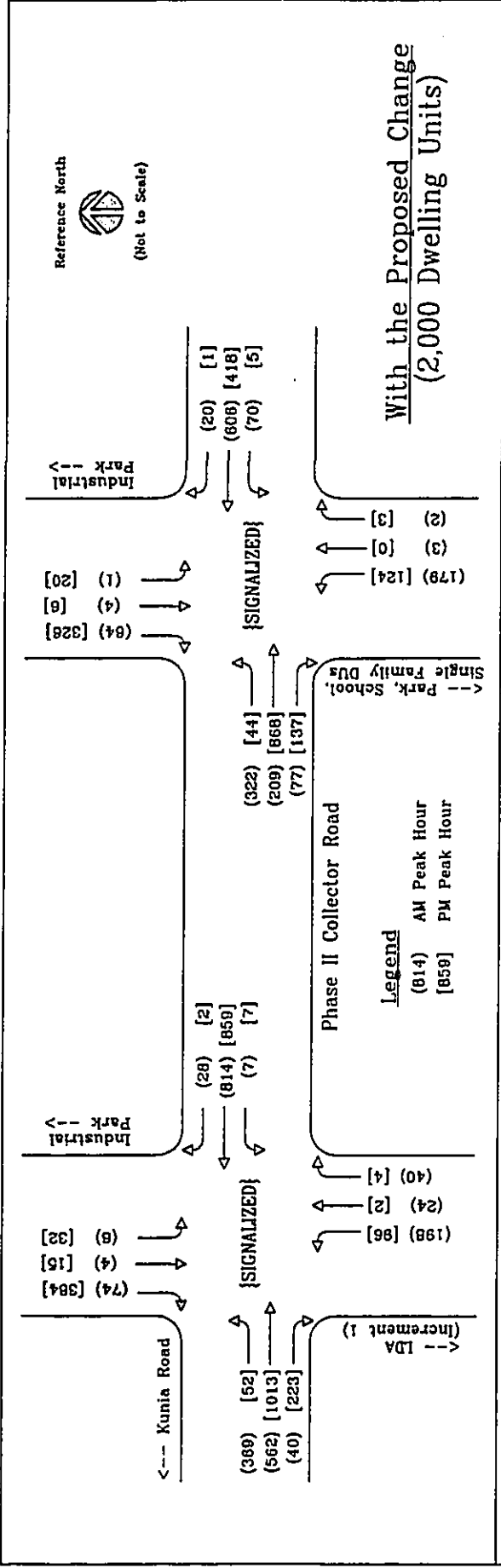
Traffic Impact Report
Royal Kunia Phase II
Increment Three

Traffic Assignments (2005)
Kunia Road & Collector Road

prepared for: Halekua Development Corporation

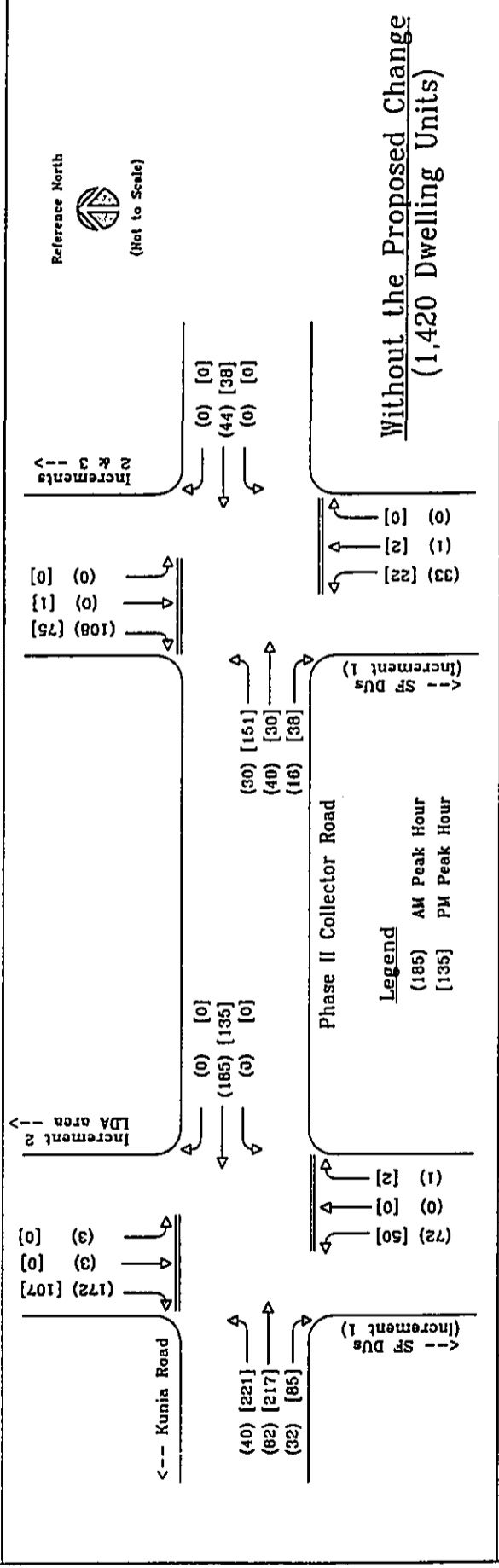
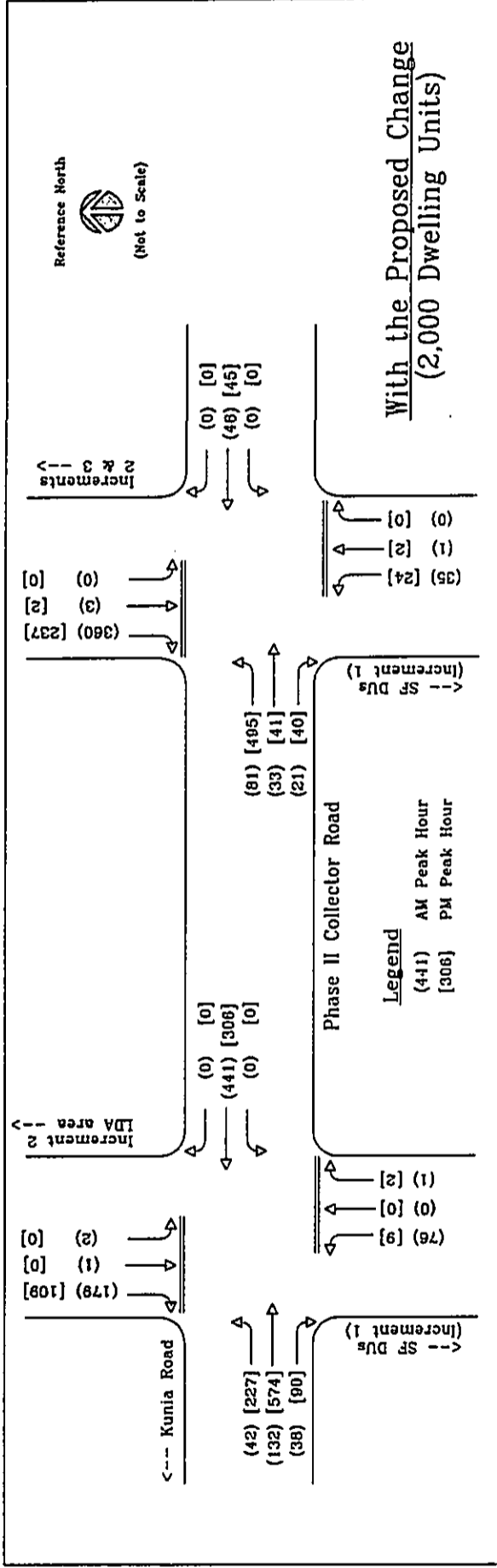
Exhibit
5

RK2-3TD.SKD 01/09/96



| | | | |
|---------------------------------|--|---|--------------|
| prepared by:
Julian Ng, Inc. | Traffic Impact Report
Royal Kunia Phase II
Increment Three | Traffic Assignments (2005)
Collector Road, west side | Exhibit
6 |
| January 1996 | prepared for: Halekua Development Corporation | | |

RK2-310.SKD 01/09/96



| | | | |
|---|--|--|--------------|
| prepared by:
Julian Ng, Inc.
January 1996 | Traffic Impact Report
Royal Kunia Phase II
Increment Three | Traffic Assignments (2005)
Collector Road, east side
prepared for: Halekua Development Corporation | Exhibit
7 |
|---|--|--|--------------|

APPENDIX F

**Royal Kunia, Phase II: Impact On City
And State Revenues And Expenditures**
Prepared By: Decision Analysts Hawaii, Inc.

