DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
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FRANK F. FASI
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DIRECTOR

FILE COPY

87/EIS-9(AC)

December 30, 1987

Marvin T. Miura, Ph. D
Interim Director
Office of Environmental Quality Control
State of Hawaii
Kekuanaoa Building, Room 104
465 South King Street
Honolulu, Hawaii 96813

Dear Dr. Miura:

Final Environmental Impact Statement (EIS)
West Loch Estates, Ewa, Oahu
Tax Map Key: 9-1-17: 06

We are notifying you that the above is an acceptable EIS document, pursuant to Chapter 343, HRS, and Title 11, Administrative Rules, Department of Health, Chapter 200, Environmental Impact Statement Rules.

A copy of our Acceptance Report is attached. If there are any questions, please contact Art Challacombe of our staff at 523-4648.

Very truly yours,

John P. Whalen

JOHN P. WHALEN
Director of Land Utilization

JPW:fm
cc: DPW
1550B

DEPARTMENT OF LAND UTILIZATION (DLU)
87/EIS-9(AC)

ACCEPTANCE REPORT: WEST LOCH ESTATES ENVIRONMENTAL IMPACT STATEMENT (EIS)
CHAPTER 343, HRS
EWA, OAHU, HAWAII
CITY & COUNTY OF HONOLULU
DEPARTMENT OF HOUSING & COMMUNITY DEVELOPMENT (DHCD)
TAX MAP KEYS: 9-1-17: 06

A. BACKGROUND

The City and County of Honolulu Department of Housing and Community Development (DHCD) is proposing to develop a master planned residential community to meet a portion of the housing needs of the residents of Oahu. The Master Plan provides for 1,500 residential units on approximately 255 acres to meet the needs of the following types of home buyers: elderly, gap group, and market. In addition to the residential development, the plan provides recreational opportunities, a small commercial center, a day care facility, a park and ride facility and an extensive open space/green belt network. The proposed project is located approximately 17 miles west of the Primary Urban Center of Honolulu on the Ewa Plain south of Waipahu.

The City and County of Honolulu, in its issue paper "Oahu's Affordable Housing Crisis (1987)," has estimated that approximately 40,000 affordable housing units are needed to meet the housing needs of the residents of Oahu. In order to meet a portion of this housing demand, the DHCD is proposing to use the provisions of Chapter 46-15.1 (HRS) which allows the City to plan for a housing mix of 60 percent affordable units and 40 percent market units. Under this concept, net income derived from the sale of the market units within the development would be used to maximize the affordable housing objectives of the project.

The City and County is targeting the affordable units in this project for the gap group housing market. The DHCD has defined the gap group household as one whose income is too high to qualify for government assisted rental housing, but is often too low to qualify for conventional financing of a market priced house. The targeted gap group family's income falls within the 81-120 percent range of the County's median family income.

The Master Plan provides for the development of this project in two increments. These units will include a variety of housing opportunities primarily for gap group buyers. Throughout both increments a mix of housing types (market and affordable) will be integrated although certain overriding factors will determine placement of each housing type. The

market units will be located in areas where views of the golf course and shoreline are enhanced to maximize their desirability and in turn command the highest sales prices.

Increment I is bordered on the east by OR & L Railroad right-of-way, on the north by the Waipahu Industrial Park, Fort Weaver Road on the west, and on the south by the proposed 18-hole municipal golf course. Increment I will consist of approximately 600 units. A major feature of Increment I will be its access to the proposed shoreline park and golf course. Another feature of this increment is the proposed open space/green belt network, which can be accessed by all homeowners.

Increment II is bordered by Fort Weaver Road to the west, the proposed golf course to the north, West Loch to the east, and the railroad right-of-way to the south. Increment II will consist of approximately 900 units of which 150 will be elderly rental units. The elderly housing complex will be conveniently located close to the major access roads, public transportation and commercial facilities. The features are intended to encourage their interaction with the surrounding community to participate in a variety of activities.

Community facilities have been located along the major loop road to allow convenient access via auto, bicycle, and pedestrians. A proposed district park located near the entry of Increment II will serve a growing region with active recreation facilities such as a gymnasium, play fields, courts, and a recreation center. The park and ride facility is strategically located in the same area as the district park and day care facility so that it can be utilized on weekends to support park activities, in addition to providing convenient access to the mass transit system and reducing traffic congestion.

B. PROCEDURE

1. An EIS Preparation Notice (EISPN) was published in the "Office of Environmental Quality Control (OEQC) Bulletin" of July 8, 1987 under the Register of Chapter 343, HRS documents. The applicant distributed copies to 65 parties including Federal, State and City agencies.

2. Comments on the EISPN were received from 25 parties. The applicant transmitted responses to these comments and addressed them in the EIS. The comments and responses on the EISPN are included in Chapter XI of the Final EIS.

3. On October 1, 1987, the DHCD submitted copies of the Draft EIS to the OEQC and the DLU pursuant to the requirements of the Chapter 343, HRS. The Notice for the Draft EIS was published in the "OEQC Bulletin" of October 8, 1987. The deadline for comments was set for November 23, 1987.

4. Nineteen (19) parties responded to the DHCD request by November 23, 1987. The DHCD made point-by-point responses to all substantive comments.

5. The Final EIS was submitted to the DLU on December 17, 1987. Notice of the Final EIS was published in the December 23, 1987 "OEQC Bulletin."

In conclusion, the DLU finds that the applicant has complied with the EIS procedures in accordance with Chapter 200 of Title 11, Environmental Impact Statement Rules, Sub-Chapter 7, Sections 11-200-20, 21, and 22.

C. EIS CONTENT

The Final EIS consists of a single volume, containing the EIS, the comments, and ten other appendices. The latter include: Botanical Study; Wildlife Study; Noise Study; Air Study; Archaeological Study; Traffic Study; Social Impact Study; Market Study; Geotechnic Study; and Agricultural Economics Study.

The Final EIS includes additions, revisions, and clarifications. These principally include the following:

1. Subsection 4.1.3 "Soil Types & Ratings," has been updated to state that the project parcels are located within the designated flood zones as revised by the Federal Emergency Management Agency (FEMA) on September 4, 1987.

2. Figures 4 and 5 representing "Prime" agricultural lands under the ALISH system (Agricultural Lands of Importance to Hawaii) and under the Detailed Land Classification System have been added to the text of the EIS.

3. Paragraph 3 of Section 5.2, "Soils" has been deleted.

4. Section 5.3, "Traffic" has been revised to state that the West Loch Estates project will have only a slight impact on regional transportation facilities and that the long-term cumulative impact of the project on Farrington Highway was not examined because of insufficient information on planned and proposed projects in the leeward area.

   Also added to Section 5.3 is a statement acknowledging that access to and from the H-1 Highway will be impacted to a limited degree by development of the project.

5. Section 5.7, "Wildlife" has been revised in response to concerns expressed by the U. S. Fish & Wildlife Service. The revisions state the following: there may likely be increased numbers of stray cats, dogs and mongooses as a result of the project; however, identifying mitigation measures that are cost-effective and practical is difficult; the Waiawa National Wildlife Refuge is surrounded by a fence and contains nesting islands for endangered birds; and these measures and the landscaped buffer provided by the developer should further discourage animal intrusion and predation, as well as minimize the adverse effects of light and noise associated with the project. As noted below, this remains an unresolved issue.

5. In response to comments from the City Department of Public Works, Subsection 5.10.2, Sanitary Sewer System, has been revised to state that all sewer system improvements will be designed, built, and installed to City standards for capacity, operating efficiency, maintenance and economy.

In conclusion, the DLU finds that the EIS fulfills the Content Requirements set forth in the EIS procedures in accordance with Chapter 200 of Title 11, Environmental Impact Statement Rules, Sub-Chapter 7, Sections 11-200-20, 21, and 22.

D. RESPONSES TO COMMENTS

The DHCD made point-by-point responses to all comments submitted before the deadline. These are reproduced in Chapter XI, "Comments & Responses," of the Final EIS. The EIS therefore fulfills the public review requirement in accordance with Chapter 200 of Title 11, Environmental Impact Statement Rules, Sub-Chapter 7, Section 11-200-22.

E. UNRESOLVED ISSUES

In reviewing the EIS, the DLU has identified one unresolved issue: the potential impacts to the National Wildlife Refuge by pet dogs and cats from the housing project. The EIS recognizes this as a concern; however, it implies that practical and cost-effective mitigation measures which can be incorporated into the project may not exist. The EIS further states that the Refuge contains deterrents to dogs and cats such as a chain-link fence surrounding the Refuge site, as well as substantial water areas which surround the nesting locations. In consultation with the U. S. Fish and Wildlife Service, the applicant should continue to explore mitigation measures which can be successfully incorporated into the development and at the same time effectively deter stray animals.

F. DETERMINATION

The Final EIS is determined to be acceptable under the procedure established in Chapter 343, HRS.

This determination in no way implies a favorable recommendation on any application for subsequent permits which may be required for this project.

APPROVED _____
JOHN P. WHALEN
Director of Land Utilization

JPW:sl

Environ. Impact Statement
Final
1987 - Dec.
1c.

OEQC LIBRARY

FINAL

WEST LOCH ESTATES

ENVIRONMENTAL IMPACT STATEMENT

City and County of Honolulu

Department of Housing
and Community Development

December 1987

OA
379

P 1989. J180

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

DATE DUE

~~7-19-99~~
~~8-2-99~~
~~Sept. 29, 1999~~

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

FINAL ENVIRONMENTAL IMPACT STATEMENT FOR WEST LOCH ESTATES

West Loch, Ewa, Oahu, Hawaii

This document is prepared pursuant to Chapter 343, HRS.

PROPOSING AGENCY: Department of Housing and Community Development

RESPONSIBLE OFFICIAL: Robert Miyamoto
for Mike Moon, Director

12-15-87
Date

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F	Traffic, Pacific Planning and Engineering, Inc.
G	Social Impact, Community Resources, Inc.
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I	Geotechnic, Geolabs Hawaii
J	Agricultural Economics, Decision Analysts Hawaii

I. INTRODUCTION

1.1 INTRODUCTION

The City and County of Honolulu's Department of Housing and Community Development (DHCD) is proposing to develop an innovative, master planned residential community located approximately 17 miles west of the primary urban center of Honolulu, on the Ewa plain south of Waipahu. The City's goal is to help alleviate the county's affordable housing shortage. Approximately 40,000 such affordable housing units are needed according to "Oahu's Affordable Housing Crisis," an issue paper prepared by the City in March 1987. As a means to achieve this goal, the DHCD is proposing to acquire fee title to approximately 255 acres of land to master plan and develop this community. These plans will be in concert with the new Secondary Urban Center as designated by the City and County's General Plan.

Chapter 46-15.1, of the Hawaii Revised Statutes (HRS) allows the DHCD to plan a 60/40 housing unit mix whereby no less than 60 percent of the units would be sold in price ranges affordable to families targeted by the DHCD, and the remaining 40 percent would be sold at market prices. Under this concept, net income derived from the sale of market units within the development would be used to maximize the affordable housing objectives of the project.

The Master Plan provides for 1,500 residential units. These units will be developed in two increments and will include a variety of housing opportunities primarily for gap group* buyers. Ten percent or 150 of the housing units will be set aside as elderly housing. Increment I, the mauka portion of the project is bordered on the north by Waipahu's industrial park and Farrington Highway and on the south by a proposed 18-hole municipal golf course, will consist of approximately 600 single-family units. Increment II, the makai portion of the project is bordered on the north by the anticipated municipal golf course, consists of approximately 900 units of which 150 will be elderly, multi-family rental units. The balance of the units will be single-family homes.

Other land uses in this project are a district park, an elementary school site, a daycare center, a small commercial area, and a Park and Ride facility.

Throughout both increments a mix of housing types will be provided. Residential unit types will be integrated although certain overriding factors will determine placement of each housing type. The market units will be located in areas of unimpaired views of the proposed golfcourse, shoreline park, and West Loch, to maximize their desirability and in turn command the highest sales prices.

The elderly housing complex will be conveniently located close to the major access roads, public transportation and commercial facilities. These features are intended to encourage interaction with the surrounding community and provide opportunities for participation in a variety of activities.

Community facilities have been located along the major loop road to allow convenient access via auto, bicycle and on foot. The district park located near the entry of Increment II at the old Ft. Weaver Road will serve a growing region with facilities for active recreation such as a gymnasium and recreational center. The Park and Ride facility is strategically located in the same area that it can be utilized on weekends to support park activities such as neighborhood sporting events and social occasions, in addition to both providing convenient access to the mass transit system and reducing traffic congestion within the H-1 corridor.

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*The gap group household is one whose income is too high to qualify for government-assisted rental housing, but is often too low to qualify for conventional financing of a market priced house. The DHCD is targeting the gap group family whose income falls within the 81-120% range of the county's median family income. As defined by the Department of Housing and Community Development, the upper limit; 120%, of median income is defined as shown below:

Family Size

1	2	3	4	5	6	7	8
$28,650	$32,775	$36,825	$40,950	$43,500	$46,050	$48,600	$51,225.

1.2 PURPOSE

This Environmental Impact Statement is prepared pursuant to Chapter 343, Hawaii Revised Statutes and intended for submittal to the State Land Use Commission as a part of a petition for reclassification of the lands designated as a part of the project site from the Agricultural District to the Urban District. The expenditure of public funds for the project also triggers the applicability of this chapter.

1.3 SECONDARY URBAN CENTER

Campbell Estate's Ewa Master Plan states that the decision to direct urban growth to the Ewa area became the official policy of the City and County of Honolulu when Ewa was first designated as the Secondary Urban Center (SUC) for Oahu in the 1977 General Plan. The policy was reaffirmed in 1982 when the location of the SUC was more specifically defined as being in the West Beach-Makakilo area.

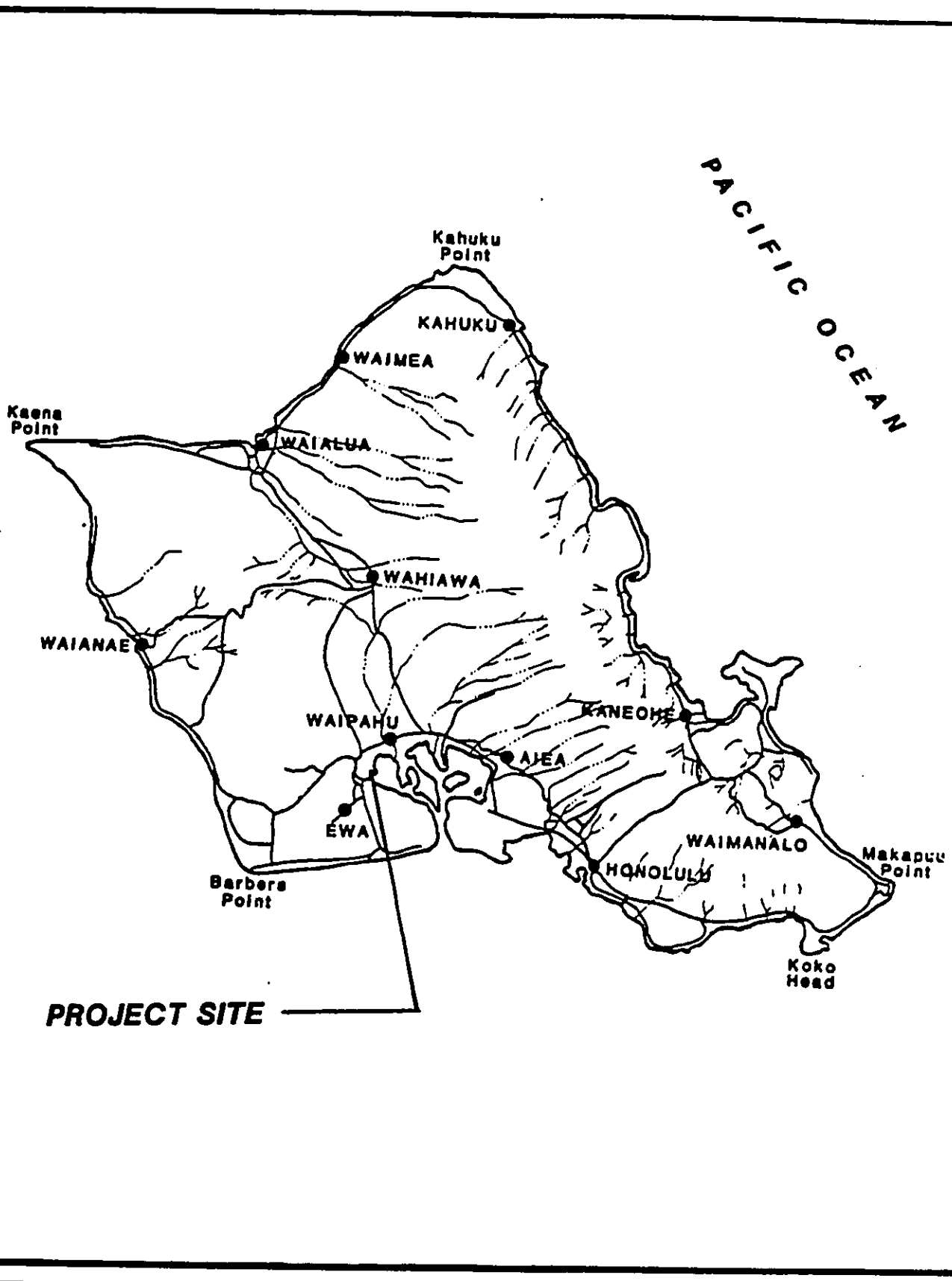
II. PROJECT SUMMARY

2.1 PROJECT LOCATION

The proposed project is situated on approximately 255 acres located on the Ewa Plain at Honouliuli, Ewa, Oahu. A portion of the property fronts the West Loch of Pearl Harbor while Fort Weaver Road serves as the Waianae boundary for the residential areas. The Ewa and Waipahu communities are located adjacent to the subject project (Figure 1, 2).

The land area affected by the proposed project are listed by owner, Tax Map Key, and acreage listed below:

Tax Map Key		Average	Total
9-1-17:06		266.979	
9-1-17:09		26.414	
9-1-17:10		16.428	
9-1-17:11		0.543	
9-1-17:18		11.880	
9-1-17:34		2.668	
9-1-22:01		0.112	
9-1-22:02		0.619	
9-1-22:03		0.088	
9-1-22:05		0.294	
Ownership:	Estate of James Campbell		326.025
9-1-22:04		0.778	
9-1-22:12		0.255	
9-1-22:13		1.944	
Ownership:	Individuals		2.977
9-4-48:74		6.025	
Ownership:	City and County of Honolulu		6.025
TOTAL ACREAGE			335.027



West Loch Estates

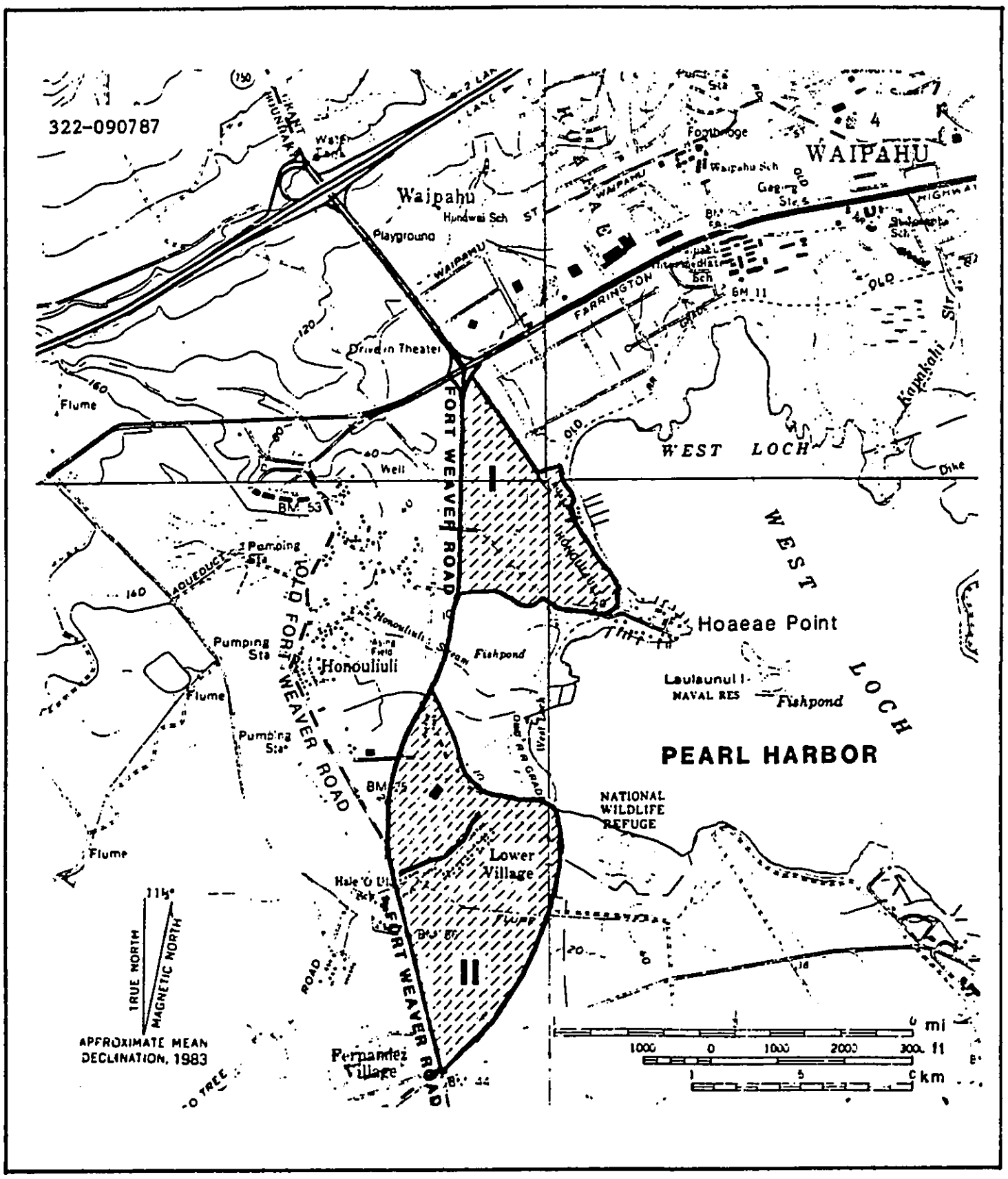
LOCATION MAP

Ewa, Oahu, Hawaii

0' 6 mi

Figure: 1

322-090787



West Loch Estates

AREA MAP

Ewa, Oahu, Hawaii

Figure:

2

The project acreage is less than that specified above as only portions of several parcels are being utilized.

2.2 PHYSICAL SETTING

The site is comprised of extensively modified lands, which in recent times, have been primarily utilized for sugarcane cultivation.

Increment I of the proposed residential development occupies the northern portion of the site, and is bounded by Fort Weaver Road on the west, Waipahu and part of the proposed shoreline park development and West Loch on the east. In this area, the topography is gently sloping down toward the southeast towards the ocean (West Loch). Ground elevations generally vary from about 65 feet near the Farrington Highway/Fort Weaver Road intersection to approximately 25 feet near the southwestern edge of the project site. In general, most of the area consists of fallowed cane land with poorly maintained dirt roads and drainage ditches.

Increment II of the proposed residential development occupies the southwestern portion of the site, and is bounded by Fort Weaver Road on the west, the old Oahu Railway and Land Company (OR&L) easement on the southeast and the Honouliuli Stream flood plain (the site of a planned municipal golf course) on the north. In general, the topography in this area is undulating, sloping eastward. West-east and north-south trenching remnants of old sea bluffs (approximately 30 feet high) separate the northern lower one-third of the site (elevations 14 to 26 feet) from the remaining Increment II project area. Most of the area is used for growing sugarcane with many cane haul roads, drainage ditches and irrigation trenches located throughout the site.

2.3 PROJECT DESCRIPTION

The Master Plan consists of 1,500 residential units (Figure 3). These units will be developed in two increments and will include a variety of housing opportunities primarily for gap group buyers. Ten percent or 150 of the housing units will be set aside as elderly housing. Increment I, the northern portion of the project, is bordered on the north by Waipahu's industrial park

West Loch Estates

SITE PLAN

Ewa, Oahu, Hawaii

Figure:

3

and Farrington Highway and on the south by a proposed 18-hole municipal golf course, consists of approximately 600 single-family units.

Increment II, the southern portion of the project is bordered on the north by the anticipated municipal golf course, consists of approximately 900 units of which 150 will be elderly, multi-family rental units. The balance of the units will be single-family homes.

Other land uses in this project are a district park, an elementary school site, a daycare center, a small commercial center, and a Park and Ride facility.

A planned shoreline park will also separate the residential development from the waters of West Loch.

2.4 PROJECT ALTERNATIVES

The project site was selected because of its location adjacent to an urbanized area which provides ready access to existing infrastructure thereby minimizing development costs. Its proximity to the planned municipal golf course and shoreline park proposed by the Department of Parks and Recreation also enhances the feasibility of such a residential community.

Alternative sites and configurations have been considered within the City and County's designated second urban center, but these alternatives would involve higher development costs which would ultimately result in higher housing prices or increased densities with the associated adverse impacts on the quality of living desired for the area.

The non-project alternatives must generally assume continued agricultural use consistent with the present State Land Use designation and zoning of the property. Increment I has been fallowed by the Oahu Sugar Company for sometime and Increment II is scheduled for fallowing in 1990. Under these circumstances, the "no project" alternative is likely to leave the site without productive use and result in it becoming an eyesore or a blight to the area

due to the dumping of trash and discards. This would be a detriment to the owner of the site, adjacent properties, and the community as a whole.

2.5 PROJECT TIMETABLE AND PHASING

The project will be phased in two increments over a three year construction period with the first increment beginning in 1988. Construction activities will begin in the northern half of the project and then progress southward over the construction period.

Increment I will involve a total of approximately 86 acres and is expected to produce about 600 housing units over 71 acres, 8.2 acres of greenbelts, and 6.7 acres of roadways. Increment II will total 163 acres. This will include approximately 900 housing units on 100 acres, 23 acres of recreation space, 14 acres of buffer and setbacks, 10 acres of civic uses such as the elementary school, day care facility and park and ride, 3.5 acres of commercial uses, and another 9.7 acres of roads.

Financing of the project is a critical part of ensuring that the final product (a house and lot "package") is affordable. An estimated amount of $66 million will be required to fund the land acquisition and site improvements. The use of General Obligation Bonds would provide a means of assuring the lowest possible interest rate and ultimate project costs over the planned development period.

Development of additional off-site water resources, storage and transmission facilities and sewerage facilities including a pump station, are required to accommodate the subdivision within the context of existing and planned development in the area.

The development budget, which is provided for budget planning purposes only, is comprised as follows. (These figures are preliminary and subject to change; anticipated costs listed are approximate and do not reflect confirmed estimates.)

Land Acquisition			$ 6,200,000
Planning and Engineering			5,700,000
Site Improvements Construction			40,800,000
	Off-Site	$10,600,000	
	On-Site	30,200,000	
Indirect Costs			2,000,000
	Sales Processing		
	Escrow and Closing		
	Construction Management		
	Administrative Costs		
Interest @ 8%			3,600,000
Relocation Costs			200,000
Contingency			7,500,000
		Total	$66,000,000

2.6 PROJECT RATIONALE

The City's goal for the proposed project is to help alleviate the county's affordable housing shortage, which is estimated to be approximately 40,000 units, according to the "Oahu's Affordable Housing Crisis" issue paper prepared in March, 1987. As a means to achieve this goal, the DHCD is proposing to acquire fee title to approximately 255 acres of land to master plan, and develop this community. This will be in concert with the new Secondary Urban Center as designated by the City and County's General Plan.

Chapter 46-15.1, HRS allows the DHCD to plan a 60/40 housing unit mix whereby no less than 60 percent of the units would be sold in price ranges affordable to families targeted by the DHCD, and the remaining 40 percent would be sold at market prices. Under this concept, net income derived from the sale of market units within the development would be used to reduce the cost of some or all of the affordable units also in the project.

2.7 IMPACTS AND MITIGATING MEASURES

The proposed project is not expected to have any significant adverse environmental impact, nor will it be environmentally controversial. Air quality and noise impacts, which are associated with the increase of vehicular traffic, will be minimal and will be mitigated through design and measures intended to encourage the use of mass-transit and multiple ridership of private vehicles. Increased demand on public facilities will also result, however, adequate sewer, water, and roadway capacities are available or planned. The project will provide much needed gap group and elderly housing, and is expected to have widespread community benefit in the areas of housing, employment, the economy, and for long range, planned population growth. The project generally comforms with all applicable plans, policies, and controls.

2.8 RELATIONSHIP TO PLANS AND POLICIES

The proposed project, in accordance with Chapter 343, HRS, relating to Environmental Impact Statements (EIS), constitutes an agency action requiring preparation of an EIS. This EIS will be subject to review and acceptance by the City Department of Land Utilization.

As indicated by the State Land Use Map, most of the project site is designated for agriculture with a portion of Increment I designated for urban useage.

The site is also designated for both agriculture and residential use on the Ewa Development Plan Land Use Map. The residential designated portion of the site is located in Increment I of the project.

The site is zoned AG-1 with a small portion of Increment I zoned for R-5 use.

The project generally conforms with the State Plan, the State Functional Plans, and the City and County of Honolulu General Plan, and is expected to conform with/and fulfill the policies and objectives outlined by these plans.

The project lies within the Special Management Area and will be subject to applicable controls in Act 205-A, Coastal Zone Management.

III. PROPOSED PROJECT DESCRIPTION

3.1 LAND USE

The project Master Plan encompasses approximately 255 acres and provides for 1,500 residential units. Both northern and southern increments are separated by a flood plain which is proposed to be developed as a 175-acre, 18-hole municipal golf course by the City's Department of Parks and Recreation as part of a separate project. Included in the proposed Department of Parks and Recreation project is a 39-acre shoreline park which will be located along the two residential communities and the golf course along the shores of the West Loch, of Pearl Harbor.

3.1.1 Residential

The most extensive land use is residential, occupying 68 percent of the project area.

Market Units. Market units occupy 41 percent of the residential land areas. The master plan accommodates 590 market units on a total of 71.1 acres of land distributed over a number of sites located throughout Increments I and II. Many of the market units have been placed on lots with unimpaired views of the golf course, the shoreline park and West Loch to maximize their desirability and amenity value. The net or residual income derived from the sale of the market units will be used to "write-down" the cost of the affordable housing units within the project.

Affordable/Gap Group Units. The affordable or gap group units comprise 53 percent of the residential land areas. Approximately 760 gap-group houselots have been located on 91.7 acres of land situated throughout the two increments of the project.

Elderly Housing. Multi-family elderly housing units comprise 6 percent of the total residential lands. The master plan accommodates 150 units on a

10-acre parcel. This elderly project is conveniently located adjacent to major public and commercial facilities and has easy access to public transportation.

3.1.2 Civic

A 1.7-acre day care center site has been located adjacent to the district park, the Park and Ride facility and the school site. The sites have been selected for their high visibility and convenience to encourage high use levels by the residents of this project as well as others in the region. It is envisioned that parents may wish to drop their children off at the day care center and/or elementary school while leaving their cars at the Park and Ride facility and joining rideshare programs to commute to work.

3.1.3 Schools

A 6-acre site for an elementary school is located within the civic and public activities corridor in Increment II of the project. This school is intended to be accessible to the adjacent neighborhoods in the Ewa plain. However, should the school in the Ewa by Gentry subdivision be developed first, an elementary school in West Loch Estates may not be necessary.

3.1.4 Commercial

One commercial area is located within the project. The 3.6-acre site is located at the corner of Ft. Weaver Road and the major access loop road of Increment II. This will be a "neighborhood" convenience shopping area.

3.1.5 Transportation

A 2.8-acre Park and Ride site (capacity: 350 vehicles) has been located adjacent to the southern increment's main entry on Ft. Weaver Road and its major access loop road. The Park-and-Ride facility is sited adjacent to a commercial area and a day care center for purposes of convenience and efficiency.

3.1.6 Recreation, Parks and Open Space

District Park. A district park is planned for Increment II of the project and will offer such amenities as a recreation center, ball fields, and courts. The park will serve the needs of a growing community as well as those of adjacent developments such as Ewa by Gentry and Ewa Village. A portion of the park is situated within the 100-year flood plain as an alternative use of an area that is not suitable for residential use. The park will also function as a storm runoff retention area to mitigate impacts on West Loch's receiving waters.

Entry Features/Buffer. An entry feature at the northern increment's Ft. Weaver Road intersection will signal arrival at the West Loch Estates. Landscaped buffer areas will be established on Ft. Weaver Road stretching along the mauka boundary of both increments and the cane haul road that traverses the makai portion of the project to create an aesthetically pleasing edge to the development and to insulate residences from adjacent roadway activities. Buffer areas total approximately 14.3 acres, or 6 percent of the entire project. Well-landscaped greenbelts running throughout both areas of residential development and through the center of the elderly housing project constitute a total of about 13 acres.

3.1.7 Anticipated Adjacent Land Uses

Shoreline Park and Golf Course. The City Department of Parks and Recreation is proposing to develop a 39-acre shoreline park which will be located along the eastern boundary of Increment I of the residential development. A 175 acre municipal golf course will be located between the two residential increments of the West Loch Estates. These proposed adjacent projects are expected to parallel or follow the residential development project. A rationale for the golf course is its' ability to function as the retention and recharge basin for stormwater drainage flows generated from the project site and major drainage areas mauka of the project site.

3.2 INFRASTRUCTURE

3.2.1 Circulation Systems

Residential units in Increment I will be served by a major access loop road, with a 108-foot wide entry on Ft. Weaver Road, narrowing to an 80-foot right-of-way width through the residential areas, and providing an alternate, secondary entrance on to Leokane Street within the abutting Waipahu industrial park. In addition to the main loop, a secondary loop road will be routed through the development with direct feeder roads flowing into this loop. A landscaped greenbelt system will run through the central portion of Increment I to provide access to the shoreline from Ft. Weaver Road. The greenbelt will provide for pedestrian and bicycle circulation throughout the project. The use of cul-de-sacs has been utilized to discourage high traffic speeds and through traffic. Many of the interior cul-de-sacs terminate near the loop roads and greenbelts to allow pedestrian and bicycle access.

A major access loop road will serve Increment II of the project with a 108-foot wide entry on Ft. Weaver Road that will also serve the Park-and-Ride facility. This loop road will run in a curvilinear north-south direction through this portion of the development, narrowing to 80 feet in width through the residential neighborhoods, and providing access on the southern end of this increment at Ft. Weaver and Renton Roads. The internal green-belt system providing pedestrian and bicycle circulation is also utilized in this area. This system is designed to fully utilize the panoramic views of the West Loch and the area beyond West Loch. The use of cul-de-sacs will again be utilized to discourage high speeds and through traffic. The cane haul road, which traverses Increment II, will be buffered by a landscaped setback area on both sides to minimize the effects of cane hauling activities along this route.

3.2.2 Water

Potable water demand for the project is estimated to be 800,000 gallons per day. The Board of Water Supply will supply the demand required by both Increments I and II of the project. A new well at the Waipio Heights III

site will provide the water. Storage will be provided by a new 228' reservoir to be constructed in the Waipahu-Honouliuli area. Utilization of non-potable water to fulfill the irrigation requirements of the project is also planned. An approved water allocation from the State Department of Land and Natural Resources (DLNR) is required and an application is pending before that agency.

3.2.3 Sewage Treatment

Anticipated sewage flow of 550,000 to 600,000 gallons per day (GPD) from the project site will be accommodated by the City and County's Ewa and Waipahu sewer systems. The first increment will connect with the Waipahu system and a 1,200-foot long, 12-inch relief sewer is planned to extend from the site to the Kunia Wastewater Pump Station. The line may be upgraded to a 15-inch trunk sewer if necessary. The second increment of the project require connection to the Ewa sewers through lines running under Ft. Weaver Road to an 84-inch interceptor line at Geiger Road. Waste will be treated at the Honouliuli Waste Water Treatment Plant (WWTP). A wastewater pump station will be constructed at or near Increment II of the project to accommodate flow requirements. Both the Ewa and Waipahu sewer systems have the necessary capacity with the specified improvements. The Honouliuli WWTP currently has the capacity necessary to treat and dispose of the effluent generated by the project.

3.2.4 Drainage

Onsite drainage will be managed by a street drainage system consisting of underground drain lines, drain manholes, and intake boxes. Runoff from the system will be discharged into the proposed municipal golf course drainage system. The design of the golf course drainage system will provide the capacity necessary to effectively retain and settle surface runoff from the residential increments, the golf course itself, and drainage areas mauka of the project, prior to discharge into West Loch receiving waters. This is expected to minimize the effects of increase runoff and possible alterations of constituent quality due to urbanization.

3.2.5 Telephone and Electricity

Telephone service to the project will be provided by Hawaiian Telephone Company, and electricity will be provided by Hawaiian Electric Company.

Project electricity demand has been estimated at about five million volts per day. Two sets of electrical lines abut the project. An existing elevated line runs along Ft. Weaver Road, containing one 46-KV circuit and one 12 KV circuit. Another electrical line with two 46-KV circuits and one 12-KV circuit runs along the West Loch shoreline and the OR&L right-of-way. Electrical power for the site will come from either the Kahe or Waiau generating plants. It is anticipated that Hawaiian Electric will need a new transformer station at or near the project site. Definitive engineering design will be coordinated with the respective utility firms during the final offsite improvements planning.

Telephone service will be provided by existing switching stations which are located near Waikele Street and Renton Road. An underground telephone cable linking Hickam Air Force base and Kunia also crosses the mauka portion of the project site. Connections to both increments will be planned with Hawaiian Telephone Company during offsite improvements planning.

3.3 PROJECT PHASING

The project will be phased in two increments over a three year construction period with Increment I beginning in 1988. Construction activities will begin in the northern half of the project and then generally progress southward over the construction period.

The first increment will total approximately 86 acres. This phase will include approximately 600 housing units over 71 acres, 8.2 acres of greenbelts, and 6.7 acres of roadways. The second increment scheduled for construction in 1990, will involve 163 acres. This will include about 900 housing units on 100 acres, 23 acres of recreation space, 14.3 acres of buffer and setbacks, 10 acres of civic uses such as the elementary school, day care facility and park and ride, 3.5 acres of commercial uses, and another 9.7 acres of roads.

Affordable and market units will be developed in each increment. The 150 elderly housing units will be developed in the second increment.

Increment I, expected to begin construction in 1988, includes a total of 86 acres and is bordered to the north by the Ft. Weaver Road/Farrington Highway corner. A total of 600 housing units will be developed in the first increment consisting of 310 gap group single-family units, and 290 market single-family units. The entry feature located at the Ft. Weaver Road/ major access loop intersection, the remaining portion of the loop, and greenbelts comprise the other land uses within the first increment.

The second increment (163 acres) will begin construction in mid-1990. It will consist of 450 gap group single family units, 300 single family market units and 150 multi-family elderly units. An approximately 18-acre district park and 5 acres of greenbelts will be included. 14.3 acres of road buffers and setbacks will be developed; while an elementary school, day care center, and park and ride facilities will be constructed over 10.6 acres in this increment. Another 3.5 acres of commercial space will be built; while the remaining 9.7 acres will go to roadways.

IV. AFFECTED ENVIRONMENT

4.1 PHYSICAL ENVIRONMENT

4.1.1 Topography

The project site consists of gently sloping lowlands with grades ranging from 0 to 5 percent. Ground elevations within the project site range from sea level along the coastal areas to approximately 65 feet above sea level at the northern region and 40 feet above sea level at the southern region.

4.1.2 Hydrology

The proposed project site is located within the Pearl Harbor Ground Water Control Area (GWCA), which is regulated by the State Board of Land and Natural Resources (BLNR). In 1980, the BLNR certified the sustainable yield of the Pearl Harbor GWCA at 225 million gallons per day (MGD). In 1985, the BLNR established three subareas within the Pearl Harbor GWCA: the Koolau subarea; the Waianae subarea; and the coastal caprock subarea. The sustainable yield for the Koolau subarea was set at 200 MGD. The Waianae subarea included the Waianae basal aquifer and was determined to have a sustainable yield of 25 MGD. A sustainable yield for the coastal caprock subarea will be determined in the future for brackish water and sea water withdrawals. At present, the Koolau subarea has an unallocated water resource of 90,000 GD and the Waianae subarea has an unallocated water resource of 5.96 MGD.

The project site is located within the coastal caprock subarea boundary of the Pearl Harbor GWCA.

4.1.3 Soil Types and Ratings

The project site contains a variety of soil types including silty clays, mottled

clays, massive clays, coral deposits, as well as mixed soil types. Generally, permeability and runoff are slow, with only slight erosion hazards. Colors of the different soils include dark brown, dark reddish-brown, dark grayish-brown and very dark gray soils. The soils are neutral to slightly acid and workability of the soil is considered difficult.

Ratings for the different soil types are listed in the Land Study Bureau's (LSB) Detailed Land Classification. The classification system ranks soils in five overall productivity categories ranging from the best rank, "A" to the worst rank of "E". Factors involved in the ranking process were machine tillability, stoniness, texture, clay properties, drainage, rainfall, elevation and slope.

According to the Department of Agriculture, the project lands are largely classified "Prime" and "Other Important" according to the Agricultural Lands of Importance to the State of Hawaii (ALISH) system.

It should also be noted that according to the Flood Insurance Study for the City and County of Honolulu, the project parcels are located in the following designated zones:

Other Flood Areas

Zone AE. Base flood elevation determined.

Zone X. Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

Zone X. Zone X (previously Zone C) is an area determined to be outside 500-year flood plain.

Zone D. Zone D represents unstudied areas under the Federal Insurance Administration study and is an area of undetermined but possible flood hazards. No information on potential flood hazards has been identified for this area.

The following are brief descriptions of the soil types on the site and their LSB ratings.

HxA (0 to 2% slope), HxB (2 to 6% slope), Honouliuli Series

The Honouliuli soil series consists of well-drained soils on coastal plains in the Ewa area. These soils developed in alluvium derived from basic igneous material. They form in gently sloping elevations ranging from 15 to 125 feet above sea level. Average annual rainfall in these areas is approximately 18 to 30 inches per year and occurs mainly between the months of November and April. The mean annual soil temperature is 74° F. Honouliuli soils are geographically associated with Ewa, Lualualei, Mamala, and Waialua soils.

The HxA and HxB soil profile consists of dark reddish-brown, very sticky and very plastic clay throughout. The surface layer is about 15 inches thick. The subsoil and substratum have subangular blocky structures and many slickensides. The soils are neutral to mildly alkaline.

Permeability of these soils is moderately slow. Runoff is slow and the erosion hazard is no more than slight. These soils are principally used for sugarcane, truck crops, and pasture. Workability of the soil is considered slightly difficult due to the very sticky and plastic characteristics. The shrink-swell potential is high. The natural vegetation consists of kiawe, koa haole, fingergrass, bristly foxtail, and bermudagrass. The LSB ratings for these soils are B16i and C17i.

HeB (2 to 6% slope), Haleiwa Series

The Haleiwa soil series consists of well-drained soils on fans and in drainageways along the coastal plains. They developed in alluvium derived from basic igenous material. They are nearly level to strongly sloping. Elevations range from sea level to 250 feet. Annual rainfall is 30 to 60 inches per year, most of which occurs in the months between November and April. The mean annual soil temperature is 73° F.

Haleiwa soils are geographically associated with Waialua and Kawaihapai soils on the Island of Oahu.

A representative profile of the HeB soil type includes a 17-inch thick surface layer consisting of dark brown silty clay. The subsoil and substratum layers, which may reach a depth of more than 5 feet, are dark brown and dark yellowish-brown silty clay with a subangular blocky structure. The soil is neutral to slightly acid.

The HeB soil is characterized by slow runoff and slight erosion hazards. Uses of the soil include sugarcane, pineapple and truck crops. Natural vegetation occurring with this soil includes koa haole, lantana, guava, Christmas berry, bermudagrass and fingergrass. The LSB rating for these soils are B16i and C17i.

HLMG (30 to 90% slope), Helemano Series

The Helemano soils are well-drained soils on alluvial fans and colluvial slopes on the sides of gulches. They developed from alluvium and colluvium derived from basic igneous rock. Slope percentages are steep to extremely steep with elevations ranging from 500 to 1,200 feet above sea level. Average rainfall for these soils is 30 to 60 inches per year and soil temperatures average 72° F. Helemano soils are geographically associated with Lahaina, Leilehua, Manana, Molokai, and Wahiawa soils.

A representative profile of the HLMG soil type includes a dark reddish-brown surface layer approximately 10-inches thick. The subsoil, approximately 50-inches thick, is dark reddish-brown with a dark-red silty clay that has a subangular blocky structure. The substratum is soft, highly weathered, basic rock. The soil neutral in the surface layer and neutral to slightly acid in the subsoil.

Permeability of the soil is moderately rapid. Runoff is medium to very rapid, and the erosion hazard is severe to very severe. This soil is used for pasture, woodland, and wildlife habitat. Natural vegetation occurring with this soil includes bermudagrass, Christmas berry,

eucalyptus, Formosa koa, guava, Japanese tea, Java plum, and koa haole. The LSB rating for this soil is E105.

Kfb, Kaloko Series

The Kaloko soil series consists of poorly drained soils on coastal plains. These soils developed in alluvium derived from basic igneous rock and deposited over marly lagoon deposits. The soils are nearly level in slope with elevations ranging from sea level to 20 feet above sea level. Average rainfall for these soils is 20- to 25-inches per year and soil temperatures average 73° F. Kaloko soils are geographically associated with Keaau, Pearl Harbor and Waialua soils.