**ROYAL KUNIA, PHASE II:
IMPACT ON CITY AND STATE REVENUES AND EXPENDITURES**

**PREPARED FOR:
Halekua Development Corporation**

**PREPARED BY:
Decision Analysts Hawaii, Inc.**

May 1996

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EXECUTIVE SUMMARY

The Royal Kunia, Phase II project, proposed by Halekua Development Corporation, will be located on about 655 acres of land in Central Oahu. This project will contain 2,000 townhouses and single-family homes at prices ranging from below \$100,000 to about \$350,000 (based on 1996 purchasing power of the dollars). Additional components of the project include a 123-acre business park, a 150-acre State agricultural park, a community park, and land for a school. The developer will provide road, water, drainage, and sewer improvements.

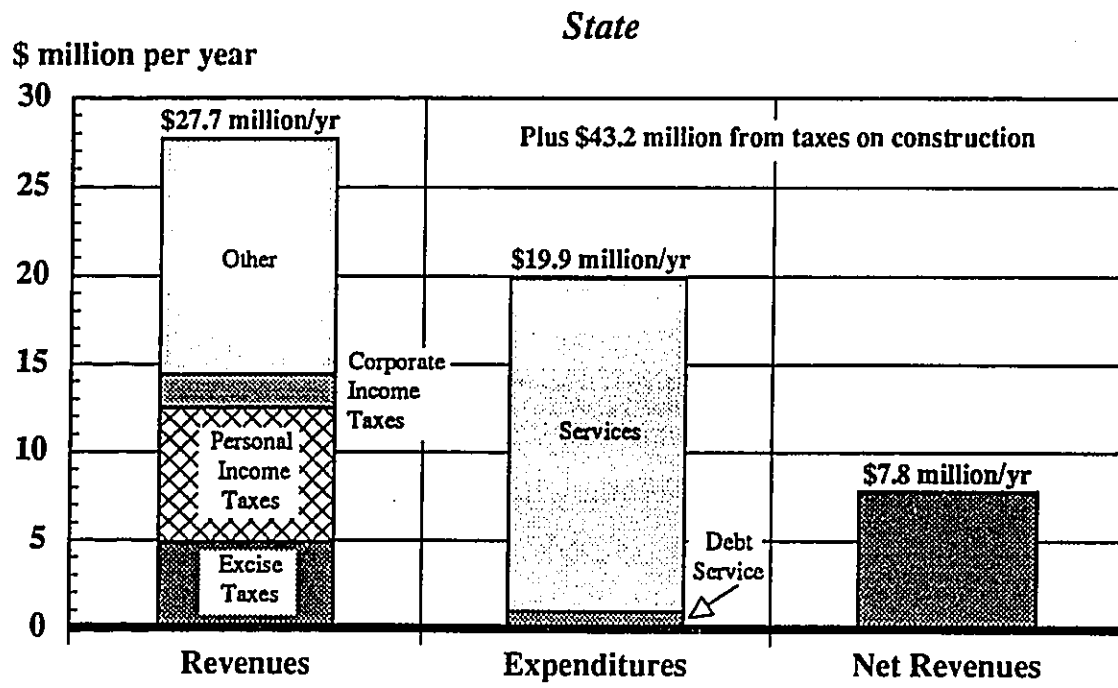
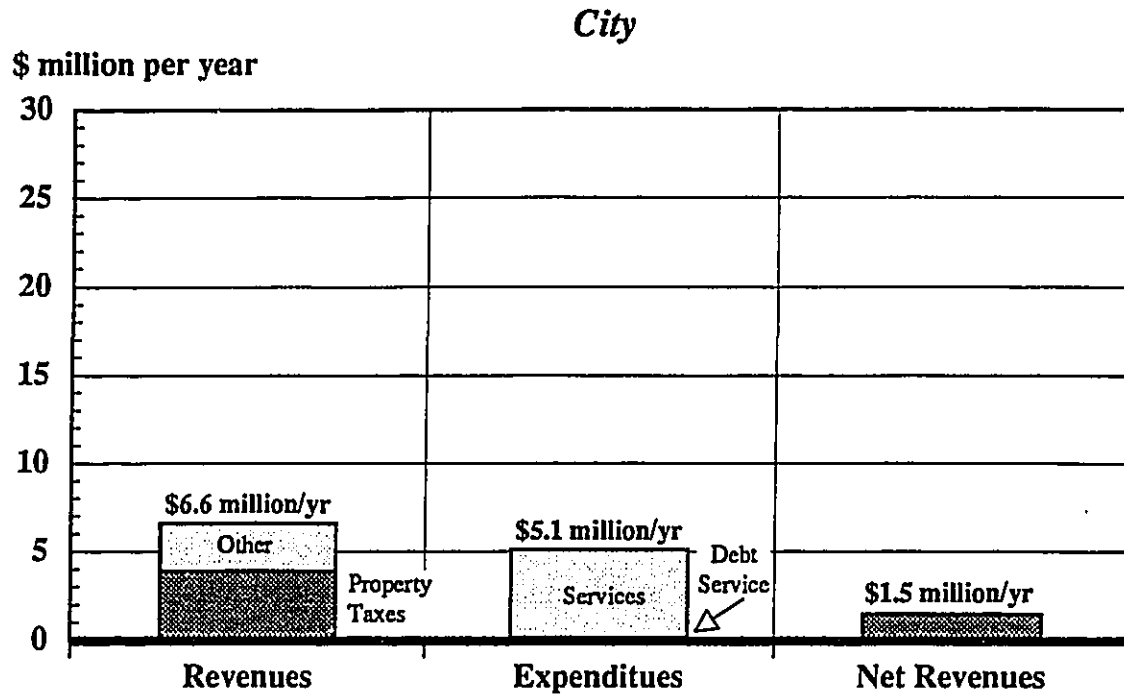
City and State revenues to be derived from this project are expected to be significant, and sufficient to allow government to afford the capital improvements and services required to accommodate the project. The revenues are expected to be sufficient to: (1) finance park and school improvements; (2) 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 full development, City revenues derived from Royal Kunia Phase II are projected to be \$6.6 million per year, while expenditures required to support the project will be about \$5.1 million (including debt service on park improvements), for a net income to the City of about \$1.5 million per year (see Figure ES-1).

For the State, revenues generated by construction activity are estimated at \$43.2 million. At full development of the project, State revenues derived from Royal Kunia, Phase II are projected to be about \$27.7 million per year, while expenditures required to support the project will be about \$19.9 million per year (including debt service on school improvements), for a net income to the State of about \$7.8 million per year.

In summary, Royal Kunia, Phase II will strengthen City and State finances by providing significant net income.

**Figure ES-1. Royal Kunia, Phase II:
Impact on City and State Revenues and Expenditures**
(Values in 1996 dollars)



ROYAL KUNIA, PHASE II: IMPACT ON CITY AND STATE REVENUES AND EXPENDITURES

INTRODUCTION

The Royal Kunia Phase II project, proposed by Halekua Development Corporation, will be located on about 655 acres of land in Central Oahu. The land is bounded on the east by Kunia Road, on the north by high-voltage electric lines of Hawaiian Electric Co., Inc., on the east by Waikele Gulch, and on the south by Royal Kunia Phase I.

Impacts of this project on City and State revenues and expenditures are summarized in this report. The estimates of government revenues to be derived from residents and business activities in the project include taxes (property, excise, income, and other taxes), user charges and fees, earnings, and all other sources of revenue. Government expenditures required to support the project cover capital improvements, debt service on these improvements, and all government services normally provided to residents and businesses (police, fire, waste disposal, transportation, health, education, general government, etc.). All values are expressed in 1996 dollars.

PROJECT DESCRIPTION AND ASSUMPTIONS

The components of Royal Kunia Phase II are shown in Table 1. As indicated, the project includes townhouses, single-family homes, a 123-acre Business Park, a 150-acre State Agricultural Park, 40 acres of park and open space, a school, and roads for internal circulation.

A total of 2,000 homes—750 townhouses and 1,250 single-family homes—are to be provided in a variety of floor plans. Of these, 200 “affordable” townhouses will be sold to families having incomes below 80% of the median family income of Oahu families, and 400 moderately-priced townhouses will be sold to families having incomes of 80% to 120% of the median. All the remaining townhouses and all single-family homes will be sold at market prices.

The Business Park will include space for light industry, with the floor area estimated at 20 percent of the land area. The Business Park is intended as a center to serve the needs of residents and businesses of Royal Kunia Phases I & II, Village Park, and other communities in Central Oahu and Ewa. Tenants may include construction companies which would use the area to store materials and equipment, and partially fabricated structures; construction- and housing-support companies such as those engaged in masonry, plumbing, electrical systems, glass, painting, floor-covering, roofing, cabinet-making, carpeting, window shades, air conditioners, alarm systems, yard supplies, furniture assembly and repair, appliance assembly and repair, etc.; warehousing for nearby businesses; storage for residents; and automotive maintenance and repair shops covering mechanical systems, electrical systems, radiators, air conditioners, body repair and painting, upholstering, tires, glass-tinting, alarm systems, etc.

Construction is projected to last for approximately 12 years, with the total construction cost estimated at about \$495 million for all on-site and offsite improvements, homes, and buildings, excluding the cost of the land, cost to obtain permits, interest costs, sales commissions, etc. The construction effort will require a total of about 4,560 man-years, which corresponds to an average on-site employment of about 380 construction jobs during the 12-year construction period. Construction labor costs will total about \$205 million, or an average payroll of approximately \$17 million per year. The average employment and annual payroll will fluctuate greatly from one year to the next, depending upon the phase of construction. Profits of construction companies and suppliers are estimated at \$74 million.

Measured in 1996 dollars, the property-tax base for Royal Kunia Phase II is projected to be about \$719 million at full development. Home prices are expected to range from under \$100,000 for the "affordable" townhouses to \$350,000 or more for market-priced single-family homes. The estimated property tax base for the project includes a home-owner exemption of \$40,000 per home. Larger exemptions for owners over age 55 are not assumed since nearly all buyers are expected to be under this age.

The light-industry space is expected to be valued at \$50 per square foot for improvements and about \$1.75 million per acre for land (about \$40 per sq. ft.). Agricultural land is valued at about \$1,000 per acre.

Eventually, Royal Kunia Phase II will house an estimated 6,250 residents, of which about 820 residents will be school-aged children who attend public schools.

Total household income for residents within the project is expected to reach about \$139 million per year. This figure is based on incomes which are consistent with the above home prices—annual incomes ranging from under \$40,000 to over \$80,000.

Retail purchases by the residents of Royal Kunia Phase II are estimated at \$70 million per year, based on approximately 50 percent of household income being spent on retail purchases. Wholesale sales are estimated at \$190 million per year, based on light-industry sales of \$175 per square foot, and farm sales of \$10,000 per acre.

On-site employment is projected to be about 1,300 jobs, most of which will be generated by light-industry activities within the Business Park. Additional employment will be available for farmers at the State Agricultural Park, and for grounds and home maintenance workers throughout the residential area. Total payroll for these jobs is estimated at \$38 million per year.

Profits related to the project are estimated at about \$30 million per year. This includes profits from retail purchases by the residents of Royal Kunia Phase II, suppliers of retail stores, and operations within the Business Park.

IMPACT ON CITY REVENUES AND EXPENDITURES

Table 2 shows the projected impact of Royal Kunia Phase II on City revenues and expenditures.

City Revenues

At full development, City revenues from Royal Kunia Phase II are expected to reach \$6.6 million per year, with \$3.9 million of this being derived from property taxes.

The remaining \$2.7 million per year derives from a variety of sources related to population. These revenues, which are estimated at \$430 per resident based on a detailed analysis of City & County finances, include various taxes, licenses, fees, grants and other sources of revenues which generally increase in proportion to population growth.

City Expenditures

Capital Improvements

Most of the capital improvements will be provided and/or financed by the developer. These items include land for park improvements, interior roads, the widening of Kunia Road along the project frontage, water developments and a distribution system, drainage, collector sewers and trunks, and the developer's fair-share of wastewater treatment facilities. Furthermore, the project will *not* require additional police or fire facilities. Also, solid waste disposal is financed via user charges.

The major capital improvement required by the City to support the project is a community park. The proportional share of its cost assignable to Royal Kunia Phase II amounts to \$2.5 million.

Annual Expenditures

At full development, total annual expenditures by the City in support of Royal Kunia Phase II will amount to about \$5.1 million per year. About \$200,000 per year

will be for debt service for the above-mentioned park improvements, based on a 6-percent, 20-year bond.

The remaining \$4.9 million per year will be for City services. These expenditures, which are estimated at \$780 per resident based on a detailed analysis of City & County finances, 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, police, fire, waste disposal, parks, streets maintenance, bus service, etc.

Net City Revenues

The difference between annual revenues and expenditures results in net revenues to the City of about \$1.5 million per year to be derived from Royal Kunia Phase II upon full development of the project.

IMPACT ON STATE REVENUES AND EXPENDITURES

Table 3 shows the projected impact of Royal Kunia Phase II on State revenues and expenditures.

State Revenues

Revenues from Construction Activity

For the State, construction activity is expected to generate a total of \$43.2 million in excise, personal-income, and corporate-income tax revenues during the 12-year construction period.

Excise tax revenues are based on a 4-percent excise tax on construction costs, plus an additional 1.5 percent in indirect excise taxes (called “tax pyramiding”) paid by various suppliers.

Annual Revenues

At full development, the increase in State tax revenues is expected to be \$27.7 million per year, with about half of the revenues being derived from (1) excise taxes related to retail purchases by residents and sales of on-site businesses, (2) personal income taxes paid by residents of the project, and (3) corporate income taxes paid by businesses which are supported by residents of the project and by on-site businesses. Income taxes received from on-site employees are excluded from the estimate of State revenues, since government expenditures to provide services to these employees are also excluded.

The remaining half of the revenues derives from a variety of sources related to population. These revenues, which are estimated at \$2,130 per resident based on a detailed analysis of State finances, include various taxes, licenses, fees, grants and other sources of revenue which generally increase in proportion to population growth.

State Expenditures

Capital Improvements

For the State, the major capital improvements required to support the project will be school improvements which are estimated at \$11.8 million. The fair share of freeway interchange and highway improvements is to be paid by the developer.

Annual Expenditures

At full development, total annual expenditures by the State in support of Royal Kunia Phase II will amount to about \$19.9 million per year. About \$1 million per year will be for debt service for school improvements, based on a 6-percent, 20-year bond.

The remaining \$18.9 million per year will be for State services. These expenditures, which are estimated at \$3,020 per resident based on a detailed analysis of State finances, 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. The

expenditures cover general government, education, culture, parks, health, highways maintenance, etc.

Net State Revenues

The difference between annual revenues and expenditures results in net revenues to the State of about \$7.8 million per year to be derived from Royal Kunia Phase II once full development is achieved.

SUMMARY

To summarize the previous discussion and the results of Tables 2 and 3, City and State revenues to be derived from Royal Kunia Phase II are expected to be significant, and sufficient to allow government to afford the capital improvements and services required to accommodate the project. The revenues are expected to be sufficient to: (1) finance park and school 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.

In combination, net revenues to the City and State are expected to total about \$9.3 million per year upon completion of the project. In addition, the State will net an estimated \$43.2 million in taxes related to construction activity.