The Kfb soil type occurs in slight depressions on coastal plains. The surface layer of the soil is very dark, grey clay. The subsoil and substratum layers are massive clay and silty clay. The soil is neutral to slightly acid throughout.

Permeability of the soil is slow. Runoff is ponded to very slow, and the erosion hazard is none to slight. The natural vegetation consists of Kiawe, klu, bermudagrass, and annuals. This soil is typically used for pasture and sugarcane purposes. The LSB rating for this soil is B16i.

KmaB (2 to 6% slope), KmbA (0 to 2% slope), Keaau Series

This series consists of poorly drained soils on coastal plains. These soils developed in alluvium deposited over reef limestone or consolidated coral sand. They are nearly level and gently sloping. Elevations of this soil range from 5 to 40 feet. Average rainfall is 20- to 35-inches per year with most of the rainfall occurring between the months of November and April. The mean annual soil temperature is 73° F. These soils are geographically associated with Kaloko, Mokuleia, and Pearl Harbor soils.

These soils have a representative profile consisting of a surface layer (about 15-inches thick) of very dark grayish-brown clay. The subsoil

(about 19-inches thick) is very dark grayish-brown and dark brown mottled clay that has a subangular and angular blocky structure. The substratum is white to very pale brown reef limestone or consolidated coral sand. The soil is mildly alkaline in the surface layer and subsoil and moderately alkaline in the sustratum.

KmaB soil is characterized by a sufficient amount of stones to hinder cultivation. Runoff is slow and the erosion hazard is slight. This soil is used for sugarcane and pasture.

KmbA soil is strongly affected by salts within the soil profile occurring where seepage water evaporates. Use of this soil under natural conditions remains idle or is used for pasture. The LSB rating for these soils are E32, C17i, and B16i.

Ph, Pearl Harbor

The Pearl Harbor soil series consists of very poorly drained soils on the nearly level coastal plains. These soils developed in alluvium overlying organic material. Elevations of the soil range from sea level to 5 feet above sea level. Average annual rainfall is 18- to 40-inches per year with an average soil temperature of 74° F. Pearl Harbor soils are geographically associated with Hanalei, Kaloko, and Keaau soils.

A profile of the Ph soil type includes a 12-inch thick surface layer of very dark gray mottled clay. The 19-inch subsoil is very dark gray and very dark grayish-brown mottled clay that has an angular and subangular blocky structure. The substratum is muck or peat. The soil is neutral in the surface layer and mildly to moderately alkaline in the subsoil.

Permeability of the soil is very slow and runoff is very slow to ponded. The erosion hazard is considered slight. While workability of the soil is difficult, the soil is used for taro, sugarcane and pasture. Natural vegetation occurring within this soil includes cattails, mangrove trees,

california grass, and sedges. The LSB rating for these soils are D99 and D99i.

WzA (0 to 2% slope), WzC (6 to 12% slope), Waipahu Series

The Waipahu soil series consists of well-drained soils on marine terraces. These soils developed in old alluvium derived from igneous rock and are nearly level to moderately sloping. Elevations range from sea level to 125 feet above sea level. Average rainfall is 25- to 35-inches per year, mostly occurring between the months of November and April. The average soil temperature is 75° F. Waipahu soils are geographically associated with Hanalei, Honouliuli, and Waialua soils.

A representative profile of these soils consists of a 12-inch thick, dark grayish-brown, silty clay with a prismatic structure and is very sticky and very plastic in the lower part. The substratum is alluvium clay. The soils are slightly acid in the surface and subsoil layers.

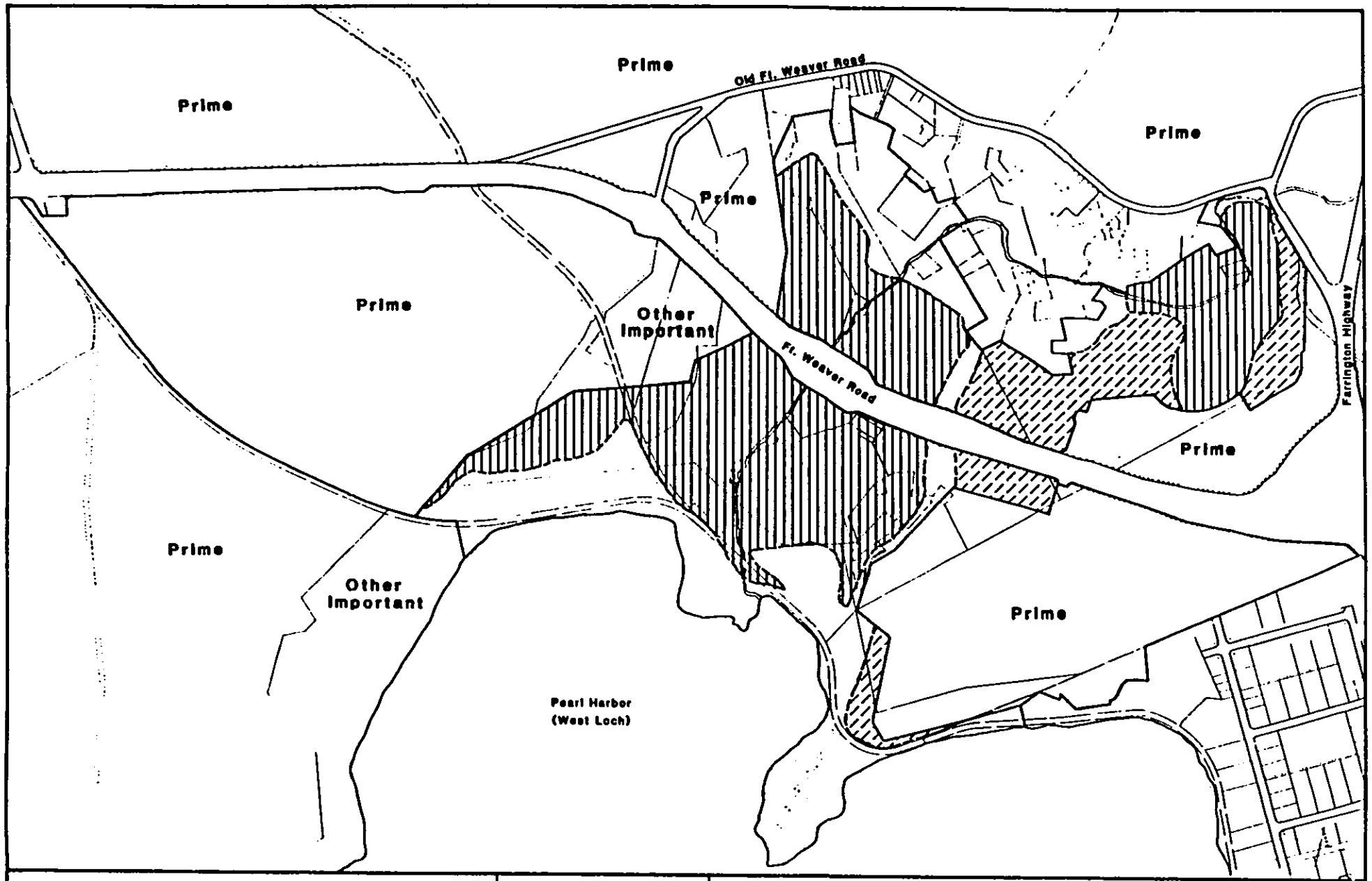
Permeability of the WzA soil type is moderately slow and runoff is slow with an erosion hazard of none to slight. This soil is used for sugarcane and homesites.

The WzC soil type has a medium runoff and a moderate erosion hazard. This soil is also used for sugarcane and homesites. The LSB rating for these soils are B16i and C17i.

The soils within the project site are classified as "Prime" under the ALISH system (Agricultural Lands of Importance to Hawaii), and "A" and "B" lands under the Detailed Land Classification System (Figures 4, 5).

4.1.4 Climate

The climate of the project area is constant and relatively dry, with prevailing trade winds coming out of the northeast. Wind data gathered from Naval Air Station, Barbers Point (located southwest of the project site) reveals the dominant wind regime is the northeast tradewinds which blow 85 percent of the time at an average of 9 knots per hour.



WEST LOCH ESTATES

City and County of Honolulu
DEPT. OF HOUSING AND COMMUNITY DEVELOPMENT

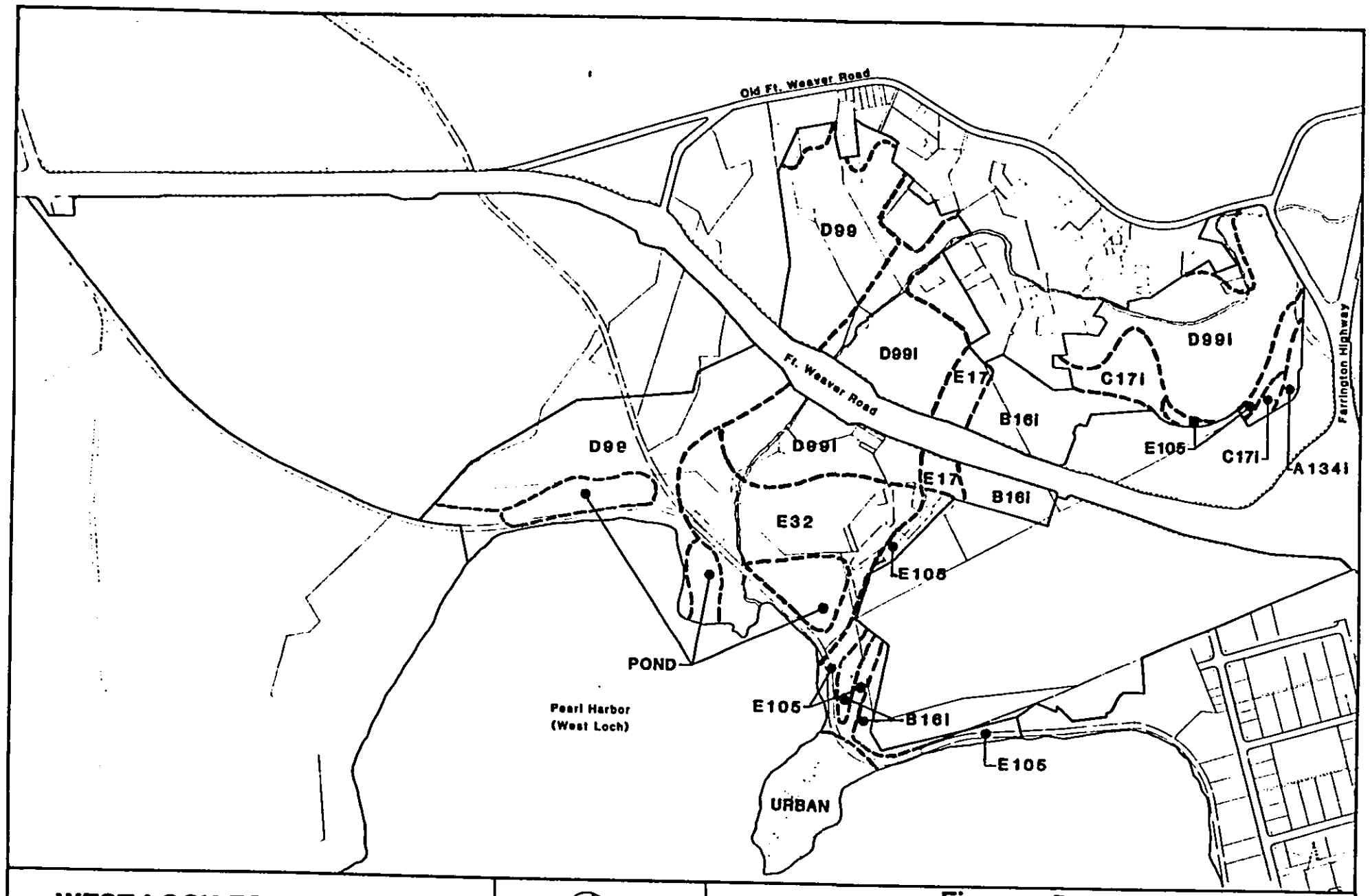
N

400' 0' 400' 800'
SCALE IN FEET

R.M. TOWILL CORPORATION

Figure 4
Agricultural Lands Important to the State of Hawaii (ALISH)

Prime Other Important



WEST LOCH ESTATES

City and County of Honolulu
DEPT. OF HOUSING AND COMMUNITY DEVELOPMENT

N
400' 0' 400' 800'
SCALE IN FEET

R.M. TOWILL CORPORATION

Figure 5

Detailed Land Classification

A134I . . . . E105 – Productivity Rating

Temperatures in the Ewa Plain area range from 72 to 80 degrees Fahrenheit (F.) Climate data (1986) taken from Honolulu International Airport (located southeast of the project site) reveals the average temperature for the warmest month is 81° F. The average temperature for the coolest month is 72.6° F. Extreme temperatures were recorded at 94° F. as the highest temperature and 53° F. as the lowest temperature.

The Ewa Plain experiences light rainfall amounts of approximately 20-inches per year. Most of this rainfall occurs between the months of November and April.

4.1.5 Flora

A botanical survey for the project site was conducted during July 1987 by Char & Associates. The report is attached as Appendix A and is summarized below.

The project area consists largely of gently sloping lands, most of which are presently under sugar cane cultivation by Oahu Sugar Company.

Abandoned cane fields covered by weedy species occupy the northern portion of the project area. Scattered patches of scrub vegetation are generally found along the perimeter boundaries of the cane fields. Pasturelands are found in the middle portion of the property and wetlands, composed of mangrove swamp and cattail-bulrush marsh, occur along the West Loch boundary.

The vegetation on the proposed West Loch Estates Development is dominated by introduced (or alien) species. Of a total of 164 plant species inventoried, 86.6% or 142 species are introduced; 16 are indigenous, i.e., native to the islands and elsewhere; 1 is endemic, i.e., native only to the islands; and 5 are of early Polynesian introduction. There is little of botanical interest on the project site. The native species are found in similar environmental habitats throughout the islands. Some plants, such as the koali (Ipomoea cairica), koali-'awania (Ipomoea indica), 'uhaloa (Waltheria indica), and hoary abutilon (Abutilon incanum) are considered rather "weedy" natives

which do well in open, more or less disturbed areas. None of the native species are considered rare, threatened or endangered.

While the wetlands do not contain any species of botanical significance, they do provide habitat for a number of endangered Hawaiian waterbirds. The cattail-bulrush marsh around the Apokeo Fish Ponds is especially valuable as wetland habitat. This portion of the study area is primarily located in the non-residential sectors of West Loch Estates.

4.1.6 Wildlife

A study of wildlife within the project site and vicinity was conducted during August 1987 by Andrew J. Berger. The study is attached as Appendix B and is summarized below.

The terrestrial vertebrate study indicated that the project area had been drastically disturbed for more than 100 years and there was no evidence of an endemic ecosystem in the vicinity of the project area. Amphibians and reptiles are found throughout the islands; however, all have been introduced and none are threatened or endangered species.

Many of the endemic birds, which are unique to the Hawaiian Islands are classified as endangered or threatened species and a Fish and Wildlife Service (FWS) refuge is situated adjacent to Increment II.

Indigenous birds, which occur naturally in Hawaii and in other parts of the world, are found in the project area. These primarily consists of Black-crowned night herons and migratory winter residents such as the golden plover. No indigenous nesting seabirds are found in the vicinity of the project site.

Introduced birds are also found throughout the project site; however, none are considered threatened or endangered species.

Introduced mammals are also likely to be found on the project site. None are considered to be threatened or endangered and most have been proven to be deterimental to man, his buildings, products, agricultural crops and/or to native forests and their animal life.

4.1.7 Noise

Existing noise levels within the project site and vicinity have been subject to study by the U.S. Navy as part of the Air Installations Compatible Use Zone (AICUZ) program for NASBP (U.S. Navy, 1984). An additional noise study was conducted by Y. Ebisu & Associates during August 1987. This study is summarized below and is attached as Appendix C.

Along the Fort Weaver Road Right-of-Way, existing traffic noise levels are in the "Significant Exposure, Normally Unacceptable" category. Existing setback distances to the 65 Ldn contour line are estimated at 235 FT and 128 FT from the centerline of the roadway at the north and south sections of the roadway. In the vicinity of the proposed residential subdivisions of West Loch Estates, which are located on the Diamond Head (east) side of the roadway, existing traffic noise levels are in the "Significant Exposure, Normally Unacceptable" category (approximately 67 to 73 Ldn) along the first row of proposed lots which will front the highway.

In the vicinity of the Renton Road intersection, existing residences of Fernandez Village are in the "Moderate Exposure, Acceptable" category due to the large setback distances (240+ FT) from the centerline of Fort Weaver Road, and due to the lower vehicle speeds near the signaled intersection. To the north, the existing Hale O Ulu School on the west side of Fort Weaver Road is exposed to traffic noise levels of 65 to 70 Ldn, which are considered "Unacceptable" for naturally ventilated schools. Existing quonset huts on the project site and south of the Honouliuli Stream Bridge are in the "Significant Exposure, Normally Unacceptable" category (approximately 65 to 70 Ldn). These existing structures will be removed under the proposed project development plan.

Along the existing cane haul road which runs through the southern portion (Increment II) of the project, cane haul trucks are the dominant noise sources during the harvesting season, which occurs on a 2.5 year cycle.

During a peak harvesting day of 24-hour operation, cane haul truck noise levels could exceed 65 Ldn within 190 FT setback distance from the haul road's centerline. However, average Ldn values for the 190 day harvest season or for the 365 day annual period do not exceed 65 Ldn at setback distances of 80 Ft, and cane haul truck noise levels are in the "Moderate Exposure, Acceptable" category at the proposed residential lots along the haul road.

The West Loch Estates project site is located outside the Barbers Point Naval Air Station and Honolulu International Airport Ldn 55 noise contours. The potential impacts are considered negligible due to the sites' distance from aircraft flight patterns.

4.1.8 Air Quality

An Air Quality analysis for the project site was conducted during September 1987 by J.W. Morrow. The study is attached as Appendix D and is summarized below.

The two nearest State Department of Health air monitoring stations to the project area are located at the Campbell Industrial Park about 6 miles to the southwest and at Pearl City, some 4 miles to the northeast. Total suspended particulates (TSP), sulfur dioxide (SO2), and nitrogen dioxide (NO2) were all monitored on a 24-hour basis. Initially, the site was at the Barbers Point Lighthouse, but the proximity to the ocean resulted in very high TSP levels due to salt spray. The station was therefore moved to the Chevron Refinery site about 1.7 kilometers north of the lighthouse on March 17, 1972. In 1976, NO2 monitoring was ceased. On August 7, 1979, the monitoring station was moved to a rooftop location at the same Chevron site.

It should also be noted that total suspended particulate monitoring with a

high-volume sampler was ceased at the site in October, 1985. In November, 1985, a new PM-10 sampler was installed. This instrument measures respirable particulate matter under 10 microns in aerodynamic diameter.

It is evident from existing data that both the National Ambient Air Quality standards (NAAQS) and Hawaii Ambient Air Quality Standards (HAAQS) are being met at those monitoring sites.

Because the Campbell Industrial Park monitoring station is situated relatively close to the elevated sources, i.e., the stacks, located at the industrial park, the data collected may not be representative of the highest ambient pollutant levels resulting from the various industrial sources at the park. Computer modeling done in conjunction with the City's resource recovery facility permitting indicated maximum SO2 concentrations occurring some 1.0 to 1.5 kilometers north of the park in the flat terrain as well as on the hillsides also north of the park.

Unfortunately, there are no routine monitoring data for the primary automotive pollutant, i.e., carbon monoxide. The nearest CO monitoring site is at the Department of Health building in downtown Honolulu some 11 miles east-southeast of the project area. Because the area is presently at an early stage of development, it can be surmised that present CO levels are also relatively low.

A spot sampling of carbon monoxide concentrations along Fort Weaver Road was conducted during two recent a.m. peak hour traffic periods as part of the air impact analysis.

It should be noted that during the September 17, 1987 sampling the monitoring instrument was located upwind of the Fort Weaver Road traffic due to the light northeasterly winds; thus, the low CO levels being measured were due to vehicles operating on the H-1 freeway upwind (northeast) of the sampling site.

During the September 22, 1987 sampling, onsite winds were very light and

at times calm. During the calm periods, CO concentrations leveled off at about 1.0 - 1.5 mg/m3.

4.1.9 Historic and Archaeological Resources

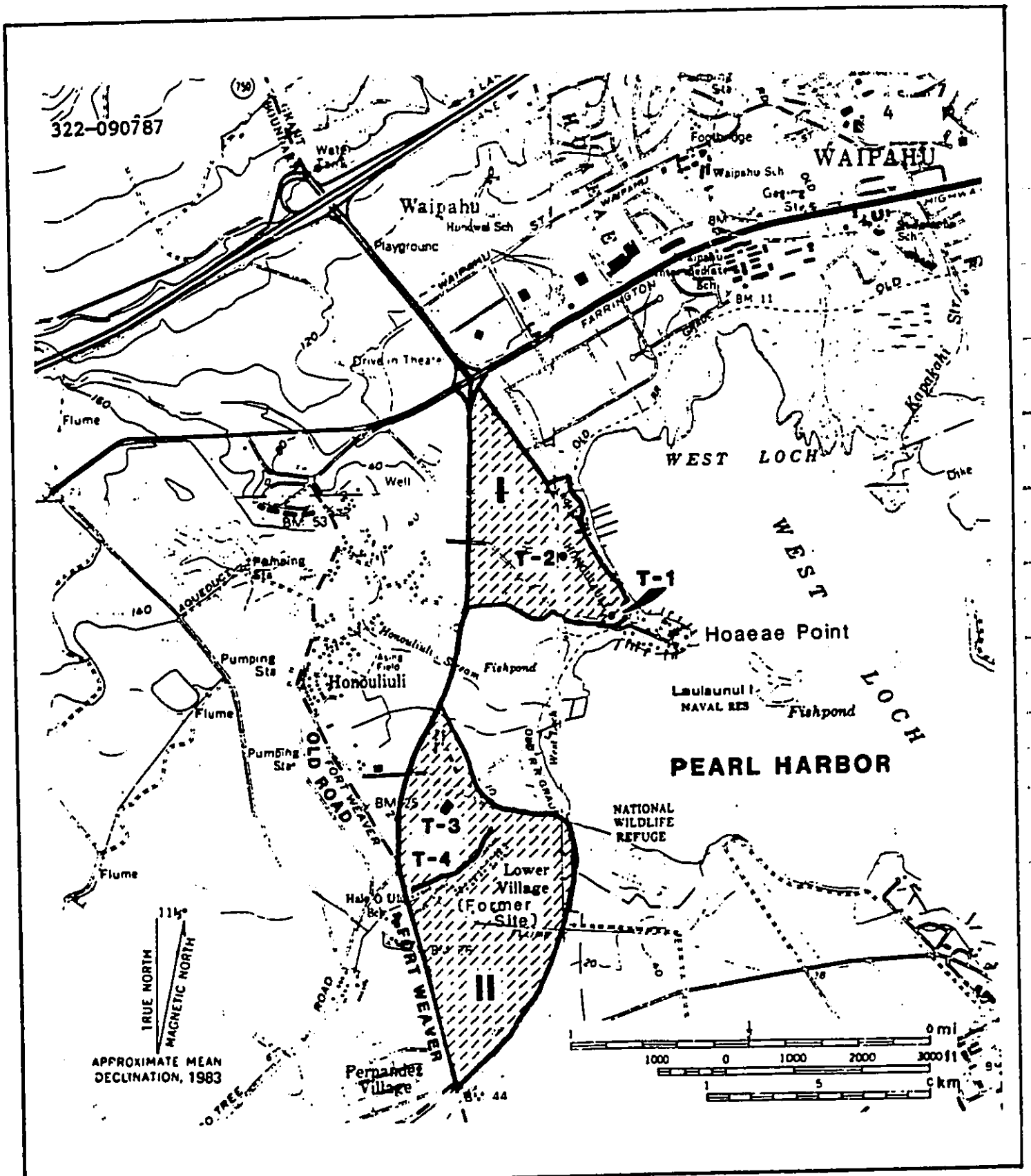
An archaeological reconnaissance survey of the project site was conducted by Paul H. Rosendahl, Ph.D., Inc. and is included as Appendix E. The findings of the study, which is dated September 1987, are summarized below.