**Table 1.— ROYAL KUNIA, PHASE II:
PROJECT DESCRIPTION AND ASSUMPTIONS**
[Values in 1996 dollars]

| Item | Amount |
|---|-------------------|
| PROJECT DESCRIPTION | |
| Land Area | |
| Townhouses | 67 acres |
| Single-Family Homes | 257 acres |
| Business Park | 123 acres |
| Agricultural Park | 150 acres |
| Park and Open Space | 40 acres |
| School | 8 acres |
| Roads | 10 acres |
| Total Area | 655 acres |
| Homes | |
| Townhouses | |
| Affordable Price (below 80% of median) | 200 homes |
| Moderate Price (80% to 120% of median) | 400 homes |
| Market Price | 150 homes |
| Total Townhouses | 750 homes |
| Single-Family Homes, Market Price | 1,250 homes |
| Total Homes | 2,000 homes |
| Business Park Floor Area (20% coverage) | 1,071,580 sq. ft. |
| CONSTRUCTION ACTIVITY | |
| Duration of Construction | 12 years |
| Construction Costs | |
| Infrastructure | \$ 85 million |
| Townhouses (\$140,000 per home) | 105 million |
| Single-Family Homes (\$200,000 per home) | 250 million |
| Business Park Improvements (\$50 per sq. ft.) | 55 million |
| Total Construction Costs | \$ 495 million |
| (Excludes cost of the land, cost to obtain permits,
interest costs, sales commissions, etc.) | |

**Table 1.— ROYAL KUNIA, PHASE II:
PROJECT DESCRIPTION AND ASSUMPTIONS**
[Values in 1996 dollars]
(continued)

| Item | Amount |
|--|------------------------|
| CONSTRUCTION ACTIVITY (continued) | |
| Construction Effort | |
| Infrastructure | 210 man-years |
| Townhouses (1.75 man-years per unit) | 1,310 man-years |
| Single-Family Homes (2 man-years per unit) | 2,500 man-years |
| Business Park (1 man-year per 2,000 sq. ft. of space) | 540 man-years |
| Total Construction Effort | 4,560 man-years |
| Average Construction Employment | 380 jobs |
| Construction Labor Costs | |
| Total Construction Payroll (\$45,000 per man-year) | \$ 205 million |
| Average Annual Construction Payroll | \$ 17 million per year |
| Profits of Construction Companies and Suppliers
(15% of Construction Costs) | \$ 74 million |
| INCREASED PROPERTY TAX BASE | |
| Townhouses | |
| Affordable Price (based on prices of recent sales) | \$ 24 million |
| Moderate Price (based on prices of recent sales) | 69 million |
| Market Price (based on prices of recent sales) | 30 million |
| Less Owner Exemption (\$40,000 per home) | -30 million |
| Assessed Value of Townhouses | \$ 93 million |
| Single-Family Homes | |
| Single-Family Homes (based on prices of recent sales) | \$ 406 million |
| Less Owner Exemption (\$40,000 per home) | -50 million |
| Assessed Value of Single-Family Homes | \$ 356 million |
| Improvements Component | \$ 200 million |
| Land Component | \$ 156 million |
| Business Park | \$ 270 million |
| (Cost of Industrial Improvements + \$1.75 million per acre for land) | |
| Agricultural Park (\$1,000 per acre) | \$ 0.2 million |
| Total Assessed Property Value | \$ 719 million |

**Table 1.— ROYAL KUNIA, PHASE II:
PROJECT DESCRIPTION AND ASSUMPTIONS**
[Values in 1996 dollars]
(continued)

| Item | Amount | |
|---|--------|------------------|
| POPULATION | | |
| Residents | | |
| Townhouses (2.5 people per home) | 1,875 | residents |
| Single-Family Homes (3.5 people per home) | 4,375 | residents |
| Total Residents | 6,250 | residents |
| Public-School Population (41 per 100 homes) | 820 | students |
| HOUSEHOLD INCOME | | |
| Townhouses | | |
| Affordable Price (\$40,000 per home) | \$ 8 | million per year |
| Moderate Price (\$55,000 per home) | 22 | million per year |
| Market Price (\$60,000 per home) | 9 | million per year |
| Single-Family Homes (\$80,000 per home) | 100 | million per year |
| Total Household Income | \$ 139 | million per year |
| SALES | | |
| Retail Purchases by Residents (50% of Household Income) | \$ 70 | million per year |
| Wholesale Sales, On-site | | |
| Business Park Sales (\$175 per sq. ft.) | \$ 188 | million per year |
| Farm Sales (\$10,000 per acre) | 2 | million per year |
| Total Wholesale Sales | \$ 190 | million per year |
| OPERATING EMPLOYMENT AND PAYROLL | | |
| Employment | | |
| Business Park (10 jobs per acre) | 1,230 | jobs |
| Agricultural Park (0.2 job per acre) | 30 | jobs |
| Grounds and Home Maintenance (1 job per 50 homes) | 40 | jobs |
| Total Employment | 1,300 | jobs |

**Table 1.— ROYAL KUNIA, PHASE II:
PROJECT DESCRIPTION AND ASSUMPTIONS**
[Values in 1996 dollars]
(continued)

| Item | Amount |
|---|-------------------------------|
| OPERATING EMPLOYMENT AND PAYROLL (continued) | |
| Payroll | |
| Business Park (\$30,000 per job) | \$ 37 million per year |
| Agricultural Park (\$20,000 per job) | 0.6 million per year |
| Grounds and Home Maintenance (\$20,000 per job) | 0.8 million per year |
| Total Payroll | <u>\$ 38 million per year</u> |
| PROFITS | |
| Retail Stores and Suppliers (15% of Retail Sales) | \$ 11 million per year |
| On-site Wholesale Sales (10%) | <u>19 million per year</u> |
| Total Profit | <u>\$ 30 million per year</u> |

**Table 2.— ROYAL KUNIA, PHASE II:
IMPACT ON CITY REVENUES AND EXPENDITURES**
[Values in 1996 dollars]

| Item | Amount |
|--|--------------------------------|
| CITY REVENUES at Full Development | |
| Property Taxes | |
| Townhouses (\$3.52 per \$1,000) | \$ 0.3 million per year |
| Single-Family Homes, Improvements (\$3.92 per \$1,000) | 0.8 million per year |
| Single-Family Homes, Land (\$3.12 per \$1,000) | 0.5 million per year |
| Business Park (\$8.51 per \$1,000) | 2.3 million per year |
| Agricultural Park (\$9 per \$1,000) | 0.0 million per year |
| Total Property Tax Revenues | \$ 3.9 million per year |
| Other Revenues (\$430 per resident) | \$ 2.7 million per year |
| Total Revenues | \$ 6.6 million per year |
| CITY EXPENDITURES at Full Development | |
| Capital Improvements | |
| Park Land (paid for or provided by developer) | \$ -- million |
| Park Improvements (proportional share of \$4 million in improvements which serve 10,000 residents) | 2.5 million |
| Police Station (no additional facility required) | -- million |
| Fire Station (no additional facility required) | -- million |
| Interior Roads (paid by developer) | -- million |
| Exterior Roads (fair share paid by developer) | -- million |
| Water Wells, Mains, Pumps, and Storage Tanks (paid by developer) | -- million |
| Drainage (paid by developer) | -- million |
| Collector Sewers and Trunks (paid by developer) | -- million |
| Wastewater Treatment Plant Expansion (fair share paid by developer) | -- million |
| Solid Waste Disposal (financed with user charges) | -- million |
| Total Capital Improvements | \$ 2.5 million |
| Annual Expenditures | |
| Debt Service (6%, 20-year bonds) | \$ 0.2 million per year |
| Services (\$780 per resident) | 4.9 million per year |
| Total Annual Expenditures | \$ 5.1 million per year |
| NET CITY REVENUES at Full Development | \$ 1.5 million per year |

**Table 3.— ROYAL KUNIA, PHASE II:
IMPACT ON STATE REVENUES AND EXPENDITURES**
[Values in 1996 dollars]

| Item | Amount |
|--|---------------------------------|
| STATE REVENUES from Construction Activity | |
| Excise Taxes on Construction Costs (5.5% with pyramiding) | \$ 27.2 million |
| Personal Income Taxes on Total Construction Payroll (5.5%) | 11.3 million |
| Corporate Income Taxes on Profits (6.4%) | 4.7 million |
| Total Taxes from Construction Activity | \$ 43.2 million |
| STATE REVENUES at Full Development | |
| Excise Taxes | |
| Retail Purchases by Residents (5.5% with pyramiding) | \$ 3.9 million per year |
| Wholesales Sales, On-site (0.5%) | 1.0 million per year |
| Total Excise Taxes | \$ 4.9 million per year |
| Personal Income Taxes, Residents (5.5% of Household Income) | \$ 7.6 million per year |
| Corporate Income Taxes on Profits (6.4%) | \$ 1.9 million per year |
| Other Revenues (\$2,130 per resident) | \$ 13.3 million per year |
| Total Revenues | \$ 27.7 million per year |
| STATE EXPENDITURES at Full Development | |
| Capital Improvements | |
| School Improvements
(23 students per classroom, and \$330,000 per classroom
and associated improvements) | \$ 11.8 million |
| Freeway Interchange and Highway Improvements
(fair share paid by developer) | -- million |
| Total State Capital Improvements | \$ 11.8 million |
| Annual Expenditures | |
| Debt Service (6%, 20-year bonds) | \$ 1.0 million per year |
| Services (\$3,020 per resident) | 18.9 million per year |
| Total Annual Expenditures | \$ 19.9 million per year |
| NET STATE REVENUES at Full Development | \$ 7.8 million per year |

REFERENCES

City & County of Honolulu. *The Executive Program and Budget, annual*. Honolulu, Hawaii.