The combined surface and subsurface reconnaissance survey of the West Loch Estates, Residential Increments I and II project area confirmed an initial impression that the project area had been extensively and almost entirely modified by decades of historic period sugarcane cultivation. Only four sites were identified during the survey field work (Figure 6). Three of these (Sites T-2, -3, and -4) were found to be historic period in age, while the fourth (T-1) was ambiguous as to whether or not it even was a cultural feature. Two of the historic period sites, the cemetery (T-3) and the surface artifact collection area (T-4) appear to be related to relatively recent sugar plantation occupation, while the third, a small surface artifact collection area (T-2), appears to date somewhat earlier. Study results have been discussed with the State Historic Preservation Office (SHPO) of the State Department of Land and Natural Resources (DLNR) and the Study provided for their review.

4.1.10 Surrounding Land Uses

4.1.10.1 Existing Uses

The Ewa area encompasses the entire Ewa Plain which extends from Kunia Road in the northeast to Kahe Point in the west. Within this area, lie scattered residential communities, a major industrial park, a major destination resort area, a wildlife refuge, two major military installations, and a portion of Oahu's largest sugar plantation. The surrounding land uses that have major influence on the project site are described below.



West Loch Estates

ARCHAEOLOGICAL SITES

Ewa, Oahu, Hawaii

Figure: 6

Waipahu

Waipahu is located northeast of the project site at the northern tip of Pearl Harbor. In 1980, the Federal Census recorded the resident population of Waipahu at 29,139 persons.

Waipahu is an older community which was primarily founded by the location of Oahu Sugar Company's major sugar mill. Many immigrant groups were brought in to work in the sugar industry and many settled in Waipahu. As the sugar industry declined, the U.S. Navy operations in Pearl Harbor began to play a more prominent role in Waipahu. Waipahu's growth as an industrial and commercial center is tied in part to nearby defense activities.

Ewa Beach

Ewa Beach, an older residential community with a small commercial center is located south of the project site along the coastline. Homes in Ewa Beach are moderately priced, except for some oceanfront properties. The Ewa Beach community had 3,465 housing units and a population total of 14,500 residents in 1980.

Ewa Villages

Located southeast of the project site are a number of small plantation villages known collectively as the Ewa Villages. These communities are the Varona, Tenney, Renton, and Fernandez Villages. Their heritage goes back to the Ewa Plantation when it was an active sugar mill town. Most of the housing units within the Ewa Villages are very old and low priced. In 1985, 3,000 people lived in the villages.

James Campbell Industrial Park

The James Campbell Industrial Park, located southwest of the project site, includes 2,400 acres with 1,360 acres in current use and the remaining acreage reserved for future expansion. Uses within the Industrial Park

include a mix of light industrial and heavy industrial activities. The Industrial Park employed approximately 2,500 people in 1985.

Naval Air Station, Barbers Point (NASBP)

Also located southwest of the project site is NASBP, which housed approximately 2,900 residents and employed 1,500 civilians in 1985. According to the NASBP master plan 1985, the mission of NASBP is to maintain and operate facilities and provide services and material support operations for aviation activities and units of the operating forces of the United States Navy. Aircraft operations of NASBP are conducted on a 24 hour basis and primarily consist of fixed wing propeller-driven aircraft with most flights occurring within the daylight hours.

Blast Hazard Zone

The proposed development is near the Explosive Safety Quantity Distance (ESQD) hazard zone that originates from the ammunition wharves at NAVMAG Lualualei, West Loch Branch. These explosive safety quantity distance arcs or "blast hazard zone," is a known constraint in the planning of the project. It is located approximately 200 feet from the project boundary at the closest point and will be buffered by a shoreline park and setback area related to the FWS bird refuge.

4.1.10.2 Approved Uses

Within the Ewa Plain, there are three planned developments which have recently received government approvals. A brief description of these developments are presented below.

Ko Olina

The Ko Olina planned residential/resort community is located on the western edge of the Ewa Plain, west of the James Campbell Industrial Park. The total area of the planned community includes approximately 642 acres. Amenities of the planned community include 5,200 housing units, 4,000 visitor

units, a 500 slip marina, an 18-hole championship golf course, a Hawaiian cultural center, two shopping centers, and a number of restaurants.

Ewa Marina

The planned Ewa Marina consists of 727 acres of land and water area designed for water-oriented activities. The dominant element of the planned development is the 98-acre marina. Other elements of the plan include 4.5 miles of waterfront property to accommodate residential and commercial use, 4,850 units within 26 development areas, a retail shopping center, a golf course, restaurants, parks and a school.

Ewa by Gentry (Pearl Meadows)

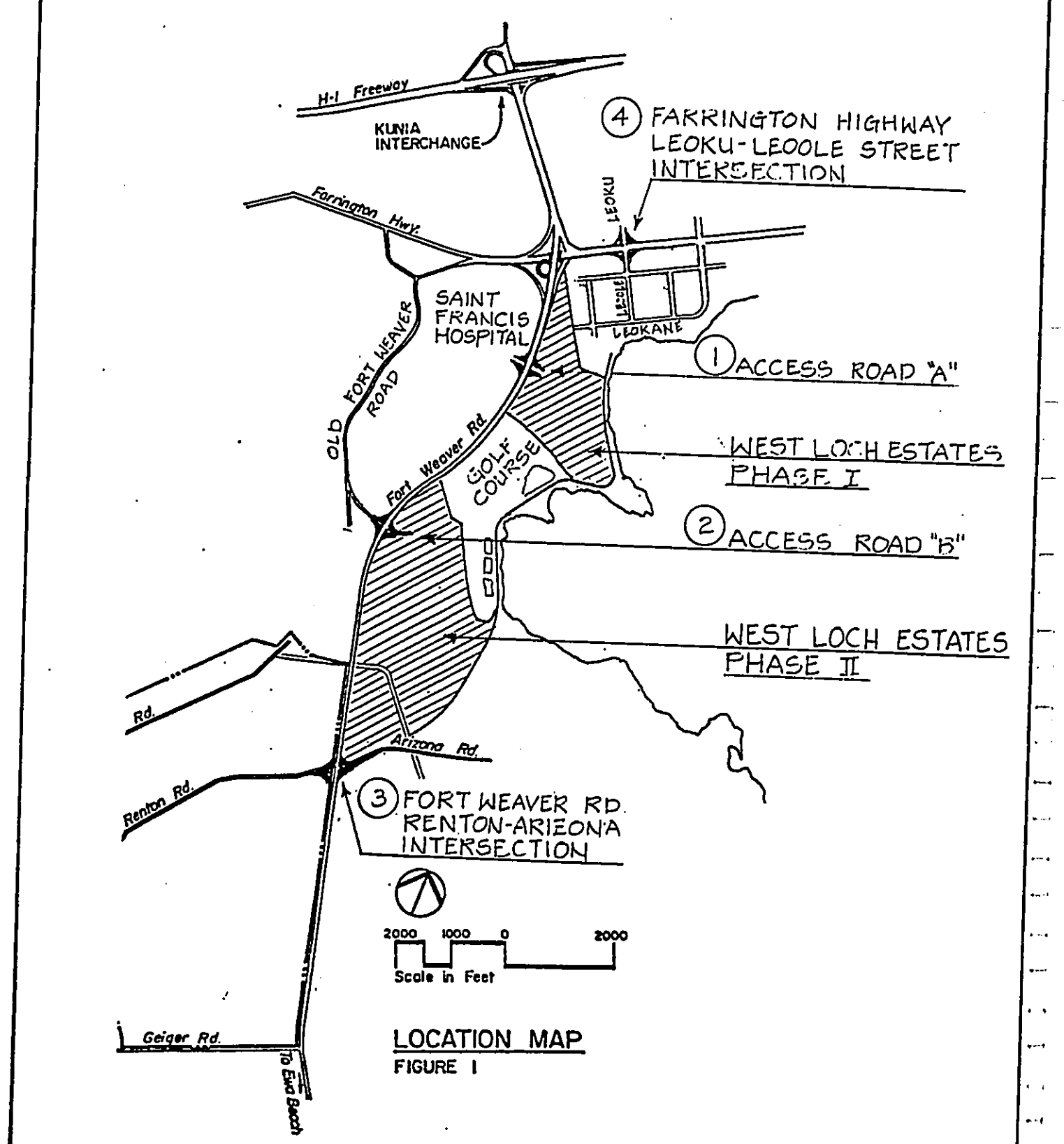
Ewa by Gentry, previously known as Pearl Meadows is a planned residential development adjacent to the Ewa Villages. Development of the project is expected to create approximately 8,500 housing units consisting of single family detached, single family attached, townhomes, and apartment/condominum units with various densities.

4.2 PUBLIC FACILITIES AND SERVICES

4.2.1 Transportation

A regional traffic impact study was conducted during September 1987 by Pacific Planning and Engineering. The study is attached as Appendix F and is summarized below.

Fort Weaver Road provides the primary access to the proposed development and serves as a major arterial roadway between H-1 Freeway and the existing Ewa Beach Community (Figure 7). The roadway is a four-lane divided highway with a wide grassed medial that provides roadway width for left-turn storage lanes into the proposed subdivision.



West Loch Estates

TRAFFIC ACCESS

Ewa, Oahu, Hawaii

Figure:

7

There are no sight distance or other physical roadway constraints which would result in unusual traffic safety concerns or conditions at the proposed intersections with Fort Weaver Road. The speed limits are 35 and 45 miles per hour. There is a designated bikeway on the east side of the roadway. There are no driveway access points. All access is controlled by the State Department of Transportation, Highways Division.

Intersection improvements for the St. Francis Hospital-West, presently under construction, will provide deceleration and left turn storage lane for north-bound Fort Weaver Road traffic turning left into the hospital site. In addition, a traffic signal system was recommended at the intersection to improve egress during the afternoon peak hour.

Arizona Road is located along the southern portion of the project and will serve as the secondary access for Increment II. It is an extension of Renton Road and is signalized at the intersection with Fort Weaver Road. It is presently an unpaved road servicing the West Loch U.S. Naval Magazine installation.

Leokane Street is located along the Northern portion of the project and serves as the secondary access for Increment I. Leokane Street is intersected by Leoole Street which access Farrington Highway in Waipahu. These streets serve the industrial area located northeast of the proposed project.

4.2.2 Water

The project site is located within the Board of Water Supply's (BWS) Ewa - Waianae district. At present, the BWS has imposed restrictions on potable water connections in the Fort Weaver Road-Ewa Beach area until planned water transmission improvements are completed and in place. The existing system presently draws from the Kunia I Well (6.00 MGD) and the Hoaeae Well (6.61 MGD). The project will draw the projected demand of 0.8 MGD from the Waipio Heights III Well (.85 MGD) currently under construction.

4.2.3 Wastewater

Wastewater from the Ewa Plain area is currently treated at the City and County's Honouliuli Wastewater Treatment Plant (WWTP) and disposed of via the Barbers Point Ocean Outfall. The capacity of the WWTP is 25 MGD. The current flow to the plant is 21 MGD. The Barbers Point Ocean Outfall has a capacity of 112 MGD, the projected peak flow for the year 2020. The County Division of Wastewater Management (DWM) is asking for funds to expand the plant capacity to 38 MGD by the year 1994 to accommodate proposed developments in Central and Leeward Oahu.

4.2.4 Solid Waste

The Ewa Plain area is currently serviced by the City and County of Honolulu. The Department of Public Works, Division of Refuse Collection and Disposal provides solid waste collection and disposal in single family residential areas. Non-residential and multi-family residential areas are serviced by private refuse collection companies. Solid waste is disposed of either at the Palailai Landfill or the Waipahu Incinerator.

The Palailai Landfill is scheduled to close within the next few years and is not expected to provide refuse disposal capacity for the West Loch Estates project. The City and County of Honolulu is exploring new means and locations for disposal of solid wastes. A new landfill site at Waimanalo Gulch is being implemented. Also, a Garbage-to-Energy H-POWER facility, to be located in the James Campbell Industrial Park, is scheduled to become operational in late 1990.

4.2.5 Power and Communications

The Ewa Plains area is serviced by the Hawaiian Electric Company for power generation and transmission facilities. Existing power facilities within the project area and vicinity include the Kahe and Waiau Power Plants.

Hawaiian Telephone Company maintains communication facilities for the project site and vicinity.

4.2.6 Police and Fire Protection

Police service for the Ewa Plains area is provided by the Pearl City station, which is staffed by 161 officers who rotate on three different shifts. Three districts are patrolled by the Pearl City station: Waianae Coast; Waipahu/Ewa Beach; and Aiea/Pearl City.

Fire protection services for the project area and vicinity are provided by the Waipahu station, which houses one engine company (5 fire fighters), and one ladder company (6 fire fighters). Additional fire protection services are available from the Ewa Beach and Pearl City stations. A new engine company is planned for Ewa Tenney Village in 1991.

4.2.7 Medical Facilities

Current medical facilities serving the project area and vicinity are provided by the Waipahu Clinic, staffed by 70 doctors, nurses and aides. The Waipahu Clinic offers a variety of services including physical, occupational, speech therapy, public health nursing, children's health, Hansen's disease clinics, and complete mental health services. The nearest hospital/emergency services are provided by the Moanalua Kaiser Medical Center.

The new St. Francis Hospital-West is also planned for the immediate vicinity which should significantly increase health service capabilities in the region. The St. Francis Hospital-West facility, when completed, will include a comprehensive emergency and ambulatory care center, a full service hospital, a major medical office building, a medical education center, day care facilities, and a "wellness" center.

4.2.8 Schools

The State Department of Education has indicated that Ewa Elementary, Ilima Intermediate, and Campbell High, currently service the project area. The Department also indicated that Ilima Intermediate and Campbell High Schools are currently operating at capacity, therefore, additional budgeting will be

required to expand the facilities at both of these schools. A new elementary school site of 6.1 acres is planned adjacent to the District Park in Increment II of the West Loch Estates Masterplan.

4.2.9 Recreational Facilities

Currently, there is only one existing recreation facility located within the immediate area. Asing Field consists of a medium-sized baseball field area and one basketball court.

From a regional perspective, surrounding recreational facilities are numerous with many smaller neighborhood parks located in nearby communities, as well as larger community parks located in Ewa Beach and Waipahu. Other existing facilities include beach parks located in Ewa Beach and NASBP, and golf courses located in NASBP and Waipahu.

4.2.10 Energy Corridor

The State Department of Transportation has indicated that a small portion of the northern end of the West Loch Estates Increment I is located in the PRI energy corridor. This corridor consists of fuel lines which link Campbell Industrial Park with Pearl Harbor. The County will maintain coordination with the State DOT in any actions affecting the energy corridor. A second energy corridor is located within the OR&L right-of-way and provides connection from Campbell Industrial Park to Nimitz Highway for Chevron USA. There will be no impacts on either energy corridor from the West Loch Estates project.

4.3 SOCIO-ECONOMIC ENVIRONMENT

A socio-economic study was conducted for the proposed project by Community Resources, Inc. and is dated September 1987 (Appendix G). A summary of the demographics of the area is presented below.

Data presented are from the 1970 and 1980 U.S. Census. This time period

was one of significant population growth in the study area. Ewa, which had 24,037 residents in 1970, grew by more than 50 percent to 36,234 in 1980. The population of the Waipahu census designated place (CDP) grew from 24,150 to 29,139.

The most recent estimate of population in the study area is for 1985. The City and County Department of General Planning (personal communication, Steve Young, planner, September 14, 1987) estimates the Ewa Development Plan Area population as 37,400 and the Waipahu CDP population as 29,400. If correct, these estimates suggest much slower study area population growth rates in the 1980's than in the 1970's, possibly due in part to the high interest rates and general slowdown in housing construction experienced during much of the early 1980's.

4.3.1 Ewa

Ewa's largest civilian community is Ewa Beach, located a few miles south of the project site. With a 1980 population of 14,400, Ewa Beach is partially a military support community and partially a bedroom community of commuters to Honolulu. Proximate to Ewa Beach are the military housing areas of Iroquois Point (1980 population of 3,900) and Barbers Point Housing (1980 population of 1,400). In western Ewa, the major community is Makakilo (1980 population of 7,700, with ongoing construction and population growth).

Caucasians and Filipinos are the largest ethnic groups among Ewa's population. Almost half of the area's residents are Caucasian (44.5 percent) and almost one quarter are Filipino (24.8 percent); these shares are higher than the 33.1 percent and 12.8 percent shares, respectively, for all of Oahu.

The Ewa area has a relatively young population. Greater percentages of Ewa residents are under five years of age (10.7 percent) and between five and 17 years of age (27.8 percent), as opposed to Oahu as a whole (7.9 percent and 24.2 percent, respectively). The proportion of residents aged 65 years and older is especially low in Ewa -- senior citizens constitute 7.2 percent of Oahu's population, but only three percent of Ewa's. The youth

of the Ewa population can be attributed in large part to the substantial numbers of military force members and dependents living there -- 18.5 percent of Ewa residents aged 16 years and above were in the armed forces in 1980, a figure well above the Oahu-wide average of 10.1 percent.

Ewa residents are somewhat more likely than all Oahu residents to have been born elsewhere in the United States; 36 percent were born outside of Hawaii, while 30.1 percent of total Oahu residents in 1980 were born elsewhere in the United States. Ewa's share of foreign-born residents was similar to Oahu's; thus, the percentage of Hawaii-born residents was lower than for the island as a whole.

As would be expected from data on place of birth and age, Ewa residents show greater mobility than the entire Oahu population. Relatively fewer Ewa than overall Oahu residents reported living in the same house or on the same island in 1980 as in 1975. The principal mobility difference was that Ewa residents were markedly more likely (26.1 percent) to have resided in a different state five years previously than were Oahu residents generally (18.4 percent).

The adult population of Ewa contains proportionately fewer highly-educated people than does Oahu as a whole. While a slightly lower proportion of Ewa residents completed eight or fewer years in school and the proportion of high school graduates is higher, the percentage who have completed four years of education beyond high school (12.6 percent) is considerably lower than for Oahu (21.7 percent).

4.3.2 Waipahu

The Waipahu CDP includes census tracts 87.01, 87.02, 89.01, and a portion of tract 88. Several of the more suburban-oriented neighborhoods -- such as Village Park, Waipio and Crestview/Ocean View -- are within the Waipahu Neighborhood Board area, but not within the census designated place of Waipahu.

Waipahu's ethnic characteristics indicate a substantially greater proportion of Filipinos than is the case for the island as a whole. This is consistent with the historic roots of Waipahu as a plantation community comprised heavily of immigrants. More than 40 percent of Waipahu residents (41.6 percent) reported Filipino ancestry, far greater than the 12.8 percent percent for the island as a whole. Each of Hawaii's other major ethnic groups show lower representation in Waipahu than for all of Oahu. Differences are most pronounced for Caucasians, who made up 33.1 percent of Oahu's population in 1980 but just 13.5 percent among Waipahu residents.

Waipahu has a relatively young population. Considerably higher proportions of Waipahu residents are less than five years of age (10.7 percent) than for the City and County (7.9 percent); Waipahu's median age of 24.5 years is much younger than all of Oahu's 28.1 years.

The population of Waipahu contains considerably larger numbers born in a foreign country than is the case for the entire island. More than one in every four Waipahu residents (27.9 percent) was born abroad, compared with 14.8 percent of all Oahu residents. Waipahu also has a slightly higher proportion of Hawaii-born residents (56.9 percent) than the county as a whole (55.1 percent), and only about half as many people who were born elsewhere in the United States (15.2 percent, compared with 30.1 percent for all of Oahu).

Mobility patterns, measured by residence five years prior to the 1980 Census, are similar for Oahu and Waipahu residents. The chief differences, as suggested by differences in birthplace, are that greater proportions of Waipahu residents (9.3 percent) than of Oahu residents as a whole (6.6 percent) lived in a different country in 1975. Similarly, relatively fewer Waipahu residents (8.5 percent) reported having lived in a different state in 1975, compared with 18.4 percent for all of the island's population.

Education levels of Waipahu residents are somewhat lower than for Ewa or for all of Oahu. While 14.4 percent of Oahu's population aged 25 years and above completed eight school years or less, the similar statistic for Waipahu

was 27.5 percent. Less than ten percent of Waipahu residents (8.7 percent) have four or more years of education beyond high school, compared with 21.7 percent for Oahu residents generally. Education levels rose for Waipahu, as for the island as a whole, between 1970 and 1980. The proportion of Waipahu's population with some education beyond high school almost doubled over the decade, moving from 13 percent to 23.6 percent.

4.3.3 Housing

Housing tenure in Ewa resembles the pattern for all of Oahu; 49.8 percent of dwelling units are owner-occupied. Crowded units -- those occupied by more than 1.51 persons per room -- are somewhat more common in Ewa, where 8.5 percent of all homes would be defined as crowded by this standard. This could be related to a larger-than-average family size in Ewa, (3.96 persons per household, compared with 3.15 for all of Oahu). While the 1980 median value of owner-occupied housing was lower than for the island as a whole, median monthly mortgage payments (at $514) were higher than the islandwide average of $494. This would suggest that Ewa homeowners had, in general, purchased their homes more recently than was the island-wide norm, a proposition supported by the fact that Ewa residents were more likely to be in-migrants to Hawaii than Oahu residents as a whole.

Waipahu's housing stock characteristics are similar to those of the entire county so far as tenure (owner- vs. renter-occupied units) and availability of plumbing facilities are concerned. However, Waipahu contains a larger than average number of "crowded" dwelling units, where crowding is defined as 1.51 persons or more per room. The percentage of such units in Waipahu (13.8 percent) was almost twice the islandwide rate of 7.4 percent. More widespread crowding may be related to Waipahu's relatively large household size; average number of persons per household was 4.11 in 1980, compared with 3.15 for Oahu as a whole.