Hawaii Department of Business, Economic Development & Tourism. *The State of Hawaii Data Book, annual*. Honolulu, Hawaii.

State of Hawaii. *State of Hawaii Comprehensive Annual Financial Report, annual*. Honolulu, Hawaii.

APPENDIX G

**Royal Kunia Phase II - Increment III
Engineering Study**
Prepared By: ParEn, Inc.

*Royal Kunia Phase II - Increment III
Engineering Study*

SUMMARY

INTRODUCTION

The purpose of this engineering study is to present preliminary engineering information for the proposed Royal Kunia Phase II - Increment III Development. Specifically, this report will include the following:

1. Project Description
2. Physical Environment
3. Water System
4. Wastewater System
5. Solid Waste and Disposal
6. Drainage and Grading
7. Traffic
8. Electrical and Communication Systems

DEVELOPMENT SUMMARY

| | |
|--------------------------|---|
| Applicant: | Halekua Development Corporation
2024 North King Street
Honolulu, Hawaii 96819 |
| Consultant: | ParEn, Inc., dba Park Engineering
567 South King Street, Suite 300
Honolulu, Hawaii 96813 |
| Project Name: | Royal Kunia Phase II - Increment III |
| Project Location: | Hoaeae & Waikele, Ewa, Oahu |
| Tax Map Key: | 9-4-02 : Por 1 |
| Project Area: | 156.8± acres to be developed |
| Existing Use: | Agriculture, fallow sugarcane areas |
| Proposed Use: | Single Family Dwellings |
| State Land Use District: | Urban |

*Royal Kunia Phase II - Increment III
Engineering Study*

Development
Plan Designation:

Single Family Dwellings

Zoning:

Ag-1 Restricted Agriculture

Royal Kunia Phase II - Increment III
Engineering Study

1.0 PROJECT DESCRIPTION

1.1 LOCATION AND SIZE

The proposed development site is located at Hoaeae & Waikele, Ewa, Oahu, Tax Map Key: 9-4-02 : Por 1. See Figure 1 - Vicinity Map. The parcel is located approximately 1.2 miles north of Kunia Interchange of Interstate Route H-1.

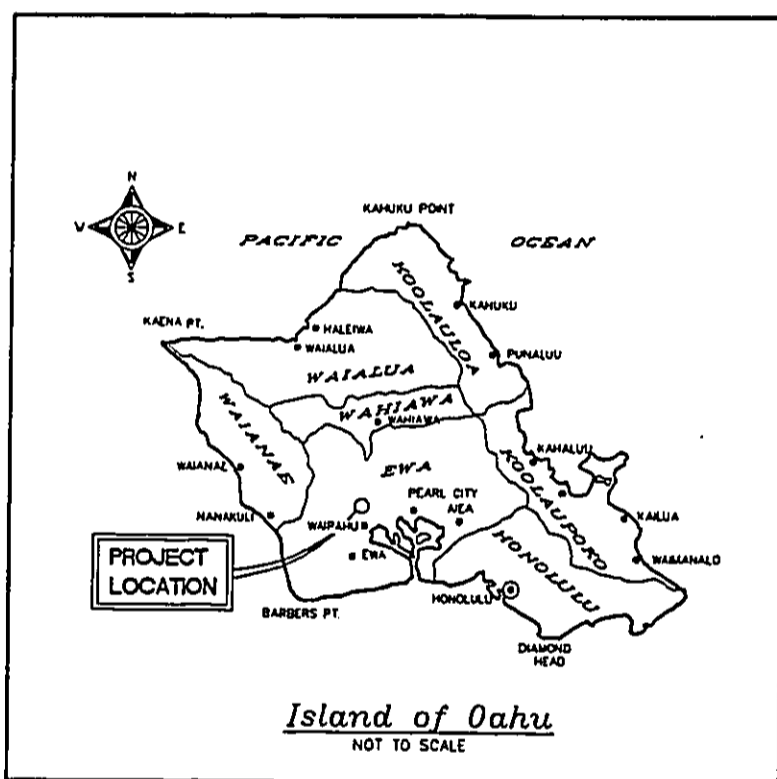
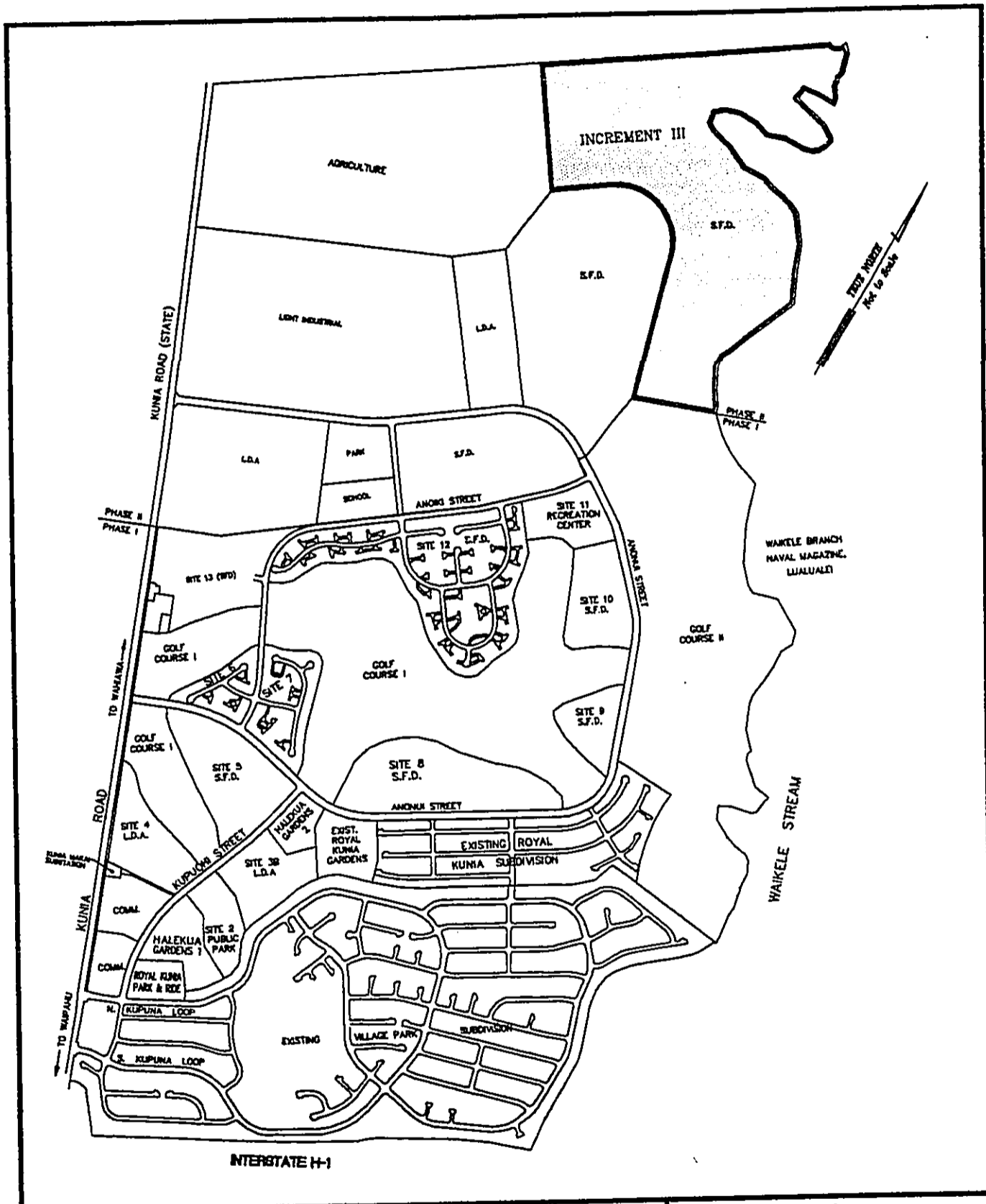


Figure 1 - Vicinity Map

The entire Royal Kunia Phase II project area is about 655± 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. Increment III is about 156.8± acres in size and is located on the right side of Royal Kunia Phase II. See Figure 2 - Location Map.