As of 1980, renters in Waipahu were slightly worse off in comparison to all island renters, while Waipahu homeowners were marginally better off than owners on the entire island. Median cash rent was $295 for Waipahu, and

represented 15.7 percent of median family income. For Oahu as a whole, median cash rent was $279, representing 14.9 percent of median family income.

The median value of owner-occupied housing in Waipahu ($112,000) was lower than the islandwide median in 1980 ($130,400). However, Waipahu homeowners had lower median monthly mortgage payments ($420) compared to Oahu as a whole ($494). The Waipahu median constituted 22.3 percent of median family income, well below the islandwide average of 25.2 percent.

4.3.4 Market Analysis

A market analysis was conducted by John Child and Company, Inc. which is dated August 1987. A summary of the analysis is presented below with the complete study included as Appendix H.

The analysis was conducted in two parts. One analysis addresses the 600 market priced single-family units and the other addresses the 750 gap group units. The analyses exclude the 150 multi-family units for elderly housing. Section I of the report summarizes methodology and findings for the 600 market priced units. Section II of the report summarizes the analysis covering the 750 gap group single-family units.

The projected residential housing requirements for market priced units were compared to the projected available inventory in Ewa and Central Oahu. Currently housing supply exceeds demand; however, within one or two years, the existing and planned inventory would be insufficient, and an additional 900 to 1,000 units would be required. However, assuming Waiawa, Mililani Mauka and Ewa by Gentry receive necessary land use and zoning approvals and development proceeded as proposed, the total available inventory would exceed demand from 1990 through about 2000.

As a result, major projects would be expected to delay or decrease the proposed phasing to minimize the surplus inventory. By 2001, housing requirements would be expected to exceed available inventory. Major

residential projects would be expected to accelerate development. About 5,000 units in Ewa Marina and Puuloa Estates would be expected to be developed between 2001 and 2005. In addition, several thousand residential units could also be developed in Ewa Town Center.

There is a current demand for 30,000± gap group housing units on Oahu. Public and private developments have been oriented to the gap group over the recent past and have enjoyed overwhelming market response. However, there have not been a sufficient number of gap group units marketed over recent years to significantly reduce overall demand.

A consequence of this imbalance of supply and demand for gap group housing is a very strong market for all single-family gap group housing projects which are located within reasonable travel times to employment. The relatively few proposed single-family projects on Oahu which will be oriented to the gap group market will not significantly change this supply/demand relationship over the foreseeable future.

The market outlook for market price units at West Loch Estates supports development of the 600 units over the next three years. The projected housing requirement is expected to remain relatively strong. The most competitive available inventory would be, Ewa by Gentry, Kapolei Village, and Village Park.

Although Makakilo would be in a position to offer competitively priced units, their new inventory is most likely to be priced higher than West Loch Estates. Mililani is also expected to be priced higher and would not be directly competitive. Based on the current and projected sales prices of competitive developments, the average sales prices of the West Loch Estates single-family market units at $140,000 to $150,000 would be reasonable.

The outlook for the 750 gap group housing units in West Loch Estates is more optimistic. The island-wide market demand for gap group housing is expected to remain very strong over the foreseeable future. While most residential developments in the Central Oahu/Ewa area will have small

portions of their inventory oriented to the gap group market, there is sufficient demand to accommodate all anticipated supply. Currently, the major competing gap group project would be Kahi Kani, a proposed 290± unit single-family project in Whitmore Village.

Based on current income qualification levels, mortgage interest rates, and sales prices in competitive gap group projects, the typical sales prices of West Loch Estates gap group single-family units would range between $100,000 and $120,000.

V. ANTICIPATED IMPACTS AND MITIGATIVE MEASURES

Impacts of the proposed project can be viewed in the short-and long-term. Short-term impacts, beneficial and adverse, generally result from construction-related activities. Consequently, these impacts should last no longer than the duration of the construction. Long-term impacts, beneficial and adverse, result from the implementation and operation of the proposed project.

5.1 TOPOGRAPHY AND SOILS

Impact on the physical terrain of the proposed project area should be minimal. The sites are generally level with gentle slopes and will require only typical site preparation. Cutting and filling will be kept to a minimum.

Prior to beginning of any grading operation it will be necessary to strip all existing vegetation from areas to be developed. The material exposed after the stripping operation may be used for engineered fill. After stripping, building slabs and pavement sub grades and areas to receive engineered fill should be excavated of any and all loose soils.

To minimize the occurrence of soil erosion, temporary soil erosion and sediment control measures will be designed and implemented during the construction phase in accordance with Chapter 23, Grading, Soil Erosion, and Sediment Control, Revised Ordinances of Honolulu, 1978, as amended; the City & County of Honolulu's Grading, Grubbing, and Stockpiling Ordinance No. 3968, 1972; and the USDA Soil Conservation Services Erosion and Sediment Control Guide for Hawaii, 1981. Approval by the City & County of Honolulu Department of Public Works will be required to ensure proper grading and erosion control.

5.2 SOILS

A geotechnical engineering reconnaissance was conducted by Geolabs-Hawaii in August 1987 and is attached as Appendix I. This study indicated the findings presented below.

Based on the preliminary borings, probings and laboratory tests performed, and from a soil engineering point of view, the site is, in general, suitable for the proposed residential development. However, because of the presence of soft ground, high groundwater levels and low to moderately expansive soils in various parts of the project site, special design criteria may be required.

The near surface soils over most of the proposed Increment I and II housing areas mainly consist of hard silty clay to clay having low to moderate swelling potential. Normal excavation and conventional site grading procedures are anticipated for earthwork in these areas. Some of these soils may be moderately to highly expansive and could require special procedures for the house foundation design, such as deep footings, subgrade saturation or capping with non-expansive soil. All site improvements will be in compliance with applicable County standards. Homesite building "pads" will be oriented and improved to reduce potential impacts due to soil conditions.

Coralline deposits were encountered at shallow depths (4 to over 12 feet) in the southeastern quarter of the Increment II housing area. The coral may be hard and may require moderately hard ripping for excavation. The excavated coral material can provide a good source of low-expansive structural fill. Cavities of varying sizes are often found in coral formation. If encountered, backfilling of the cavities with grout or compacted fill may be required.

5.3 TRAFFIC

The traffic study, conducted by Pacific Planning and Engineering and dated September 1987, assessed traffic impacts measured by the change in level-of-service (LOS) for the intersections planned for West Loch Estates. These intersections are described below. The traffic impact assessment projects anticipated traffic volumes along Ft. Weaver Road to 1991 when the project is expected to be completed. Traffic volumes increases beyond 1991 are assumed to result from other projects in the area.

The analysis was conducted for the following intersections:

1. Fort Weaver Road and Road "A" (Access to Increment I),
2. Fort Weaver Road and Road "B" (Access to Increment II),
3. Fort Weaver and Renton-Arizona Road (Secondary Access to Increment II), and
4. Farrington Highway and Leoku-Leoole Street (Secondary Access to Increment I).

The Critical Movement Analysis Planning Application from the revised (1985) Highway Capacity Manual (HCM) was used to estimate the capacity for the above intersections. It was assumed that those intersections not now signalized would be for the purposes of analysis.

The 1991 volume forecasts for Increments I and II were assigned to the intersections to estimate pm peak hour turning movements at each of the four intersections. These were added to existing volumes and traffic generated by other residential development to be occupied prior to 1991.

The method to analyze the level of capacity attainment consists of comparing the higher sum of conflicting straight and left turn movements for one roadway and adding the greater to its complement for the other roadway. The analysis was made for the four intersections for the present, 1991 without West Loch Estates, and 1991 with West Loch Estates.

The analysis stated that only the Farrington/Leoole Street intersection is operating near capacity. During the pm peak hour level in 1991 none of the intersections would be operating at or over capacity. With the West Loch project, the intersections of Ft. Weaver Road with Increment I and Increment II would operate near capacity in 1991.

The result of the 1991 forecasts show that the proposed West Loch Estates project will increase traffic volumes along Fort Weaver Road during the pm peak period. The critical traffic flows are expected to occur during the afternoon peak hour, when both the ambient traffic and projected traffic are

at a peak. Based on the capacity analysis results, it is concluded that West Loch Estates traffic will not bring an intersection to over-capacity levels.

With the anticipated growth in future years, it is recommended that turning lanes on Fort Weaver Road be considered for the Increment I and II intersections. Such improvements will contribute to better flow and less delay at the intersections, as well as smoother merges onto Fort Weaver Road.

During Increment I development, it is recommended that the contemplated traffic signal operation of Fort Weaver Road and the access Road "A" intersection be upgraded to provide for a protected left turn for southbound traffic turning left into Phase I of West Loch Estates. Provision should be made for a left turn storage lane on Fort Weaver Road for that movement.

Access from the Increment I development through the Waipahu Industrial lots will increase traffic volumes slightly along Leokane and Leoole Streets. To provide increased traffic capacity at the signalized intersection of Leoole Street and Farrington Highway, a possible action would be to modify the existing pavement markings on the south leg to two northbound lanes and one southbound lane. Given the proportion of turning movements, the right lane should be made to allow left, straight and right turns. The left lane should be an exclusive left turn lane.

Traffic signal warrants for interruption of traffic flow are likely to be met for the Access Road "B" intersection with Fort Weaver Road which serves the Increment II development plans for West Loch Estates. Signals should be considered and plans developed based on future traffic patterns. It is recommended that new developments south of Renton Road be included in the traffic signal timing plans.

Access for the Increment II development on Arizona and Ft. Weaver Roads will not require any significant remedial action since the signalized intersection is expected to operate under capacity with completion of Increment II. Improvements on Arizona Road are being contemplated for serving internal access needs.

The West Loch Estates project once completed will not have a significant impact on Farrington Highway and H-1 Freeway. The long-term cumulative impact of the project on these regional transportation facilities cannot be realistically assessed, since adequate information regarding planned and proposed projects in the Leeward and Ewa areas is not available.

5.4 AIR QUALITY

Impacts from the air quality study conducted by J.W. Morrow are summarized below and are attached in Appendix D.

Residential development such as the proposed is not normally considered a direct source of air pollution. It is, however, an "indirect" source of air pollution as defined in the federal Clean Air Act because of its inherent ability to generate motor vehicle traffic. The development also has an offsite impact on air quality due its demand for electricity and the need to burn fuel in order to supply that electricity. Disposal of the refuse generated by the residents will also result in offsite impact as it will most probably be burned in the City's proposed resource recovery facility. Finally, construction of the project will have short-term impacts on air quality in terms of fugitive dust and construction vehicle activity.

The air analysis focused primarily on the potential cumulative long-term impact of traffic on local air quality. EPA recommended emissions and dispersion models were employed along with the traffic projections to estimate maximum carbon monoxide concentrations in the vicinity of the principal intersections which serve the project area along Fort Weaver Road. Morning peak traffic hours were analyzed because of the higher probability of adverse meteorology coinciding with high traffic volumes.

The results indicated possible exceedance of state but not federal 1-hour carbon monoxide standards within 10 - 40 meters of each of the intersections studied. The probability of such exceedances was in the 6-10% range based on the frequency of "worst case" meteorological conditions during the 6:00 to 8:00 a.m. peak traffic period. Despite the projected increase in traffic,

there was a slight downward trend in carbon monoxide concentrations over the 1991 - 1997 period. This is an indication that the traffic increase did not completely offset the expected decrease in emission rates due to the federal motor vehicle emissions control program.

Estimates of 8-hour carbon monoxide levels derived by applying a "persistence" factor of 0.6 to the highest 1-hour concentrations indicated exceedance of the state standard out to 40 meters from the intersections studies. It also indicated possible exceedance of the federal 8-hour standard within 20 meters of the intersections.

The results of the traffic impact report indicating "at-capacity" conditions along Fort Weaver Road and the elevated near-roadway carbon monoxide concentrations also suggest that the occupants of vehicles would also be experiencing elevated carbon monoxide levels during their morning commute to work or school. While there is no standard model for predicting such exposures, previous studies have indicated carbon monoxide levels of the same order of magnitude as indicated for modeling receptors within 10 meters of the roadway.

The increased fuel combustion to meet the project's electrical demand will result in less than a 0.1% increase in island-wide emissions of the primary regulated pollutants. Combustion of the project's refuse will likewise result in a relatively small increment of increase in county emissions.

There is a potential fugitive dust problem during construction due to the relatively low rainfall in the area and the moderate silt content of the soil. This will be especially true during the drier, windier summer months. Strict application of dust control measures will be needed in order to avoid complaints of existing residents and possible violations of state air pollution control rules.

5.5. NOISE

Impacts and mitigative measures from the noise study conducted by Y. Ebisu and Associates are summarized below and are attached in Appendix C.

The existing and future traffic noise levels in the vicinity of the proposed West Loch Estates were evaluated for their potential impact on present and future residences in the project environs. The traffic noise level increases along Fort Weaver Road were calculated for the Calendar Year (CY) 1991 and 1997 time periods, and traffic noise increases associated with project and non-project traffic were assessed. Increases in traffic noise of 3.8 to 4.2 Ldn (Day-Night Average Sound Level) are predicted to occur as a result of project and non-project traffic on Fort Weaver Road. Traffic noise increases of 0.4 to 1.3 Ldn are projected to occur as a result of project traffic on Fort Weaver Road.

Project traffic noise impacts on existing residences along Fort Weaver Road in the vicinity of Renton Road are predicted to be relatively small, with project related increases in the order of 0.5 Ldn. Although significant increases in non-project traffic noise levels are predicted to occur by 1991, existing residences should remain in the "Acceptable, Moderate Exposure" category due to the large setbacks of the residences from Fort Weaver Road.

The existing Hale O Ulu School on the west side of Fort Weaver Road is currently in the "Normally Unacceptable, Significant Exposure" category. Projected increases in non-project traffic by 1991 are expected to increase traffic noise levels at the school by 2.0 Ldn. Project related traffic is not expected to be a significant noise source at the school, with the contribution from project traffic is predicted to be 0.5 Ldn.

Future traffic noise impacts on West Loch Estates residents can be minimized by the use of buffer zones of adequate depth on the Diamond Head side of Fort Weaver Road, and along the internal roadways of the development. In order to maintain eligibility for federal assistance on the project, it is suggested that minimum setback distances to the future 65 Ldn contour be used when practical in siting future residential units. Because these setback distances are primarily along certain sections of Fort Weaver Road, the use of other noise mitigation measures may be desirable. These mitigation measures include the construction of sound attenuating berms or walls along Fort Weaver Road, or the use of sound attenuating windows for two story homes.

The West Loch Estates project site is located outside the Barbers Point Naval Air Station (BPNAS) and Honolulu International Airport Ldn 55 noise contours.

The potential impacts are considered negligible due to the site's distance from aircraft flight patterns.

5.6 FLORA

The summary of findings from the botanical study conducted by Char & Associates are presented below and are included in Appendix A.

The vegetation on the proposed West Loch Estates Development is dominated by introduced (or alien) species. Of a total of 164 plant species inventoried, 86.6% or 142 species are introduced; 16 are indigenous, i.e., native to the islands and elsewhere; 1 is endemic, i.e., native only to the islands; and 5 are of early Polynesian introduction. There is little of botanical interest on the project site. The native species are found in similar environmental habitats throughout the islands. some plants, such as the koali (Ipomoea cairica), koali-'awania (Ipomoea indica), 'uhaloa (Waltheria indica), and hoary abutilon (Abutilon incanum) are considered rather "weedy" natives which do well in open, more or less disturbed areas. None of the native species are considered rare, threatened or endangered. The proposed project is not expected to have a significant impact on the total island populations of these species.

While the adjacent wetlands do not contain any species of botanical significance, they do provide habitat for a number of endangered Hawaiian waterbirds. The cattail-bulrush marsh around the Apokeo Fish Ponds is especially valuable as wetland habitat. This portion of West Loch Estates is primarily located in the non-residential sectors of the subject parcel.

5.7 WILDLIFE

Impacts on wildlife are summarized below from the Andrew J. Berger report of August 1987. The entire report is included as Appendix B.

In its present condition, the project area can properly be called a "waste land" as far as endemic or native vegetation and its animal life is concerned. There are no endemic forest birds in the project area. The adjacent Honouliuli and Waiawa National Wildlife Refuges are of special value to the endangered Hawaiian stilt and, to a lesser degree, for the other Hawaiian waterbirds. The report stated that it is of utmost importance that no polluting substances reach these sanctuaries. The report also recommended that plans for any improvements within the adjacent wetlands be coordinated with personnel of the U.S. Fish and Wildlife Service and the Corps of Engineers. The Increments I and II residential sectors will be sufficiently distant from the Refuge areas with greenbelt buffer areas providing adequate setback distances sufficient to prevent impacts on the endangered avifauna species.

Concerns have been expressed by the U.S. Fish & Wildlife Service on the potential impacts to the Refuge by pet dogs and cats from the project. The liklihood of increased numbers of stray cats, dogs and mongooses is a recognized concern; however, identifying mitigation measures that are both cost-effective and practical, is extremely difficult.

At present, we note that the Refuge is surrounded by a chain-link fence and that recent changes, increasing the use of "nesting islands" should discourage intrusion and predation by feral animals. These measures would be supplemented by the substantial landscaped area that will act as a buffer between the Refuge and the residential subdivision to further discourage entry and minimize any adverse effects of light, noise, and activity associated with urbanization.

None of the 20 species of introduced or alien birds found in the proposed housing project area are endangered species and a number have proven to be serious pests in Hawaii.

All of the mammals, land reptiles, and amphibians that occur in the project area are introduced or alien mammals. Many of them are predators on birds and several are destructive to agriculture and forest lands and/or to man,

his buildings, and products. None of these animals were considered to be of any significance or environmental concern.

5.8 HISTORICAL AND ARCHAEOLOGICAL RESOURCES

The archaeological reconnaissance survey, included as Appendix E, presented the following conclusions.

Based on the findings of the combined reconnaissance survey field work, the cultural remains identified within the West Loch Estates - Residential Increments I and II project area appear to be, for the most part, of minimal significance in terms of potential information content. In view of the essentially negative results of the reconnaissance survey, it is concluded that, with the exception of appropriate treatment of Site T-3, no further archaeological work of any kind is necessary. The information recovered during the present survey from Sites T-1, -2, and -4 is considered adequate and sufficient to warrant recommending that no further archaeological work is necessary for any of these sites. Only one site (T-3), an apparently modern cemetary complex, is believed to be culturally significant; preservation "as is," if at all possible, is recommended as the more desirable treatment for this site. If this course of action is not practical, then proper disinterment and reburial in accordance with State Health Department regulations and procedures should be carried out. The latter alternative should include an attempt to locate any living relatives of individuals buried at Site T-3, as it is considered likely that such relatives may still reside in the Ewa District.

It is also recommended that a qualified archaeologist selectively monitor initial grubbing activity and/or vegetation clearing within the project area. The general significance evaluations and recommended general treatments presented in this report are based on the findings of the combined reconnaissance survey field work, which involved only minimal subsurface testing. Therefore, these evaluations and recommendations are given with the general qualification that during any development activity involving the extensive modification of the land surface, there is always the possibility-however remote, that previously unknown or unexpected subsurface cultural features, deposits, or

burials might be encountered. In such a situation, immediate archaeological consultation should be sought.

5.9 SOCIO-ECONOMIC CONDITIONS

A summary of socio-economic impacts from the Socio-economic Impact Assessment conducted for the project is presented below and can be found in Appendix G.

5.9.1 Population

New housing development at the project site will add to the population of the Ewa development plan area. Estimating the size of project population depends upon assumptions about the average household size of future residents.

Households sizes will differ among residents of the elderly and single-family units. Elderly families are assumed to average 1.8 persons per household -- a figure equal to the average household size of elderly families in public housing managed by Hawaii Housing Authority (Hawaii Housing Authority, 1987).

For single-family housing, the Department of General Planning assumes 3.3 persons per unit in assessing population impacts. This figure may be somewhat high, as household sizes in Ewa and Central Oahu, as reported by developers, tend to show smaller families. At Mililani, 3.03 persons per unit were reported for single-family homes priced between $115,000 to 164,000 (John Child & Co., 1987). Therefore, the population impact is calculated using 3.0 persons per unit as the lower range for single-family units and 3.3 persons per unit as the upper range.

Utilizing these averages, it is projected that the project will produce an Ewa population higher by 4,320 to 4,725 persons than in the absence of the project.

The Oahu General Plan population guideline for Ewa, coupled with projected population, provides sufficient room for new housing to accommodate the project. Project impacts, then, will principally be to provide new housing at an earlier time than could be completed by other projects, and to cause a greater proportion of Ewa's new population to consist of households in the gap group.

5.9.2 Employment

Employment impacts at the project site will result from development of certain non-housing uses at the site. Employment opportunities created will include:

- 46 to 51 positions at the elementary school site, if it is accepted by the Department of Education (personal communications, Ed Hasegawa, Business Specialist, Hawaii State Department of Education, September 15, 1987).

- A maximum of 200 retail and service jobs at the commercial center, based on an islandwide average of one employee per 250 square feet of leasable area and a planned leaseable area of 50,000 square feet;

- Up to 20 positions at the day care center (personal communication, Lynn Koga, Supervising Principal, KCAA Pre-Schools of Hawaii, September 15, 1987);

- A possible single additional job at the park and ride bus transportation facility (personal communications, Howard Takara, Chief, Bus Systems Division, Department of Transportation Services, September 3, 1987).

Thus, potential employment at the completed West Loch Estates project totals approximately 270 positions.

5.9.3 General Overview of Community Issues and Concerns Related to the West Loch Project

This section provides an indication of community reaction towards the project as of mid-August to mid-September, 1987, very early in the overall EIS process. Only some of the persons interviewed were aware of all of the project's components; their response were therefore often based on their initial reactions to information presented to them for the first time during the interviews. Changes in attitude and issues may occur in time, given changes in the project and other events or influences in the community.

Because the interviews were conducted for issue identification only, no attempt was made to quantify the responses, or to assess the extent of project support or opposition.

In general, the project's concept was well received by almost all interviewed. The regional leaders, in particular, liked the proposed land uses because these were appropriate to the current needs of the community.

The project's concept was less important, however, to those who would be more directly impacted. Those who live near the project site tended to be more specific about their concerns about property value impacts, physical infrastructure, and public services.

On-site informants understandably placed more importance on their potential displacement than on regional benefits. Both nearby residents and on-site informants tended to express a dissatisfaction with their access to project information.

The housing component was the aspect of the project which the community tended to view most favorably. Regardless of one's opinion of specific project components, almost everyone acknowledged the need for housing.

Regional community leaders and organizations tended to appreciate the proposed "60/40 housing mix," in which 60 percent of the proposed units

would be tailored to the income levels of gap group families and the remaining would be offered at market value. Recommendations for effective management and design controls were seen as possible ways to ensure a quality, planned development.

West Loch's recreational component was also seen by many as an asset to the community. Again, some made recommendations intended to retain the overall quality and family-oriented characteristics in recreational areas, including the golf course. Potential displacees did not appreciate the proposed recreational uses, however, mostly because, at the time of the interviews, such uses would occur on their present sites.