Prepared for:
Halekua Development Corporation

Royal Kunia Phase II - Increment III
 HOAEEAE & WAIKELE, EWA, OAHU, HAWAII

LOCATION MAP

ParEn, Inc.
 dba Park Engineering
 Engineers, Surveyors, Planners

FIGURE 2

HAWAIIAN ARCHITECTURAL CENTER
 1001 KALANOAU AVENUE, SUITE 100, HONOLULU, HAWAII 96813
 TEL: 808-943-1111 FAX: 808-943-1112
 WWW.HAIAHAWAII.COM

*Royal Kunia Phase II - Increment III
Engineering Study*

1.2 LAND USE PLAN

The land use plan of Royal Kunia Phase II - Increment III (See Figure 3 - Land Use Plan) would comprise of the following land use components:

| LAND USE | ACRES | UNITS |
|---------------|-------|-------|
| Single-Family | 156.8 | 581 |

1.2.1 Residential/Apartment

This project proposes 581 single-family units, which is approximately 3.7 units per residential-acre.

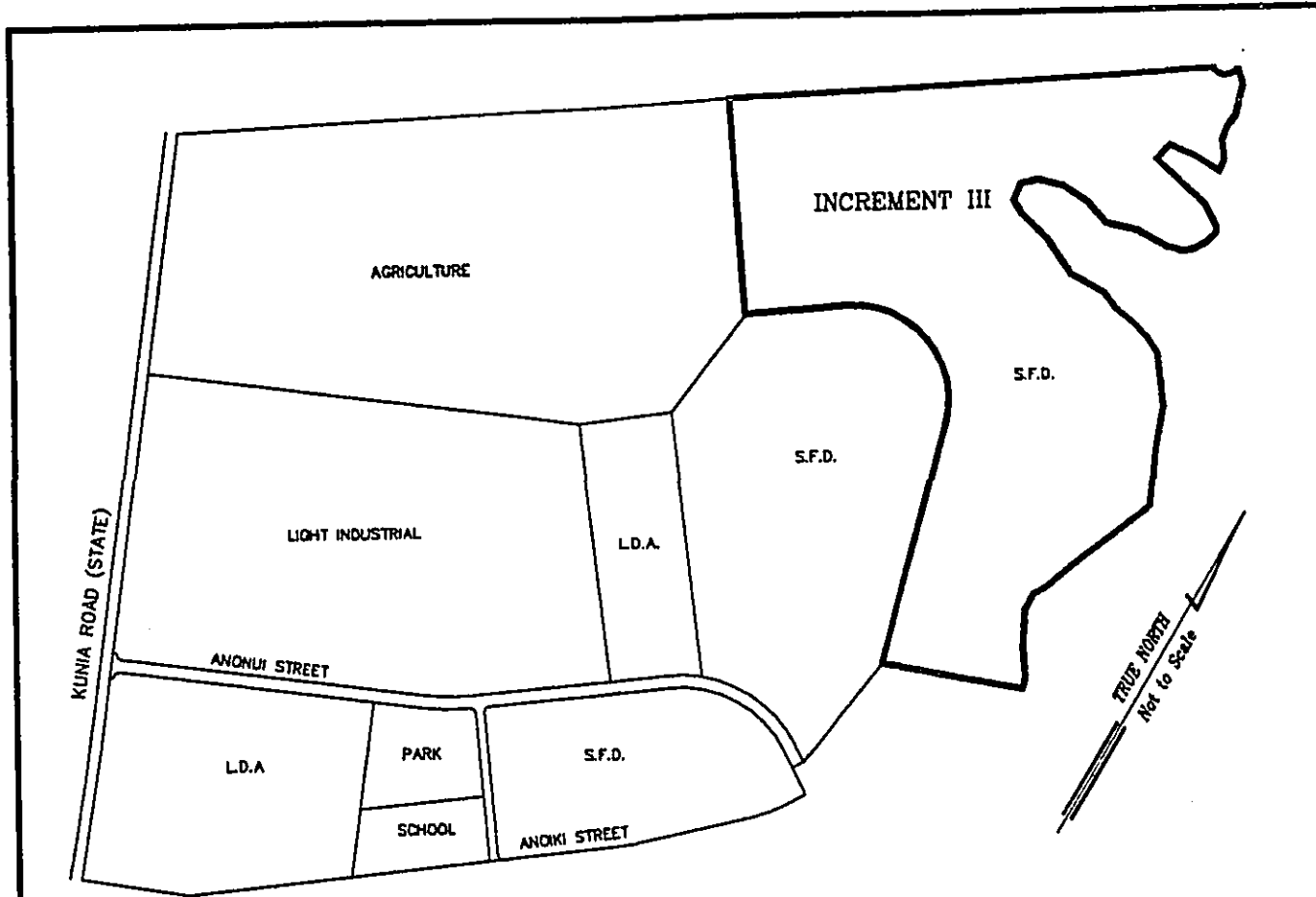
2.0 PHYSICAL ENVIRONMENT

2.1 Topography

Aerial photo contour maps of the area indicates that the site is fairly uniform with slopes in the southeasterly direction at a gradient of 2 - 6%. Two (2) drainageways traverse the middle section of the site. The ground elevations range from approximately 450 - 575 feet mean sea level. The site is comprised of fallow land.

2.2 Soils

Red to reddish brown residual soils are generally found on the site. A soils investigation conducted for Royal Kunia Phase I indicated that the subsurface soils are underlain by rocks with encounters of boulders and cobblestones.



Royal Kunia Phase II

| <u>LAND USE</u> | <u>AREA (ac.)</u> | <u>UNITS</u> |
|-------------------|-------------------|--------------|
| Agricultural Park | 150 | |
| Residential | 257 | 1250 |
| Apartments | 67 | 750 |
| Light Industrial | 123 | |
| Park / Open Space | 40 | |
| School | 8 | |
| Major Roads | 10 | |
| | <u>655</u> | <u>2000</u> |

Prepared for:

Halekua Development Corporation

Royal Kunia Phase II - Increment III
HOAEAE & WAIKELE, EWA, OAHU, HAWAII

LAND USE MAP



ParEn, Inc.
dba Park Engineering
Engineers, Surveyors, Planners

FIGURE 3

Royal Kunia Phase II - Increment III
Engineering Study

The U.S. Department of Agriculture Soil Conservation Service classifies the soils as Molokai silty clay loam (MuB, MuD) and Lahaina silty clay (LaA, LaB). The Molokai and Lahaina Series have similar characteristics - they are moderately permeable and have slight to moderate erosion hazards.

Under the Unified Soil Classification System, which is used for engineering purposes, the soils are classified as MH and ML. The "M" indicates that the soils are silt with high ("H") and low ("L") liquid limits.

The above-mentioned soil types are generally suitable for the development of the proposed land uses. A Soil Reconnaissance Report for Royal Kunia Phase II will be done in the future to assist the design and construction process of this development.

2.3 Climate

The project site is located on the leeward side of the island of Oahu. The elevations range from approximately 450 - 575 feet mean sea level. The annual rainfall of this area ranges from approximately 32 - 40 inches. The site generally receives most of this rainfall during "Kona" storms from the southwest and convective storms. These storms are characterized as having intense rainfall rates over a short duration. The site also experiences rainfall generated from the northeasterly trade winds impinging on the Koolau Mountain Range. The average annual maximum and minimum temperatures are approximately 79°F and 64°F, respectively.

2.4 Hazards

The probability for flooding and earthquakes are very low for the project site. According the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map, the site is located on land designated Zone D, an area which flood hazards are undetermined. The seismic risk classification for the entire island of Oahu is Zone 2 (Uniform Building Code). Zone 2a indicates that the island is subject to minor earthquake damage.

*Royal Kunia Phase II - Increment III
Engineering Study*

3.0 WATER SYSTEM

3.1 Existing Facilities

The existing Village Park Subdivision and a portion of Royal Kunia Phase I are currently serviced by Kunia Wells #1, #2 and #3. Source and storage facilities at the site are located about 0.8 miles above Village Park along Kunia Road (440' Reservoir Site) and 0.8 miles above the Phase I / Phase II border along Kunia Road (665' Reservoir Site).

These sites include the following facilities:

| 440' Reservoir Site | 665' Reservoir Site |
|--|---|
| <ol style="list-style-type: none">1. 1.0 MG Reservoir2. 1.5 MG Reservoir3. Deep Wells #1, #2 & #34. Granular Activated Carbon (GAC) Treatment System for contaminant removal5. Booster Pumps | <ol style="list-style-type: none">1. 1.5 MG Reservoir |

3.2 Potable Water Requirements

The development of Royal Kunia Phase II - Increment III will require approximately an average flow of 0.29 MGD. The flow requirement was computed according to the Board of Water Supply, City and County of Honolulu, Water System Standards, Volume 1, 1985, as amended, as follows:

| LAND USE | FLOW REQUIREMENT |
|------------------------|------------------------------|
| Single Family Dwelling | 500 gallons per unit per day |

*Royal Kunia Phase II - Increment III
Engineering Study*

3.3 New Facilities

A Water Master Plan dated September 1992 has been approved by the Board of Water Supply on October 22, 1992 .

To satisfy Royal Kunia Phase IB and Royal Kunia Phase II potable water needs, new well sources, Well #4 and Well #5, respectively, will be developed together with GAC treatment facilities, if necessary and booster pumps at the existing 440' Reservoir Site. In addition, a 2.0 MG storage tank will be constructed at the existing 665' Reservoir Site. See Exhibit 1 - Potable Water Facilities.

4.0 WASTEWATER SYSTEM

4.1 Existing System

The sewer system in Royal Kunia Phase I and the 24" sewer trunk line are existing sewer facilities. This system will be utilized to carry the wastewater from Royal Kunia Phase II - Increment III to the existing Waipahu Pump Station on Depot Road.

4.2 Wastewater Flow Requirement

The development of Royal Kunia Phase II - Increment III will generate approximately an average wastewater flow of 0.19 MGD. The flow requirement was computed according to the City and County of Honolulu, Design Standards of the Department of Wastewater Management, Volume 1, July 1993, as amended, as follows:

| LAND USE | FLOW REQUIREMENT |
|------------------------|------------------------------|
| Single Family Dwelling | 320 gallons per unit per day |

*Royal Kunia Phase II - Increment III
Engineering Study*

4.3 New Facilities

A Sewer Master Plan dated October 1993 has been approved by the City and County of Honolulu on November 3, 1993.

Wastewater from the development will be collected by a network of pipes and will flow through Royal Kunia Phase I, through an existing 24" trunk line to the existing Waipahu Sewage Pump Station on Depot Road. The wastewater will then be pumped from the pump station to the Honouliuli Wastewater Treatment Facility.

The Royal Kunia Phase II sewer connection schedule will be coordinated with the Department of Wastewater Management who is in the process of expanding the existing Honouliuli Wastewater Treatment Plant.

5.0 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 portions of Royal Kunia Phase I. Within the Ewa area, the City and County operates the Waipahu Incinerator.

5.2 Solid Waste Generation

After the Royal Kunia Phase II - Increment III is fully developed, it would generate approximately 4.6 tons of residential solid waste per day.

A solid waste management plan will be coordinated with the City and County of Honolulu, Division of Refuse and the State Department of Health. This plan will aid in the reduction of solid waste produced by this development. A recycling program may be one of the major components of this plan.

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 the City and County of Honolulu, Division of Refuse and Collection Disposal to service single family dwellings.

6.0 DRAINAGE AND GRADING

6.1 Existing Conditions

Based on aerial photo contour maps, the area of the Royal Kunia Phase I & II developments are located within six drainage basins. See Exhibit 2 - Existing Drainage Conditions. 70% of the total drainage areas flows toward the existing Village Park Subdivision and 30% of the area flows into Waikele Stream.

6.2 Proposed Improvements

A Drainage Master Plan for the Royal Kunia Phase II development, dated September 1995, has been approved by the City and County of Honolulu, Department of Public Works. A revised Drainage Master Plan was submitted to the Department of Public Works to reflect the new Phase II development configuration.

Approximately 50% of the runoff generated by the new development will flow to the existing Village Park drainage facilities. Approximately 40% of the runoff generated will be detained and diverted into a detention basin within the Phase II project. This runoff will then flow into a detention basin within Golf Course II and eventually into Waikele Stream. This method of storm drainage discharge has been approved by the Navy with the Royal Kunia Golf Course II Drainage Master Plan. Approximately 10% of the total runoff which consist mainly of agricultural runoff will discharge down a gully and into Waikele Stream.

The runoff generated by the new development which discharges into Waikele Stream will not increase from existing conditions.

6.3 Grading

Grading will be performed in accordance with Chapter 14, Articles 13, 14, 15 and 16, Grading, Soil Erosion and Sediment Control, of the revised Ordinances of Honolulu, 1990, as amended. Grading is expected to encompass the entire project site. Erosion control measures will be implemented as outlined in the City and County of Honolulu Soil Erosion Standards and Guidelines, November 1975.

*Royal Kunia Phase II - Increment III
Engineering Study*

A Notice of Intent for the National Pollutant Discharge Elimination System (NPDES) General Permit Coverage for Discharge of Storm Water Associated with Construction Activity at Royal Kunia Phase II will be acquired from the State Department of Health (DOH). Also, site specific supplemental plans will be submitted to DOH as the individual projects receive City approval. The above-mentioned application will include best management plans (BMP) to help control and reduce the discharge of pollutants into state waters. The following BMP's may be implemented:

| Non-structural | Structural |
|--|---|
| <ul style="list-style-type: none"> 1. Temp. & Perm. Seeding and Planting 2. Mulching 3. Temp. Wind Barriers | <ul style="list-style-type: none"> 1. Earth Dikes 2. Drainage Swales 3. Temp. & Perm. Interceptor Ditches 4. Sediment Traps |

7.0 TRAFFIC

7.1 Existing Streets and Highways

The proposed development is located in the middle of the Phase II project. Between the interchange and the development, there are two intersections on Kunia Road for access to the existing Village Park Subdivision and one intersection on Kunia Road for access to the Royal Kunia Phase I project. A fourth intersection on Kunia Road will be constructed with the Royal Kunia Phase II - Increment I project for access to the Royal Kunia Phase II 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.

7.2 Proposed Major Streets

A 90-ft. wide roadway will be constructed with the Royal Kunia Phase II - Increment II project. This roadway will be extended to provide access to Increment III.

8.0 ELECTRICAL AND COMMUNICATION SYSTEMS

8.1 Existing Systems

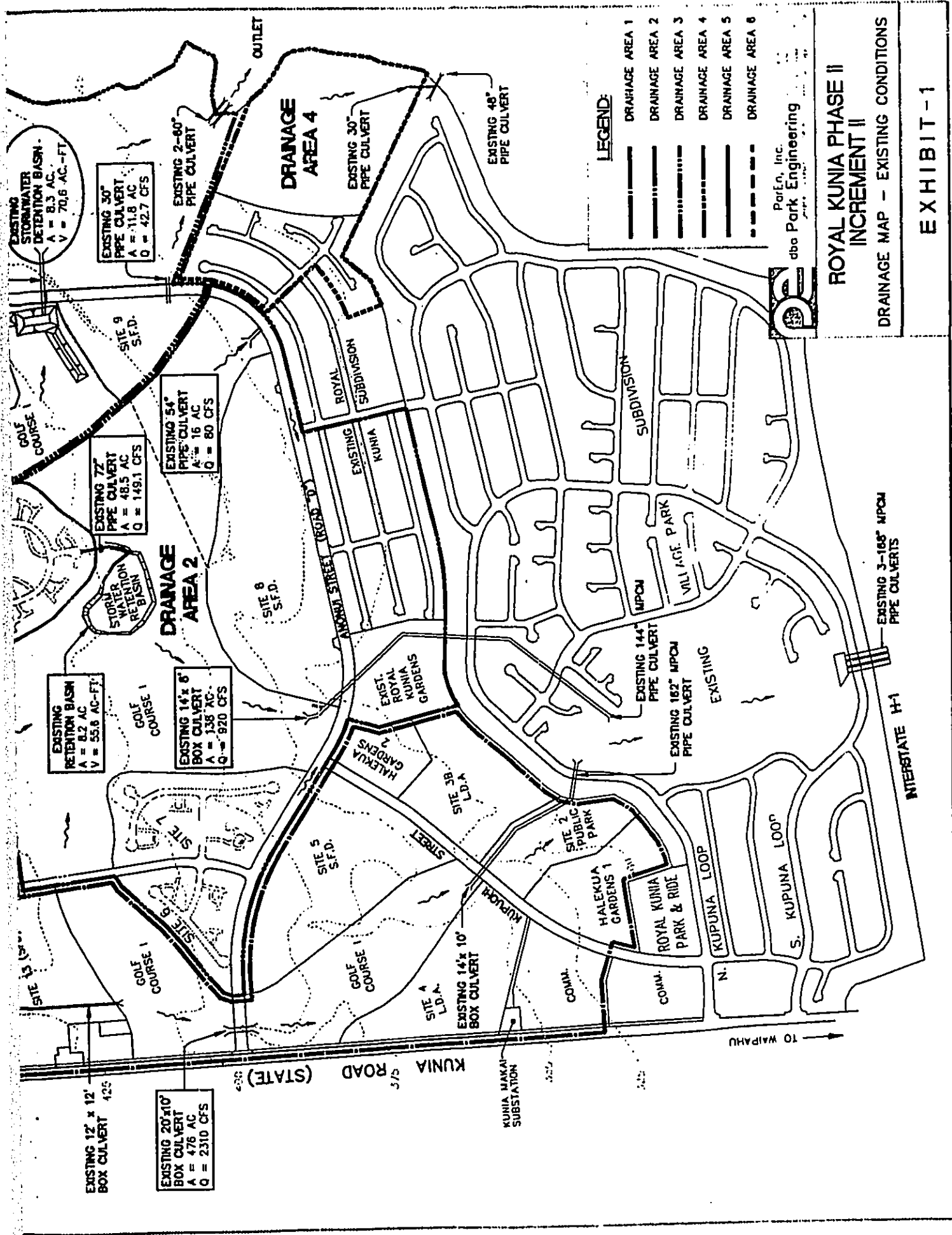
The existing Hawaiian Electric Company (HECO) substation may be inadequate to service the expansion. The existing Hawaiian Telephone Company (HTCO) substation is adequate to serve both Royal Kunia Phase I & II