Traffic headed the list of concerns related to infrastructure, followed by drainage (a concern expressed primarily by nearby residents). People also asked about the preparedness of public schools to meet the demands of this and other Ewa proposals.

An issue raised mostly by nearby and on-site residents is a lack of information about the project. Potential displacees were especially critical of receiving no project information prior to notices of potential site entries and preliminary relocation schedules.

A few regional leaders expressed concern about the City's ability to implement the West Loch Estates plans as proposed.

5.9.4 Compatibility With Surrounding Uses

The project's relationship to the surrounding communities was seen from two perspectives. On one hand, the nearby Honouliuli and relocated Ota Camp residents have distinct and independent community identities. Some nearby residents were wary that their status quo would be disturbed by a new community and that existing small businesses might have difficulty competing with the proposed commercial area.

Nearby residents also anticipated some changes which may benefit them, however. Increase in property values, access to new shopping and recreational facilities, more customers for existing businesses, elimination of some incompatible agricultural uses (such as those related to cane burning)--these were seen as potential benefits, providing these nearby communities could retain a separate identity.

Reactions of Honouliuli, the "new Ota Camp," and Ewa residents are summarized as follows:

- Because of social ties with on-site residents, initial reactions generally focused on residential displacement. It is noted, however, that on-site residents do not belong to any of the four established community organizations and associations in the area.

- Honouliuli informants were particularly concerned about the acquisition of lands owned by Honouliuli residents. The lands of three families are currently intended for acquisition if the project is implemented, and Honouliuli informants wanted assurances of equitable and fair settlements.

- The Honouliuli and "new Ota Camp" informants basically wanted to retain identities separate from the new community.

- These informants also saw potentials for community benefits, however, primarily in the form of terminating incompatible agricultural activities (mostly cane burning) increased land values for properties fronting the golf course, and access to proposed recreational, commercial and public facilities.

- Honouliuli informants were apprehensive about the impacts of proposed commercial establishements on the small Honouliuli establishments, although increased patronage was also seen as a plus.

- Honouliuli informants expressed concern about further drainage impacts because of reported increased runoff due to the construction of the nearby hospital.

- All, including the Ewa informants, were concerned about traffic increases.

Further, regional Waipahu leaders discussed systemic relationships with the proposed West Loch Estates community. They felt that the traffic generated would have more impact on the Waipahu roadway system rather than Ewa's.

On the other hand, it was also felt that until the regional Ewa development is well underway, the new West Loch residents will utilize the closer Waipahu shops, restaurants and service establishments.

5.9.5 Relocation and Other Potential Mitigations

Condemnation procedures require reimbursement of landowners, lessees, and tenants for the fair market value of property acquired by the City. Additionally, relocation assistance measures described below provide further cash and in-kind measures to displacees, including renters.

At the same time, it may be expected that some displacees -- businesses as well as residents -- may have expectations or needs beyond those which are covered by laws governing relocation assistance. This has yet to be determined in any definitive way. As previously recommended, communication between City agencies and affected residents or property holders needs to be augmented, in order to match the strong efforts being made on the regional level.

The following is a summary of applicable provisions for persons displaced by public projects:

Basis of Relocation and Displacement Provisions

Relocation assistance to displaced individuals and businesses is in accordance with State statutes and administrative rules. The applicable State statute is Hawaii Revised Statutes, Chapter 111. The applicable administrative rule is Hawaii Housing Authority, Title 17, Chapter 503. The following discussion is taken directly from documents provided by the Department of Housing and Community Development.

Relocation Assistance to Displaced Tenants

Individuals who rent housing, either through leases or sub-leases on land to be acquired for the West Loch Estates project, are entitled to relocation assistance. This assistance consists of payments for moving expenses, rental assistance, and aid in finding replacement housing.

Moving assistance may be either a fixed payment for a self-mover or reimbursement, for expenses at the tenant's discretion. If the tenant elects for a fixed payment, he/she would be entitled to payment according to a graduated scale based on the number of rooms of furniture and belongings to be moved. The amount ranges from $135 to $300. If the tenant decides on reimbursement, the tenant need only submit receipts for expenses. The tenant is entitled to either the fixed payment or the reimbursement, whichever is higher.

Mover may also be eligible for rental assistance if they have lived in their homes for at least the last 90 days prior to the City's formal notification of intent to acquire. Tenants will be entitled to the difference between their present rent and the rent of their home, for a period of two years up to a maximum payment of $1,500.

Tenants are also eligible for assistance in locating a new home. Such assistance will be given by the Department of Housing and Community Development.

Relocation Assistance to Displaced Homeowners

Homeowners who are displaced are entitled to money payments as well as assistance in finding a new home. If the homeowner buys and moves into a replacement home, he/she will be entitled to the difference in cost between the price paid for their present home and the new home, up to a maximum of $5,000. If the homeowner decides to rent instead of buying a new home, he/she will be entitled to the difference in cost between 24 months of rent and 12 percent of the price paid for the present home, up to a maximum of $5,000.

Relocation Assistance to Displaced Businesses, Farmers, and Non-Profit Organizations

Businesses, farmers, and non-profit organizations are entitled to choose between either a moving expense payment or a fixed relocation payment. The moving expense payment will reimburse actual expenses up to a maximum of $5,000. If the business does its own moving, it must submit two estimates provided from bona fide moving firms to receive payment. The business may elect to receive a fixed relocation payment instead of the moving expense payment. In this case the payment will equal the average net earnings of the business up to a maximum of $5,000.

5.10 PUBLIC FACILITIES

5.10.1 Potable Water

Potable water demand requirements for the West Loch Estates project consists of .8 MGD and will be provided by the Board of Water Supply (BWS) from the Waipio Heights III Well (.85 MGD) which is under construction. Reservoir storage capacity for the new 228' reservoir is planned for 1.5 MGD with final siting still to be determined. All off-site transmission lines necessary to bring water to West Loch Estates will be designed and installed to meet BWS standards. Utilization of non-potable water to fulfill the irrigation requirements of the project is also planned. An approved water allocation from the State Department of Land and Natural Resources (DLNR) is required and an application will be submitted to that agency. This allocation is for the brackish irrigation water system and is of non-potable quality.

5.10.2 Sanitary Sewer System

The anticipated sewage volume of 550,000 to 600,000 gallons per day (gpd) from the project site will be accommodated by the City and County's Ewa and Waipahu sewer systems. This figure is based on a peak hour flow of 2,313,750 gpd.

Increment I of the project will connect into the Waipahu sewage system and a 1,200-foot long, 12-inch relief line is planned to extend from the site to the Kunia Waste Water Pump Station. The line may be upgraded to a 15-inch sewer if necessary. Increment II of the project will connect into the Ewa sewer system through lines running under Ft. Weaver Road to an 84-inch interceptor line at Geiger Road. Waste will be treated at the Honouliuli Waste Water Treatment Plant (WWTP). A waste water pump station will be constructed at or near the Increment II of the project to accommodate flow requirements. Both the Waipahu and Ewa sewer systems have the needed capacity with the identified improvements above. All proposed improvements will be designed, built, and installed to meet City standards for capacity, operating efficiency, maintenance and economy.

These will include all transmission lines and pump stations.

The treatment, disposal, and interceptor sewer systems will be adequate to serve the proposed development. Waste water flows receive primary treatment at the Honouliuli Wastewater Treatment Plant and the effluent is disposed of by a deep ocean outfall.

The Board of Water Supply notes that "the project is located in the 'no pass zone' where ground disposal of wastewater is not permitted. Therefore, all domestic wastewater should be discharged into the City's sewer system serving the area."

5.10.3 Drainage

The runoff from the project site is presently directed into Honouliuli Stream or into West Loch of Pearl Harbor via existing drainage systems. Surface runoff flows to natural drainage outlets located to the south of the property. A portion of the drainage basin runoff flows into the Honouliuli flood plain. Ultimately, runoff from the entire drainage area is discharged into Pearl Harbor. Peak discharge from the existing drainage basin for a 100-year storm is calculated at 12,000 cubic feet per second (cfs).

The project area is bordered by Fort Weaver Road to the west, Waipahu Town and West Loch to the east. The site, which is partially cultivated in sugarcane presently, slopes towards Pearl Harbor, with elevations ranging from approximately 65 feet near Farrington Highway to 25 feet near the southwestern edge of the project site.

The project will include the construction of a street drainage system consisting of underground drainlines, drain manholes, and intake boxes designed in accordance to City and County of Honolulu standards. Collected runoff will be directed to the proposed golf course with its settlement ponds and finally into the Honouliuli Stream.

With the development of the project site certain changes to the quantity and quality of runoff can be anticipated. With the increase in paved areas it is anticipated that the quantity of water discharged will increase. As a result, the drainage system will be sized to accommodate a 10-year, 1-hour storm. This water will be directed to settling basins located in the proposed golf course.

It is further anticipated that the constituent quality of the runoff from the project site will change. Based on other studies of urban runoff (Dugan, 1986), it can be generally concluded that incremental changes per storm event for the proposed development could result in a decrease in nitrogen suspended solids as opposed to runoff from the site without the development. Total phosphorus, on the other hand, can be expected to increase.

5.10.4 Telephone and Electricity

Telephone service to the project will be provided by Hawaiian Telephone Company, and electricity will be provided by Hawaiian Electric Company.

Project electricity demand has been estimated at about five million volts per day. Two sets of electrical lines abut the project. An existing elevated line runs along Ft. Weaver Road, containing one 46-KV circuit and one 12-KV circuit. Another electrical line with two 46-KV circuits and one 12-KV

circuit runs along the Oahu Railway and Land Co. right-of-way and along the West Loch shoreline. Power to the site will originate from either the Kahe or Waiau generating plant. It is anticipated that Hawaiian Electric will need a new transformer station at or near the project site.

Telephone service will be provided by existing switching stations which are located near Waikele Street and Renton Road. An underground telephone cable linking Hickam Air Force base and Kunia crosses the mauka portion of the project site.

5.11 AGRICULTURAL IMPACTS

Impacts on agriculture were studied by Decision Analysts Hawaii, Inc. in September 1987. A summary of findings are presented below with the complete study included in Appendix J.

The development of West Loch Estates will result in the urbanization of approximately 206 acres of sugarcane lands which are currently under cultivation by Oahu Sugar Company, Ltd. (OSCo). However, the West Loch Estates-individually or in combination with other major projects planned and proposed for Ewa and Central Oahu-will not adversely affect the economic viability of OSCo, nor will it require layoffs of sugar workers. This assumes the continuation of historic development rates for housing projects-rates which would allow sufficient time to increase yields and thereby partially or completely compensate for the reduced acreage with little or no loss in production. Reductions in employment will occur through retirement and voluntary movement to other jobs. Over the long term, OSCo could accommodate a major reduction in acreage and maintain economies of scale by operating just one mill, rather than two in parallel.

If OSCo were to cease operations for whatever reason (most likely because of low sugar prices), the loss of jobs would be less than 490 direct jobs and 550 indirect jobs. This would be the equivalent of the loss of a hotel about half the size of the Hyatt Regency in Waikiki. Immediately following the mill closing, significant economic loss and social disruption would occur. But

over the long term, the economic loss would be absorbed easily by expanding economic opportunities in the Ewa/Central-Oahu area.

The development of West Loch Estates on sugarcane acreage will eliminate the possibility of using these lands for diversified agriculture (including aquaculture). However, it is extremely doubtful that this will adversely affect the growth of diversified agriculture in Hawaii. There are four reasons for this assessment: (1) an extensive amount of prime-agricultural land and water has been freed from sugar and pineapple production because of past mill closings and reductions in operations; (2) a very real possibility exists that additional land and water will be freed from sugar production given the outlook for low sugar prices; (3) some-if not most or even all-of the sugar operations would make their lands available for profitable replacement crops; and (4) compared to the available supply, a very small amount of land and water is required to grow proven and promising crops to achieve a realistc level of food and animal-feed self-sufficiency, and to increase exports. The increasing availability of prime agricultural land in Hawaii is part of a sequence of very long-term and accelerating trend occurring throughout most developed and developing market economies. Productivity and yields have been increasing faster than population growth, and genetic engineering and other advances, combined with slower population growth, indicate an acceleration of these trends. Rapid productivity and yield increases require that labor, land, and other resources be withdrawn from agriculture in order to restore balanced markets and to increase farm income for those who remain.

Since the West Loch Estates will not adversely affect the economic viability of OSCo, and will not limit the growth of diversified agriculture, the project is consistent with the major thrust of the agricultural portion of the Hawaii State Plan and the State Agriculture Functional Plan, which is to preserve the economic viability of plantation agriculture and to promote the growth of diversified agriculture. Also, the project would provide a public benefit (i.e., affordable housing) which would override the proposed "important agricultural lands" designation of the Land and Evaluation Site Assessment (LESA) Commission. Further more, the project would not adversely affect

cultivation of adjacent sugarcane acreage and, therefore, complies with the Hawaii Right-to-Farm Act.

The project is also consistent with County policies of directing population growth to Ewa, which by definition must occur at the expense of sugarcane acreage.

VI. RELATIONSHIP TO PLANS, POLICIES, AND CONTROLS

6.1 HAWAII REVISED STATUTES, CHAPTER 226 HAWAII STATE PLAN

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

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

Specifically, the Hawai State Plan details objectives and policies in the various areas such as population, the economy, physical environment, facility systems, socio-cultural advancement, agricultural lands, and fiscal management. The West Loch Estates project is consistent with many of the goals and policies of the Hawaii State Plan and substantially fulfills its objectives.

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

The West Loch Estates project, as a planned community, fulfills this policy of directing population growth toward Ewa, and provides increased housing opportunities for Hawaii's people.

6.1.2 Economy H.R.S. Section 226-6

The West Loch Estates project as a major development, will involve a substantial amount of construction activity resulting in additional employment opportunities in the Ewa district of Oahu. The project will also include commercial, recreational and educational facilities which will create new secondary employment opportunities over the long term.

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

The West Loch Estates project fulfills the objectives articulated by this part of the Plan by providing and/or improving public access to scenic ocean views through the use of open space and landscaping and limiting building heights. The project concept respects the rural and historic character of the surrounding area and is consistent with development plans for the Ewa Plain.

6.1.4 Water H.R.S. Section 226-16

The development of water sources for the development area is contingent upon approval by the State Department of Land and Natural Resources (DLNR) as the development area is within the Pearl Harbor Groundwater Control Area. Non-potable water will be utilized to irrigate the park, open space and landscaped areas of the project site. Facilities for the development, transmission, storage, and distributon of potable and non-potable water requirements of the project will be installed by the City.

The potable water requirements for Increments I and II of the project will be serviced by the Waipio Heights III project planned by the Board of Water Supply.

6.1.5 Housing H.R.S. Section 226-19

The West Loch Estates project is intended to address the need for affordable housing and the majority of the housing units will be targeted to be sold to this income group. A portion of the project has also been planned for much needed housing for the elderly.

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

6.1.6 Education H.R.S. Section 226-21

The West Loch Estates project is located in close proximity to existing public school facilities, however, a school site has been included to the plans for the development and will accommodate the expected increase in the number of school age children.

6.1.7 Agriculture H.R.S. Section 226-7

Portions of the West Loch Estates project are located in the State Agricultural District. The site consists of soils having classification ratings of B and C ratings according to the Detailed Land Classification, Island of Oahu study conducted by the University of Hawaii Land Study Bureau in 1972. A substantial portion of the site has already been withdrawn from cultivation and the remainder is scheduled for fallowing in 1990. The proposed West Loch Estates project will not adversely affect the economic viability of OSCo nor limit the growth of diversified agriculture. As such, the project is consistent with the major thrust of the agricultural portion of the Hawaii State Plan and the State Agriculture Functional Plan, which are intended to preserve the economic viability of sugar and pineapple and to promote the growth of diversified agriculture.

6.1.8 Transportation H.R.S. Section 226-17

The West Loch Estates project will incorporate measures that encourage the use of mass transit and multiple ridership of private vehicles. These measures are intended to minimize traffic impacts and address the State Plan objective of integrated multi-modal transportation systems. Additionally, the proposed traffic management plan should facilitate meeting the objective of transportation system support for planned growth objectives.

6.2 HAWAII STATE FUNCTIONAL PLANS

As a means of furthering the Hawaii State Plan, Hawaii Revised Statutes, Chapter 226, the 1984 State Legislature, by concurrent resolution, adopted

ten Functional Plans to serve as guidelines for the State of Hawaii. The West Loch Estates project conforms with the applicable objectives and policies of these Functional Plans. While a portion of the site does consist of higher agricultural quality soils, it is either already in fallow or scheduled for fallowing in 1990.

6.2.1 State Housing Plan

The West Loch Estates project will address the need for affordable housing by providing home ownership opportunities to those whose incomes will not permit them to participate in the conventional home buying market. Additionally, the market and elderly housing units that are included as a part of the West Loch Estates Master Plan assures that it will provide a diversity of housing types and serve a wide socio-economic range of households.

6.2.2 State Water Resources Development Plan

West Loch Estates will not impair the capacity of the Pearl Harbor Ground Water Control Area as the potable water demand will be within the stated limits of the PHGWCA due to the decreased requirements of agriculture - primarily sugar cultivation.

6.2.3 State Energy Plan

The West Loch Estates project is located in an easily serviceable and concentrated area that is adjacent to existing urban development. Utilization of energy saving devices and energy conservation will be encouraged through homeowner training and orientation programs provided by the City.

6.2.4 State Health Plan

Residents of the West Loch Estates will have access to health care facilities available at the Waipahu Clinic and the planned St. Francis Medical Center-West. The Waipahu Clinic is designed to serve the basic health needs of those residing in the area from Waipahu to Waianae, and offers a variety of

services such as physical, occupational speech therapy; public health nursing; children's health services, Hansens's disease clinics; and complete mental health services. The St. Francis Hospital-West facility, when completed, will include a comprehensive emergency and ambulatory care center, a full service hospital, a major medical office building, a medical education center, day care facilities, and a "wellness" center.

6.2.5 State Agriculture Plan

While the West Loch Estates project will result in a decrease of the availability of agricultural land, the site is already in fallow or scheduled for fallowing in 1990, and will not adversely affect the agricultural industry. The anticipated impact on overall agricultural activity in Hawaii, will be negligible.

6.2.6 State Transportation Plan

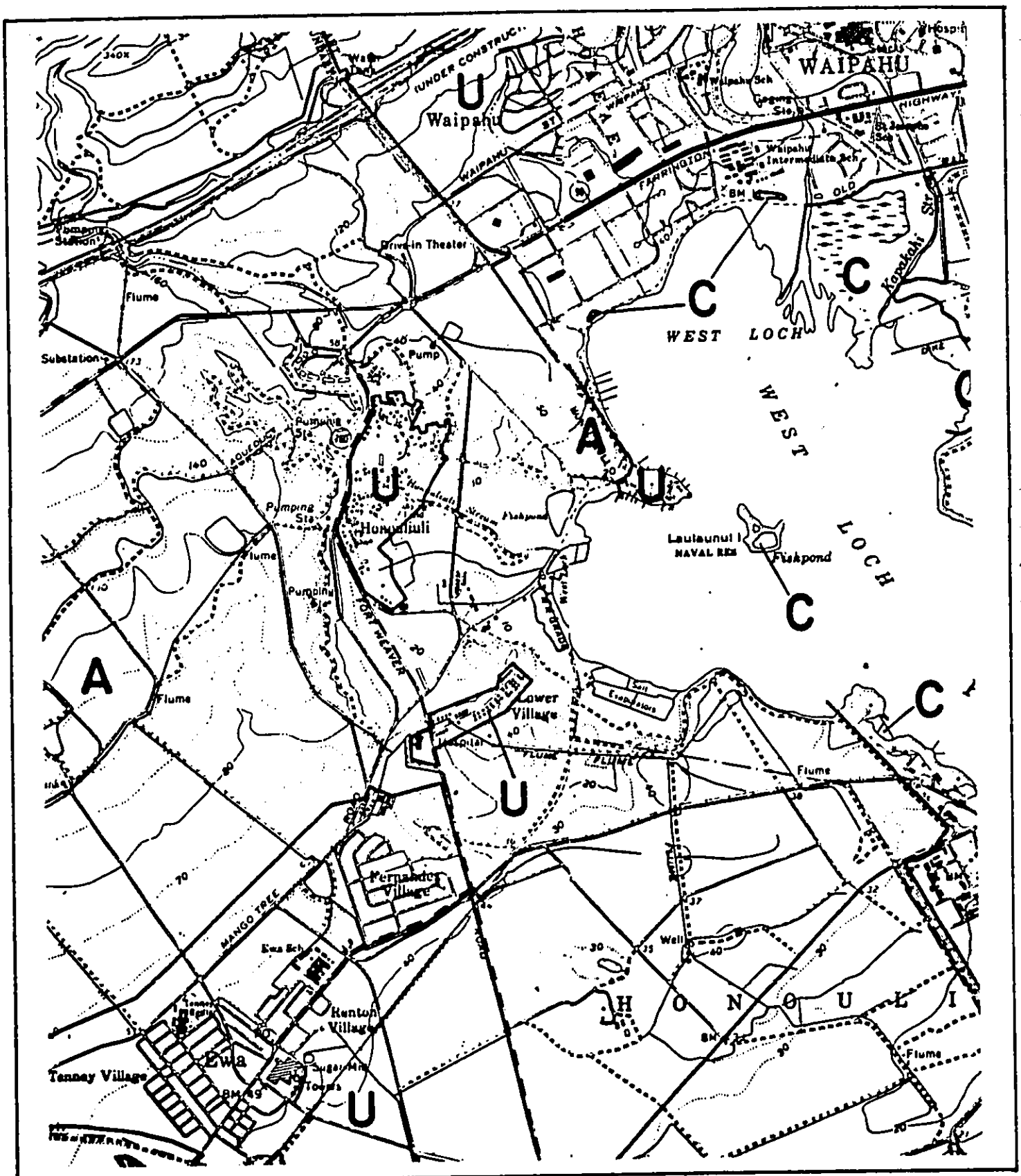
The proposed traffic management plan and ride-share and park-and-ride facilities being planned as a part of the West Loch Estates project are expected to contribute significantly towards meeting the State Transportation Functional Plan objective of developing a balanced, multi-modal transportation system. A small commercial area and employment centers in the region are also expected to divert town-bound traffic and thereby minimize interchange congestion.

6.3 STATE LAND USE

Most of the project site is classified within the State Agricultural District. A small part of the site adjacent to Waipahu is within the Urban District (Figure 6).

6.4 GENERAL PLAN

The City's planning policies are embodied in the General Plan which is a statement of long-range social, economic, environmental and design objectives



West Loch Estates

STATE LAND USE MAP

Ewa, Oahu, Hawaii

Figure: 8

for the general welfare and prosperity of the people of Oahu. The General Plan also contains broad policies intended to facilitate the fulfillment of the Plan's objectives. The General Plan is implemented by regional Development Plans which provide relatively detailed guidelines for the physical development of Oahu.