8.2 Proposed Improvements

The following improvements may be installed by HECO with the development of Royal Kunia Phase II:

1. A new substation
2. A single overhead steel pole line to extend the two (2) 46 KV circuits.
3. A new 12 KV distribution circuit system originated from the new substation.

The HTCO facilities will be extended to the project site from the HTCO Remote Office provided for Royal Kunia Phase I.



LEGEND:

- DRAINAGE AREA 1
- DRAINAGE AREA 2
- DRAINAGE AREA 3
- DRAINAGE AREA 4
- DRAINAGE AREA 5
- DRAINAGE AREA 6

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 dba Park Engineering

**ROYAL KUNIA PHASE II
 INCREMENT II**

DRAINAGE MAP - EXISTING CONDITIONS

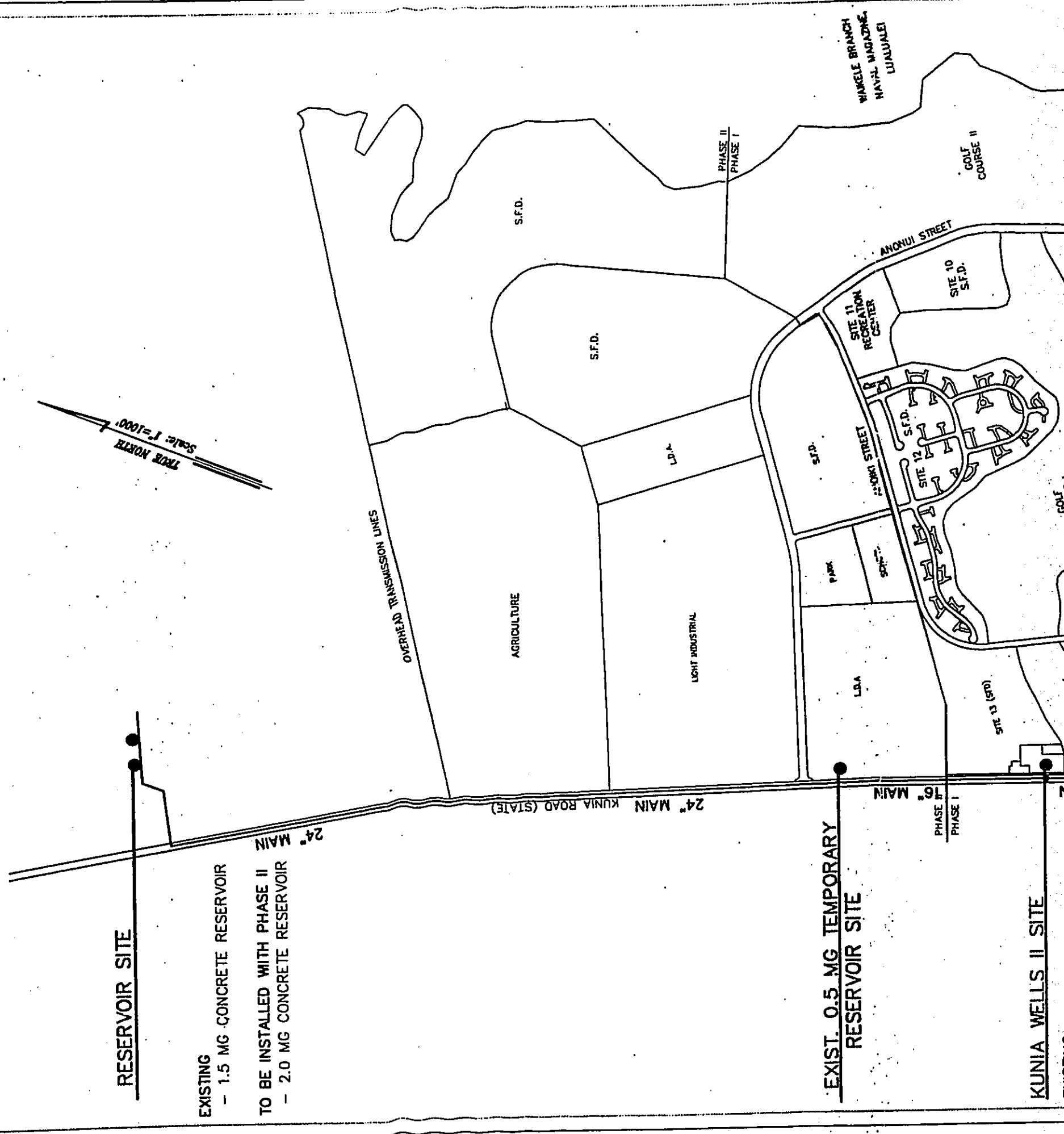
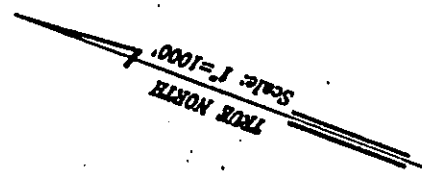
EXHIBIT - 1

RESERVOIR SITE


EXISTING
 - 1.5 MG CONCRETE RESERVOIR
 TO BE INSTALLED WITH PHASE II
 - 2.0 MG CONCRETE RESERVOIR

**EXIST. 0.5 MG TEMPORARY
 RESERVOIR SITE**

KUNIA WELLS II SITE






 Park Engineering, Inc.
 c/o Park Engineering
 1000 KUPUNA LOOP
 KUNIA, HAWAII 96706
 (808) 253-1111
**ROYAL KUNIA PHASE II
 INCREMENT II
 POTABLE WATER FACILITIES**
EXHIBIT - 2

KUNIA WELLS II SITE

- EXISTING**
- 3 DEEP WELLS (#1, #2 & #3)
 - 3 BOOSTER PUMPS
 - 6 GRANULAR ACTIVATED CARBON UNITS

- TO BE INSTALLED WITH PHASE I B**
- 1 DEEP WELL (#4)
 - 1 BOOSTER PUMPS
 - 2 GRANULAR ACTIVATED CARBON UNITS (IF NECESSARY)

- TO BE INSTALLED WITH PHASE II**
- 1 DEEP WELL (WELL #5)
 - 1 BOOSTER PUMP
 - 2 GRANULAR ACTIVATED CARBON UNITS (IF NECESSARY)

PHASE I
PHASE I

20' MAIN

ROAD TO WAHIAWA

KUNIA WELLS II SUBSTATION

KUNIA

TO WAPAHU

INTERSTATE H-1