The West Loch Estates project conforms with the broad objectives and policies contained within the General Plan. Although the project does involve the use of agricultural acreage, there will be no effect upon agriculture on Oahu as the land is either in fallow or scheduled for fallowing in 1990. As such, it fully conforms with the requirements of the General Plan. Economic Activity, Objective C.

Further, the project actively promotes Housing Objective A, "To provide decent housing for all the people of Oahu at prices they can afford."

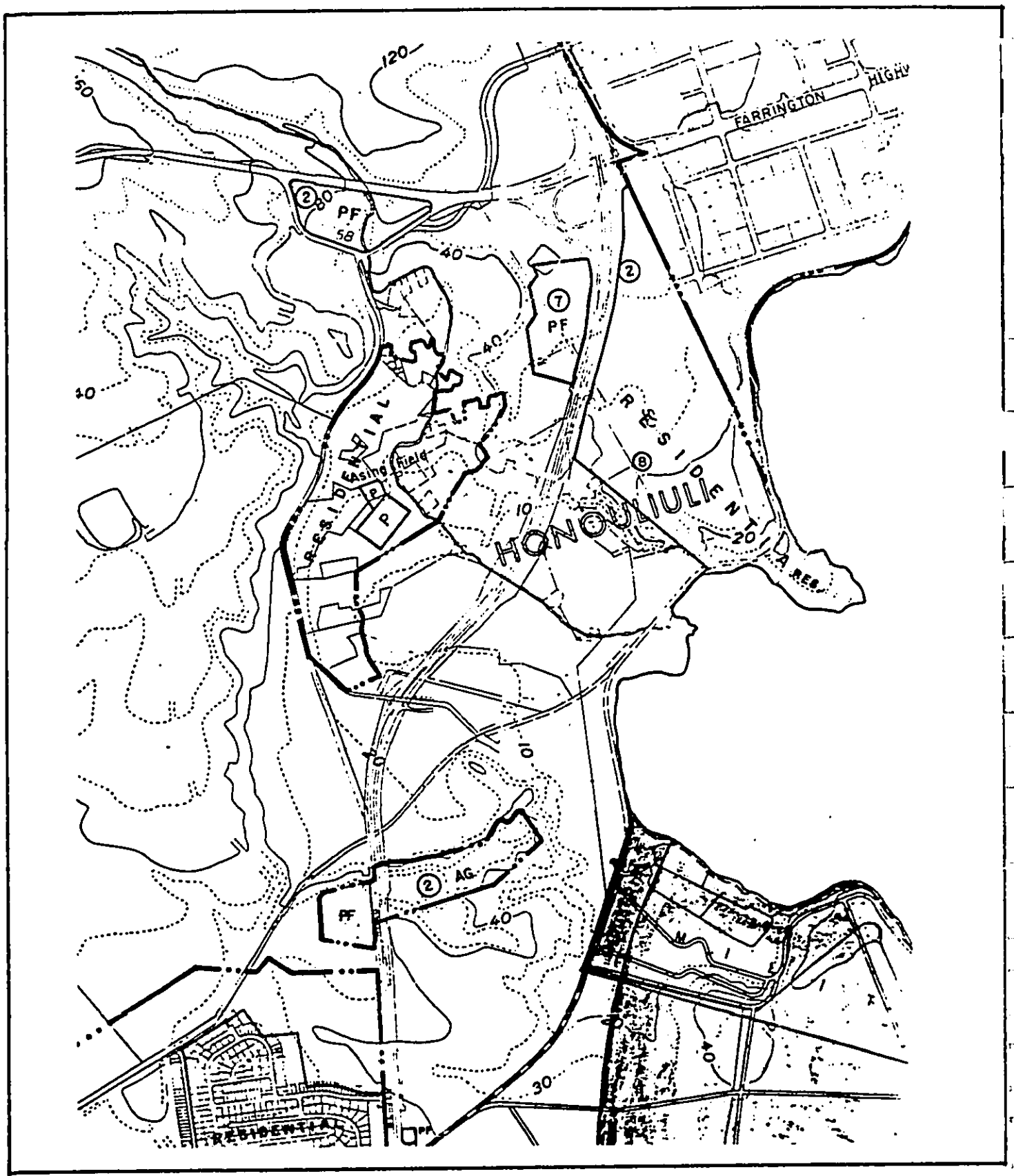
In other areas the West Loch Estates project is consistent with the objectives of the General Plan as it is contiguous with existing urbanized areas, and has reasonable access to the necessary infrastructure. It should be noted that the project is located in the Ewa district which is targeted for major growth and has been designated as the second urban center for Oahu.

6.5 EWA DEVELOPMENT PLAN

The City Development Plan (DP) Land Use Map designates West Loch Estates Increment I for residential use (Figure 7). A DP Land Use Map amendment is being processed which would redesignate Increment II from agricultural to residential use.

6.6 LAND USE ORDINANCE/COUNTY ZONING

Most of the project area is currently zoned AG-1. Minor portions of the project site are zoned R-5 and reflect existing residential use (Figure 8).

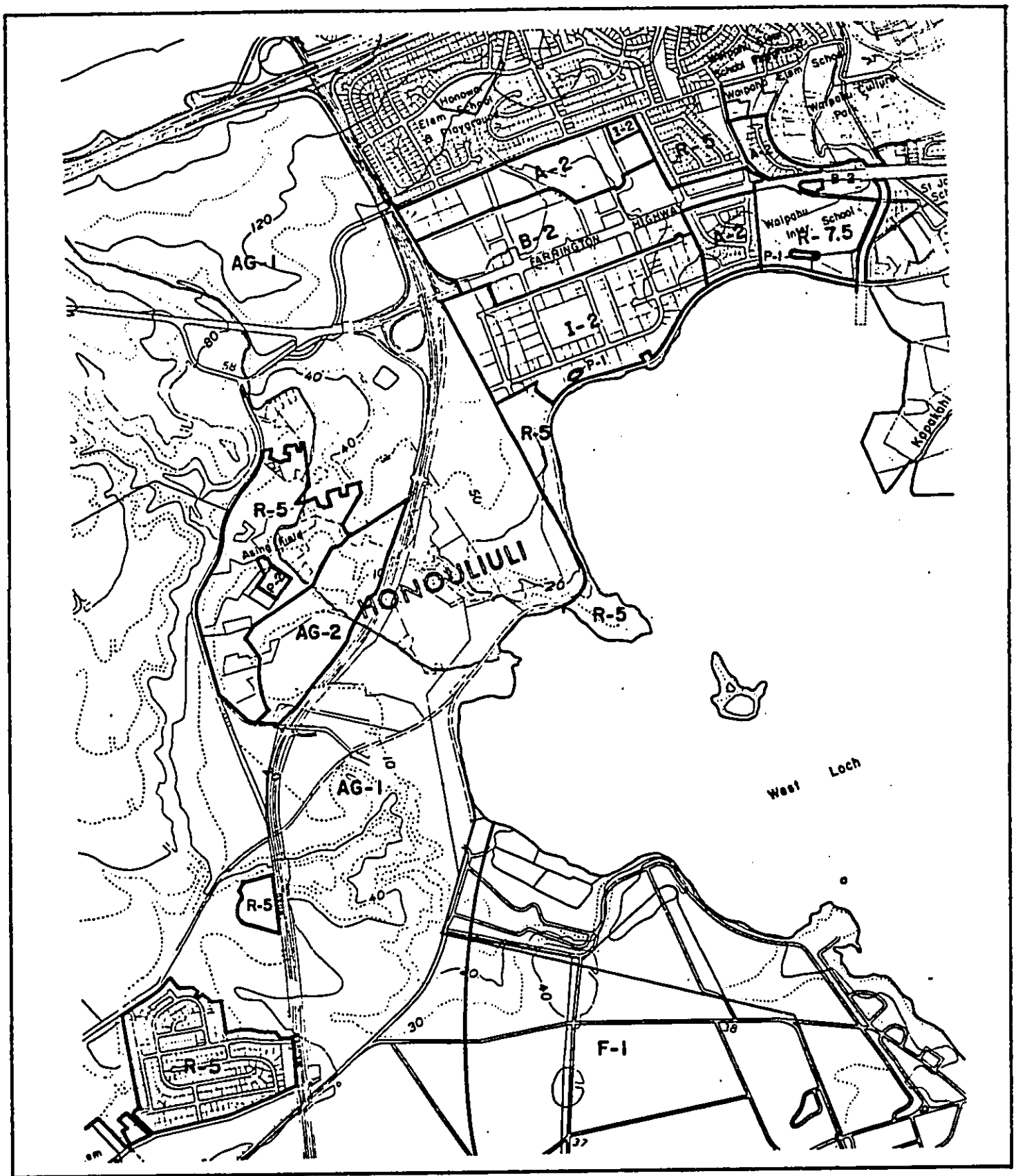


West Loch Estates

DEVELOPMENT PLAN MAP

Ewa, Oahu, Hawaii

Figure: 9



West Loch Estates

ZONING MAP

Ewa, Oahu, Hawaii

Figure:

10

6.7 H.R.S. CHAPTER 205-A COASTAL ZONE MANAGEMENT ACT

Portions of the West Loch Estates Increment II project site are designated as a special management area for which a permit is required pursuant to H.R.S. Chapter 205-A. The entire project site is within an area controlled by the CZMA and is, therefore, subject to H.R.S. Chapter 205-A's objectives and policies.

6.8 ENVIRONMENTAL IMPACT STATEMENT REQUIREMENTS

Prior to Department of Housing and Community Development's implementation of the West Loch Estates project, acceptance of the Final Environmental Impact Statement by the Mayor, through the Department of Land Utilization, is required. This Environmental Impact Statement has been prepared in accordance with Chapter 343 of the Hawaii Revised Statutes.

6.9 CITY AND COUNTY OF HONOLULU, CAPITAL IMPROVEMENT PROGRAM (CIP)

The initial funding necessary for implementation of the West Loch Estates project has already been appropriated by the City & County of Honolulu as a part of its' CIP Program for the 1987-88 Fiscal Year. The amount of $19.625 million dollars has been budgeted for land acquisition, planning and engineering, and relocation assistance. (Budget Ordinance 87-71).

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

Implementation of the proposed project will result in the commitment of the necessary construction materials and human resources (in the form of planning, designing, engineering, construction labor, landscaping, and personnel for the sales, management, services, offices, and maintenance functions). Some of the construction materials could be reused if and when the structures are demolished; however, at the present time and in view of the state of our economy, it is believed that the reuse of much of these materials is not practical. The people providing the labor necessary to implement and complete the project will be compensated during its various stages by the developer, construction and related businesses, and the City and State government.

The appearance of the project site will be altered from its present agricultural/fallowed appearance to that of a master planned residential community. The development will be visually prominent but well integrated with the surrounding areas.

The air and noise environment will be affected by the proposed project, however, these impacts are typical of urban residential developments. While ambient air quality and noise levels in the area is relatively good, the proposed development will result in greater number of vehicles going to and from the project areas, resulting in increased vehicular emissions. Compliance with existing State Air and Noise Quality Standards and Federal Air and Noise Quality Standards should not be affected. Relative to Air Quality Standards, the Federal requirement to use unleaded fuel, has resulted in "improved" automobile emission levels.

The project will result in a use commitment of the land for a long-term period. Once a residential use is established, it is unlikely that the land

would revert to a lower use except over a long term. Commitment of land for these purposes will foreclose certain use options for the land, such as open space and agriculture.

The residential and related use provided by the project will benefit its homeowners, the landowner, and commercial enterprises over both the short- and long-term. Furthermore, its affordable housing objectives address a critical need in the community that will potentially benefit all of Oahu's people.

VIII. ANY PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

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

(1) Large-scale agricultural use of the land will no longer be possible.

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

(3) Traffic will increase due to the number of additional vehicles utilized by residents of the proposed development. Additional impacts associated with increased traffic include probable reduction of air and noise quality. The specialized studies made as a part of preparing this document indicate that adequate setbacks or other mitigation measures such as sound attenuating berms or walls along Fort Weaver Road will adequately accommodate the traffic noise added by the proposed development.

(4) The project will result in additional demand for utility services.

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

(6) Solid waste and sewage generated by the project will increase the demand for disposal and treatment services and increase total waste output in that locale.

(7) A number of families and businesses will be displaced by the project. Assistance provided by the Relocation Unit of the City Department of Housing and Community Development in the form of relocation services, compensation and financial assistance will serve as mitigation.

(8) Some disturbance of the Wildlife/Bird sanctuary is likely to be caused by the project. Mitigative measures primarily in the form of a 300-foot buffer zone, and landscaping to minimize the effects of noise and lights, fencing, etc. are planned.

(9) The adverse effect of increased storm water runoff and the constiuent quality of such runoff on the waters of West Loch will be mitigated by a drainage system within the Honouliuli Flood Plain designated to provide the capacity necessary for retention and settlement prior to out flow.

The manner by which the project meets community and social needs and conforms with the policy objectives of the State and County governments are thoroughly described in Chapter VI: "Relationship to Plans, Policies, and Controls." The project is also intended to meet the critical need for affordable housing and fully conforms with the Hawaii State Plan and the General Plan of the City and County of Honolulu.

IX. SUMMARY OF UNRESOLVED ISSUES

State Land Use Boundary Amendment

The majority of the land area within the project site is currently designated for agriculture use by the State Land Use Commission. A petition for boundary amendment will be filed with the Commission to have the site designated for urban. Until this petition is filed and approval granted, the project site will remain in an agricultural use.

Site Aquisition

Most of the project site is owned by the James Campbell Estate, however, a number of smaller parcel owners will also be affected. Negotiations between the landowners and the City and County of Honolulu are currently underway and neither agreement to purchase nor the terms of such agreement have yet been finalized. The City may proceed with the project by utilizing its power of eminent domain and acquiring the property through condemnation.

City Council Approval

Incorporation of the West Loch Estates project is subject to the approval of the City Council of the City and County of Honolulu. That body must authorize the condemnation and appropriate funds for construction before the project can proceed.

X. LIST OF ORGANIZATIONS AND AGENCIES CONSULTED DURING EISPN REVIEW

10.1 ORGANIZATIONS AND AGENCIES

Agency	Date of Comment	Date Comment Received	Response to Comment
State			
Dept. of Agriculture	6/17/87	6/22/87	9/16/87
	8/05/87	8/07/87	
Dept. of Education	6/08/87	6/16/87	9/16/87
	7/15/87	7/17/87	
Dept. of Health	6/19/87	6/25/87	9/16/87
	7/31/87	8/06/87	
Hawaii Housing Authority	6/17/87	6/19/87	9/16/87
	7/20/87	7/23/87	
Dept. of Land and Natural Resources	6/23/87	6/24/87	9/18/87
	8/07/87	8/10/87	9/18/87
Dept. of Planning and Economic Development	6/10/87	6/18/87	9/16/87
Dept. of Business and Economic Development	7/29/87	7/31/87	9/16/87
Dept. of Transportation	6/22/87	6/25/87	9/16/87
	7/17/87	7/22/87	
Land Use Commission	5/27/87	6/01/87	9/16/87
	7/24/87	7/28/87	
OEQC	5/28/87	6/04/87	9/16/87
City			
Board of Water Supply	6/09/87	6/10/87	9/16/87
	7/10/87	7/13/87	
Building Department	6/02/87	6/05/87	9/16/87
	7/13/87	7/14/87	
Dept. of General Planning	5/18/87	5/20/87	9/16/87
	7/27/87	7/29/87	
Dept. Land Utilization	6/08/87	6/08/87	9/16/87
	7/14/87	7/15/87	
Dept. of Parks & Recreation	6/29/87	7/01/87	9/16/87
Dept. Public Works	6/05/87	6/08/87	9/16/87
	7/07/87	7/08/87	
Dept. of Transportation Services	6/15/87	6/15/87	9/16/87
	7/23/87	7/30/87	
Office of Human Resources	6/10/87	6/15/87	9/16/87
	7/22/87	7/22/87	

Agency	Date of Comment	Date Comment Received	Response to Comment
Fire Department	6/15/87	6/16/87	9/16/87
Police Department	6/02/87	6/08/87	9/16/87
	7/10/87	7/14/87	
Federal			
Dept. of Army	6/12/87	6/17/87	9/16/87
	7/17/87		
Dept. of Navy	7/20/87	7/22/87	9/16/87
	4/06/87		
U.S. Dept. of Housing & Urban Development, Region IX	7/20/87	7/21/87	9/16/87
U.S. Fish & Wildlife Service	6/22/87	6/23/87	9/16/87
	8/07/87	8/10/87	
Private Agencies/Individuals			
Ewa Neighborhood Board No. 23	6/18/87	6/18/87	9/16/87
HI's Thousand's Friends	7/16/87	7/17/87	9/16/87

XI. COMMENTS AND RESPONSES DURING EIS PREPARATION NOTICE

JOHN WAIHEE
GOVERNOR

SUZANNE D. PETERSON
CHAIRPERSON, BOARD OF AGRICULTURE

TADASHI TOJO
DEPUTY TO THE CHAIRPERSON

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

Mailing Address:
P. O. Box 22159
Honolulu, Hawaii 96822-0159

June 17, 1987

87 JUN 22 A8:57
DEPT. OF HOUSING & COMM. DEVELOPMENT

Mr. Mike Moon, Director
Department of Housing and Community Development
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Moon:

Subject: Environmental Assessment Notice for
West Loch Estates Housing Project
Department of Housing and Community Development
TMK: 9-1-17: 06, 9-11, 13, 14, 18, 31 & 32
Eva, Oahu
Acres: 448

The Department of Agriculture has reviewed the Environmental Assessment notice for the subject housing project and has the following comments to offer.

According to the project description, the proposed development will provide 1,500 residential units, a 157-acre golf course and another 59.4 acres of parks. The proposed project consists of three nearly adjacent areas. The subject areas are predominantly within the State Agricultural District as indicated on the "project description".

The subject lands are largely classified "Prime" and "Other Important" according to the Agricultural Lands of Importance to the State of Hawaii (ALISH) system, except the proposed shoreline park area which is not classified. This information should be included in the Environmental Assessment.

The Environmental Assessment should also include discussion on the following issues that may be affected by the proposed development:

- a complete soils description, with references to the Land Study Bureau Overall Productivity Rating system and the Soil Conservation Service Soil Survey, which indicate the agricultural suitability of the site;

- the impact on the economic viability of Oahu Sugar Company resulting from the cessation of sugarcane production on the subject lands;
- the impact on the remaining sugarcane fields adjacent to the project site (the Hawaii Right-to-Farm Act, Chapter 165, HRS, limits the circumstances under which pre-existing farming activities may be deemed a nuisance);
- the impact of this development on future agricultural production and expansion of diversified agriculture;
- the potential of establishing viable alternative agricultural uses on the agricultural-designated lands in the project site;
- the broader economic and resource impact on the State from the irrevocable loss of prime agricultural lands at the site;
- conformity to the State Agriculture Functional Plan and its objectives and policies, particularly, Implementing Action B(5)(c);
- conformity to the Hawaii State Plan priority guidelines 226-104(b)(2) and 226-106(1), which direct development into marginal or non-essential agricultural land to meet housing needs and "...(maintain) agricultural lands of importance in the agricultural district";

Thank you for the opportunity to comment. We will provide further comment upon our receipt and review of the Draft Environmental Impact Statement.

Sincerely,

Suzanne D. Peterson

SUZANNE D. PETERSON
Chairperson, Board of Agriculture

cc: Mr. William Balfour, President and Manager,
Oahu Sugar Company
DPED
OEQC
DGP

JOHN WAIHEE
GOVERNOR

SUZANNE D. PETERSON
CHAIRPERSON, BOARD OF AGRICULTURE

TADASHI TOJO
DEPUTY TO THE CHAIRPERSON

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

Mailing Address:
P. O. Box 22159
Honolulu, Hawaii 96822-0159

August 5, 1987

'87 AUG -7 P2:16
DEPT. OF HOUSING & COMM. DEVELOPMENT

MEMORANDUM

To: Mr. Mike Moon, Director
Department of Housing and Community Development

Subject: Environmental Impact Statement Preparation Notice (EISPN) for West Loch Estates Subdivision Development
Ewa, Oahu 466 acres
TMK: 9-1-17: various
9-1-20: various
9-1-21: various
9-4-48: 74

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

According to our records, the proposed project was the subject of an Environmental Assessment Notice to which we provided comments to your department (see attached copy of our letter dated June 17, 1987). Inasmuch as the difference between the earlier project description and that of the subject project is 18 additional acres to the golf course, please be apprised that the concerns we had earlier remain applicable to the subject project.

To reiterate, the concerns that should be addressed in the Draft EIS are as follows:

- a complete soils description with references to the Agricultural Lands of Importance to the State of Hawaii (ALISH) system, Land Study Bureau Overall Productivity Rating system and the Soil Conservation Service Soil Survey which indicate the suitability of agricultural use of the site;

- the impact on the economic viability of Oahu Sugar Company resulting from the cessation of sugarcane production on the subject lands;

- the impact on the existing sugarcane fields adjacent to an urban development (The Hawaii Right-to-Farm Act, Chapter 165, HRS, limits the circumstances under which

pre-existing farming activities may be deemed a nuisance);

- the impact of this development on future agricultural production requirements and expansion of diversified agriculture, as identified in the Final Report of the Land Evaluation and Site Assessment (LESA) Commission (February, 1986);

- the potential of establishing viable alternative agricultural uses on the agricultural-designated lands in the project site;

- the broader economic and resource impact on the State from the irrevocable loss of prime agricultural lands;

- conformity to the State Agriculture Functional Plan and its objectives and policies, particularly, Implementing Action B(5)(c), and;

- the relationship to the Hawaii State Plan priority guidelines 226-104(b)(2) and 226-106(1), which direct development into marginal or non-essential agricultural land to meet housing needs and "...(maintain) agricultural lands of importance in the agricultural district".

Thank you for the opportunity to comment. We will provide further comment upon our receipt and review of the Draft Environmental Impact Statement.

Tadashi Tojo
SUZANNE D. PETERSON
Chairperson, Board of Agriculture

cc: Mr. William Balfour, President and Manager, Oahu Sugar Company
DBED
OEQC
DGP

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4141

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

September 16, 1987

Ms. Suzanne D. Peterson, Chairperson
Department of Agriculture
1428 South King Street
Honolulu, Hawaii 96814-2512

Dear Ms. Peterson:

Subject: Environmental Impact Statement Preparation Notice for:
West Loch Estates Development, Ewa, Oahu

Thank you for your comments of June 17 and August 5, 1987 relating to the proposed West Loch development.

We are in the process of preparing a Master Plan and an Environmental Impact Statement (EIS) for the proposed development. As part of the master planning, we are conducting a special study to assess the impact of this development on the Oahu Sugar Company and sugar production in general, as well as the viability of alternative agricultural ventures in the area.

While we are responsible for the protection of agricultural lands, we are also charged with the responsibility of providing affordable homes for our citizens. We believe that a balance between agricultural needs and the need for affordable housing is necessary. The West Loch Estates development and its location on lands that are largely of lower productivity, represents such a balance.

The proposed golf course and beach park have been separated from the original Environmental Impact Statement Preparation Notice (EISPN) that was submitted on June 30, 1987. It was determined that it would be inappropriate to combine both projects under a single Notice as the projects are not related to one another, will be administered by different departments and involve separate funding.

Please provide all comments relative to the housing projects to this office and if you have comments specifically concerning the golf course and park, they should be directed to the Department of Parks and Recreation. A separate EISPN has been prepared and submitted to the Office of Environmental Quality Control by that Department.

Your willingness to assist in the planning of this development is greatly appreciated. If you should have any questions or additional comment and suggestions, please direct them to Mr. Howard Murai, Project Manager at 527-5321. Thank you again.

Sincerely Yours,

Robert Miyasato
for Mike Moon
Director

SEP 16 1987

JOHN WAIHEE
GOVERNOR

CHARLES T TOGUCHI
SUPERINTENDENT

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

OFFICE OF THE SUPERINTENDENT

'87 JUN 16 P2:51
DEPT. OF HOUSING
& COMM. DEVELOPMENT

June 8, 1987

Mr. Mike Moon, Director
Department of Housing and Community Development
City and County of Honolulu
650 S. King Street
Honolulu, Hawaii 96813

Dear Mr. Moon:

SUBJECT: West Loch Estates Housing Project

Our review of your proposed housing project indicates that it may generate the following additional enrollment in our area schools:

SCHOOL	GRADES	APPROXIMATE ENROLLMENT
Ewa Elementary	K-6	240 - 480
Ilima Intermediate	7-8	90 - 170
Campbell High	9-12	160 - 240

Schools at all levels in this service area are operating at capacity. Budgeting for additional classrooms will be necessary to accommodate the anticipated enrollment growth at Ilima Intermediate and Campbell High School.

A site for a new elementary school should be identified within the project. Additional classrooms at Ewa Elementary or bussing to nearby elementary schools will be necessary during the initial phase of the project.

Please keep us informed of any changes to your development plans so that we may be able to adjust to changing needs.

Sincerely,

Charles T. Toguchi

Charles T. Toguchi
Superintendent

CTT:jl

cc E. Imai, OBS
E. Nakano, Leeward Dist.

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

JOHN WAIHEE
GOVERNOR

CHARLES T TOGUCHI
SUPERINTENDENT

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

OFFICE OF THE SUPERINTENDENT

'87 JUL 17 P1:27
DEPT. OF HOUSING
& COMM. DEVELOPMENT

July 15, 1987

Mr. Mike Moon, Director
Department of Housing and Community Development
City and County of Honolulu
650 S. King Street
Honolulu, Hawaii 96813

Dear Mr. Moon:

SUBJECT: West Loch Estates Housing Project

Our review of your proposed development indicates that our response dated June 8, 1987, is still valid.

Please keep us informed of any changes to your plans.

Sincerely,

Charles T. Toguchi

Charles T. Toguchi
Superintendent

CTT:jl

attach.

cc E. Imai, OBS
E. Nakano, Leeward Dist.

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4181

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

September 16, 1987

Mr. Charles T. Toguchi, Superintendent
Department of Education
P.O. Box 2360
Honolulu, Hawaii 96804

Dear Mr. Toguchi:

Subject: Environmental Impact Statement Preparation Notice for:
West Loch Estates Development, Ewa, Oahu

Thank you for your comments of June 8 and July 15, 1987 relating to the proposed West Loch development.

We are in the process of preparing a Master Plan and Environmental Impact Statement (EIS) for the proposed development and appreciate your comments relating to the availability of educational facilities in the Ewa area.

As part of the planning for this new community, we are proposing that lands be set aside for further Department of Education (DOE) requirements. Further, we are proposing that 20 acres be designated for a district park which will include recreational facilities that can be used to augment recreational requirements at the planned school site.

The proposed golf course and beach park have been separated from the original Environmental Impact Statement Preparation Notice (EISPN) that was submitted on June 30, 1987. It was determined that it would be inappropriate to combine both projects under a single Notice as the projects are not related to one another, will be administered by different departments and involve separate funding.

Please provide all comments relative to the Housing projects to this office and if you have comments specifically concerning the golf course and park, they should be directed to the Department of Parks and Recreation. A separate EISPN has been prepared and submitted to The Office of Environmental Quality Control by that Department.

Your willingness to assist in the planning of this development is greatly

appreciated. If you should have any questions or additional comment and suggestions, please direct them to Mr. Howard Mural, Project Manager at 527-5321. Thank you again.

Sincerely Yours,

Robert Miyasato

Mike Moon
Director

SEP 16 1987

JOHN WAIHEE
GOVERNOR OF HAWAII

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

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

In reply, please refer to:
EPHSO

June 19, 1987

'87 JUN 25 P1:36
DEPT. OF HOUSING
COMM. DEVELOPMENT

MEMORANDUM

To: Mr. Mike Moon, Director, Department of Housing & Community Development
City and County of Honolulu

From: Director of Health

Subject: West Loch Estates Housing Project, Honouliuli, Ewa, Oahu

Thank you for allowing us to review and comment on the subject environmental assessment. The following are our recommendations of matters which should be addressed in the environmental assessment:

Air Pollution

The environmetal assessment should include the potential impact on the ambient air quality as a result of the increase in vehicular activity from the proposed project and all other projects which were previously approved but have not started construction. Projections on the increased traffic volume and the impact on the ambient air quality should be for the associated corridors, roadways, and highways. The results should be compared to the State and Federal ambient air quality standards. Should a potential violation be determined, the EIS should address the mitigating actions which shall be implemented.

Wastewater Disposal

The environmental assessment should address how the sewage generated by the proposed project will be collected and treated at the Honouliuli Wastewater Treatment Facility.

Noise

1. The project includes residential areas adjacent to recreational areas (golf courses and parks). Noise from recreational and grounds maintenance activities may adversely affect the residents of the project.

2. Noise from aircraft flights may adversely affect the residents of the project.

3. Construction activities must comply with the provisions of Title 11, Administrative Rules Chapter 43, Community Noise Control for Oahu.

   a. The contractor must obtain a noise permit if the noise levels from the construction activities are expected to exceed the allowable levels of the rules.

   b. Construction equipment and on-site vehicles requiring an exhaust of gas or air must be equipped with mufflers.

   c. The contractor must comply with the conditional use of the permit as specified in the rules and conditions issued with te permit.

4. Traffic noise from heavy vehicles travelling to and from the construction site must be minimized near existing residential areas and must comply with the provisions of Title 11, Administrative Rules Chapter 42, Vehicular Noise Control for Oahu.

JOHN C. LEWIN, M.D.

JOHN WAIHEE
GOVERNOR OF HAWAII

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

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

July 31, 1987

'87 AUG -6 P1:33
DEPT. OF HOUSING & COMM. DEVELOPMENT

In reply, please refer to:
EPHSD

MEMORANDUM

To: Mr. Mike Moon, Director, Department of Housing & Community Development
City & County of Honolulu

From: Deputy Director for Environmental Health

Subject: Environmental Impact Statement Preparation Notice--Proposed West Loch Estates Subdivision Development, Ewa, Oahu

Thank you for allowing us to review and comment on the subject EISPN. We provide the following comments:

Vector Control

The proposed development is in a persistent mosquito breeding area. The new residents will probably complain even if forwarned about the situation.

Administrative Rules on demolition and clearing of vacant land must be strictly adhered to.

Noise

Our noise concerns toward this proposed project were addressed in a memorandum to your office dated June 12, 1987. The following additional comment should be included to our previous concerns: Noise from vehicles travelling along Fort Weaver Road may have an adverse effect on residents of the proposed project.

Mitigative measures or provisions for compliance with noise rules must be included in the EIS.

Drinking Water

According to the proposal, West Loch Estates I can be serviced by existing and planned Board of Water Supply sources and distribution systems; however, West Loch Estates Increment II will require the development of new water sources. Please note that all new sources will be subject to all applicable terms and conditions of Chapter 20, Title 11, Administrative Rules.

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

Bruce S. Anderson
BRUCE S. ANDERSON, Ph.D.

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4181

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

September 16, 1987

Dr. John C. Lewin
Director of Health
P.O. Box 3378
Honolulu, Hawaii 96801

Dear Dr. Lewin:

Subject: Environmental Impact Statement Preparation Notice for:
West Loch Estates Development, Ewa, Oahu

Thank you for your comments of June 19 and July 31, 1987 relating to the proposed West Loch development.

We are in the process of preparing a Master Plan and an Environmental Impact Statement (EIS) for the proposed development and appreciate your comments relating to vector control, air pollution, wastewater disposal, and noise. These impacts will be discussed in specific studies and evaluations conducted as a part of the environmental process. The findings of our studies will be presented in the Draft EIS.

The proposed golf course and beach park have been separated from the original Environmental Impact Statement Preparation Notice (EISPN) that was submitted on June 30, 1987. It was determined that it would be inappropriate to combine both projects under a single Notice as the projects are not related to one another, will be administered by different departments and involve separate funding.

Please provide all comments relative to the Housing projects to this office and if you have comments specifically concerning the golf course and park, they should be directed to the Department of Parks and Recreation. A separate EISPN has been prepared and submitted to the Office of Environmental Quality Control by that Department.

Your willingness to assist in the planning of this development is greatly

appreciated. If you should have any questions or additional comment and suggestions, please direct them to Mr. Howard Murai, Project Manager at 527-5321. Thank you again.

Sincerely Yours,

Robert Miyasato for
Mike Moon
Director

SEP 16 1987

JOHN WAIHEE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF SOCIAL SERVICES AND HOUSING
HAWAII HOUSING AUTHORITY
P. O. BOX 17907
HONOLULU, HAWAII 96817

RUSSELL N. FUKUMOTO
EXECUTIVE DIRECTOR

IN REPLY REFER

TO:

87:PLNG/2517

87 JUN 19 P2:05
DEPT. OF HOUSING
COMM. DEVELOPMENT

June 17, 1987

The Honorable Mike Moon
Director
Department of Housing and Community Development
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Moon:

Re: West Loch Estates Housing Project

We have reviewed the preliminary information on the proposed project and offer the following comments:

1. The proposed project will include 1,350 single family for-sale units. At what price ranges will these units be offered and what income group will be targeted?

2. As each planned development in the Ewa area impacts the existing and planned infrastructure, what is the timetable for development of the proposed project?

3. We would appreciate to be kept informed of this project during your conceptual/planning stage so that we can better coordinate our (HHA/City & County of Honolulu) Kapolei Village Development with your proposal. Perhaps, we should joint venture this project switching the roles as structured in our proposed Kapolei Village Development.

Thank you for the opportunity to review the environmental assessment preparation notice. Should you have any questions, please contact Colette Sakoda of my staff at 848-3226.

Sincerely,

RUSSELL N. FUKUMOTO
Executive Director

JOHN WAIHEE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF SOCIAL SERVICES AND HOUSING
HAWAII HOUSING AUTHORITY
P. O. BOX 17907
HONOLULU, HAWAII 96817

RUSSELL N. FUKUMOTO
EXECUTIVE DIRECTOR

IN REPLY REFER

TO:

87:PLNG/3037

87 JUL 23 P1:52
DEPT. OF HOUSING &
COMMUNITY DEVELOPMENT

July 20, 1987

Mr. Howard Murai
Department of Housing
and Community Development
650 South King Street, Fifth Floor
Honolulu, Hawaii 96813

Dear Mr. Murai:

Re: Environmental Impact Statement Preparation Notice for the Proposed West Loch Estates Subdivision Development

Thank you for the opportunity to review the EIS notice for the proposed West Loch Estates project.

We would like to be consulted during the preparation of the EIS.

Sincerely,

RUSSELL N. FUKUMOTO
Executive Director

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4181

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

September 16, 1987

Mr. Russell N. Fukumoto
Executive Director
Hawaii Housing Authority
P.O. Box 17907
Honolulu, Hawaii 96817

Dear Mr. Fukumoto:

Subject: Environmental Impact Statement Preparation Notice for:
West Loch Estates Development, Ewa, Oahu

Thank you for your comments of June 17 and July 20, 1987 relating to the proposed West Loch development.

We are in the process of preparing a Master Plan and an Environmental Impact Statement (EIS) for the proposed development. As part of the master planning, we are conducting a market feasibility study to assess the housing demand that our proposed project will serve. We do plan to target our for-sale units for those home buyers that are in the gap-group and middle-income housing markets.

The subject of structuring this project as a joint venture with the Hawaii Housing Authority is being explored as the alternative means of implementation. Your offer is greatly appreciated and will be the subject of further discussion.

The proposed golf course and beach park have been separated from the original Environmental Impact Statement Preparation Notice (EISPN) that was submitted on June 30, 1987. It was determined that it would be inappropriate to combine both projects under a single Notice as the projects are not related to one another, will be administered by different departments and involve separate funding.

Please provide all comments relative to the Housing projects to this office and if you have comments specifically concerning the golf course and park, they should be directed to the Department of Parks and Recreation. A separate EISPN has been prepared and submitted to the Office of Environmental Quality Control by that Department.

Your willingness to assist in the planning of this development is greatly appreciated. If you should have any questions or additional comment and suggestions, please direct them to Mr. Howard Murai, Project Manager at 527-5321. Thank you again.

Sincerely Yours,

Robert Miyasato
for Mike Moon
Director

SEP 16 1987

JOHN WAIHEE
GOVERNOR OF HAWAII

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

WILLIAM W. PATY, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

LIBERT K. LANDGRAF
DEPUTY

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

DOC. NO. 0490E
FILE NO.: 87-190

DEPT. OF HOUSING & COMM. DEVELOPMENT
87 JUN 24 P1:35

JUN 23 1987

Honorable Michael Moon, Director
Department of Housing and
Community Development
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Moon:

SUBJECT: Environmental Assessment (EA) Preparation Notice -
West Loch Estates Housing, Honouliuli, Ewa, Oahu
TMK: 9-1-17, various; 9-4-48: 74

Thank you for the opportunity to review the EA preparation notice cited above. We offer the following comments:

Forestry and Wildlife Concerns:

The area planned for the housing and golf course will encompass fishponds or wetlands used by endangered waterbirds. The boundary of the project appears to abutt a U.S. Fish and Wildlife Service Refuge for endangered waterbirds. The probable impacts have to be addressed in the Impact Statement.

Historic Sites Concerns:

This project area does not contain sites that are listed on the Hawaii Register or the National Register of Historic Places, or that have been determined eligible for inclusion on the National Register of Historic Places. However, few archaeological surveys have taken place in the area, so it is uncertain if significant historic sites are present. There are several L.C.A. parcels within the subject property, an indication of historic era occupation. Thus, we believe there is a possibility that significant historic sites are present.

Therefore, we recommend that an archaeological survey with some subsurface testing be conducted in the project area. If historic sites are found, then sufficient information should be gathered to evaluate the sites' significance. The study should also offer initial significance evaluations. The study findings, in a report format, and the initial significance evaluations should then be submitted to our Historic Sites Section for review and comment. If significant sites are present, then appropriate mitigation plans will have to be developed.

As Community Development Block Grant Funds are involved, the project must comply with the National Historic Preservation Act. This requires coordination with our Historic Sites Section. The Section's phone is 548-7460. Dr. Joyce Bath, staff archaeologist handling Oahu, should be able to answer any questions.

Water and Land Development Concerns:

We request that the developer (Department of Housing and Community Development) provide the following information in its EA for the above project:

1. quantity of water to be used (in million gallons per day)
2. water sources (type and location)
3. drainage plan
4. stream uses or alterations

The project is located in the Pearl Harbor Ground Water Control Area. Accordingly, any withdrawal of basal ground water from the area will require the approval of the Board of Land and Natural Resources.

Thank you for your consideration of our concerns.

Very truly yours,

for WILLIAM W. PATY, Chairperson
Board of Land and Natural Resources
State Historic Preservation Officer

JOHN WAIHEE
GOVERNOR OF HAWAII

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

WILLIAM W. PATY, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

LIBERT K. LANDGRAF
DEPUTY

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

DOC. NO. 0897E
FILE NO.: 88-9

AUG 7 1987

Honorable Michael Moon, Director
Department of Housing and
Community Development
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

'87 AUG 10 A8:59
DEPT. OF HOUSING & COMM. DEVELOPMENT

Dear Mr. Moon:

SUBJECT: Environmental Impact Statement (EIS) Preparation Notice for West Loch Estates Subdivision, Ewa, Oahu TMK: 9-1-17, various; 9-1-20: various; 9-1-21: various

Thank you for the opportunity to review the EIS preparation notice cited above. We offer the following comments:

Aquatic Resources Concerns:

Proposed park development would improve recreational fishing opportunities by providing increased access for fishing. Since the proposed housing project is inland of the proposed park, adverse impacts to aquatic resources are not expected to be significant provided precautions are taken to prevent debris, construction material, petroleum products, and other contaminants from entering coastal waters.

Additionally the subject document states that waters of West Loch are under Navy jurisdiction. Since this project proposes to develop shoreline parks, shoreline use by park goers is highly probable (i.e. pole fishing, crabbing, etc.). The EIS should discuss the sanitary quality of West Loch waters and the impact of public use on shoreline resources and clearly determine what the Navy intends to allow in terms of shoreline and nearshore use for the project's shoreline area.

Further, this document has classified Honouliuli Stream as perennial; topographic maps show this stream to be intermittent. This should be clarified. Finally, since a proposed golf course would limit access to Honouliuli Stream, impacts to present recreational use, if any, should be discussed.

Forestry and Wildlife Concerns:

1. The EIS should include a wildlife survey and discussions on how the project will impact on wildlife.

2. In addition to the U.S. Fish and Wildlife Service the State Department of Land and Natural Resources is concerned with alterations of wetlands and its effect on wildlife both directly on-site and indirectly (run-off into Pearl Harbor).

Historic Sites Concerns:

This project area does not contain sites that are listed on the Hawaii Register or the National Register of Historic Places, or that have been determined eligible for inclusion on the National Register of Historic Places. However, few archaeological surveys have taken place in the area, so it is uncertain if significant historic sites are present. There are several Land Court Award parcels within the subject property, an indication of historic era occupation. Thus, we believe there is a possibility that significant historic sites are present.

Therefore, we recommend that an archaeological survey with some subsurface testing be conducted in the project area. If historic sites are found, then sufficient information should be gathered to evaluate the sites' significance. The study should also offer initial significance evaluations. The study findings, in a report format, and the initial significance evaluations should then be submitted to our Historic Sites Section for review and comment. If significant sites are present, then appropriate mitigation plans will have to be developed.

As Community Development Block Grant Funds are involved, the project must comply with the National Historic Preservation Act. This requires coordination with our Historic Sites Section. The Section's phone is 548-7460. Dr. Joyce Bath, staff archaeologist handling Oahu, should be able to answer any questions.

Water and Land Development Concerns:

DOWALD's major concern is the availability of water for this project, being that the proposed project would be located in the Pearl Harbor Ground Water Control Area. This concern has not been mentioned in this EIS Preparation Notice.

Thank you for your consideration of our concerns.

Very truly yours,

WILLIAM W. PATY, Chairperson
Board of Land and Natural Resources
State Historic Preservation Officer

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4181

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYABATO
DEPUTY DIRECTOR

September 18, 1987

Mr. William W. Paty, Chairperson
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Paty:

Subject: Environmental Impact Statement Preparation Notice for:
West Loch Estates Development, Ewa, Oahu

Thank you for your comments of June 23, 1987 and August 7, 1987 relating to the proposed West Loch Estates development.

We are in the process of developing a Master Plan for the housing increments and an Environmental Impact Statement (EIS) for the proposed development. We are cognizant of the need to protect our coastal ecosystem and consequently, have separated the proposed golf course and beach park from the housing EIS. It was determined that it would be inappropriate to combine both projects under a single Notice as the projects are not related to one another, will be administered by different departments, and involve separate funding.

Please provide all comments relative to the housing project to this office and if you have comments specifically concerning the golf course and park, they should be directed to the Department of Parks and Recreation. A separate EISPN has been prepared and submitted to the Office of Environmental Quality Control by that department.

There will be documentation on the wildlife, the archaeological/historic sites, and potable water demand in the Draft EIS. They will be supported by the technical studies prepared by the technical consultants and we look forward to your agency's review and comments. Thank you for your continuing interest and concern.

Sincerely yours,

Mike Moon
Director

DEPARTMENT OF PLANNING
AND ECONOMIC DEVELOPMENT

KAMAMALU BUILDING 250 SOUTH KING ST, HONOLULU HAWAII
MAILING ADDRESS P.O. BOX 2359 HONOLULU HAWAII 96804 • TELEX 7430230 HOPED

JOHN WAIHEE
GOVERNOR
ROGER A. ULVELING
DIRECTOR
MURRAY E. TOWILL
DEPUTY DIRECTOR
BARBARA KIM STANTON
DEPUTY DIRECTOR

DIVISIONS
BUSINESS AND INDUSTRY DEVELOPMENT DIVISION
ENERGY DIVISION
FOREIGN-TRADE ZONE DIVISION
LAND USE DIVISION
PLANNING DIVISION
RESEARCH AND ECONOMIC ANALYSIS DIVISION

OFFICES
ADMINISTRATIVE SERVICES OFFICE
INFORMATION OFFICE

Ref. No. P-6548

June 10, 1987

'87 JUN 18 P2:21
DEPT. OF HOUSING & COMM. DEVELOPMENT

The Honorable Mike Moon
Director
Department of Housing and
Community Development
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Moon:

Subject: EAPN for the West Loch Estates Housing Project, Ewa, Oahu

We have reviewed the subject environmental assessment preparation notice (EAPN) and have the following comments.

The entire project site is within the Hawaii Coastal Zone Management (CZM) area. Therefore, the environmental assessment and subsequent environmental impact statement (provided one is prepared) should include an assessment and discussion of the project in relation to the Hawaii CZM Program.

Coastal Ecosystems

CZM policy calls for protection and preservation of valuable coastal ecosystems of significant biological or economic importance. Relative to this, we note that the Honouliuli or West Loch unit of the Pearl Harbor National Wildlife Refuge is situated adjacent to the project site. It serves as habitat, nesting, and feeding grounds for endangered Hawaiian waterbirds and is managed by the U.S. Fish and Wildlife Service (FWS).

After consulting the FWS, we believe the project can have an adverse effect upon the refuge if appropriate mitigation measures are not employed. Potential impacts upon the refuge and endangered Hawaiian waterbirds should be discussed in the environmental assessment. Also, mitigating measures such as fencing and buffer strips to prevent intrusion by domestic animals and humans, and to lessen impacts from noise, lighting and surface water runoff should be considered and discussed in the environmental assessment.

In addition to the refuge, there are fish ponds and wetlands located within the project area. Activities which can alter these resources, i.e., dredge and/or fill, must be coordinated with the U.S. Army Corps of Engineers since such activities may require a Department of the Army permit.

Historic Resources

The Hawaii CZM statute, Chapter 205A, provides for the protection, preservation and, where desirable, restoration of those natural and man-made historic and pre-historic resources in the CZM area. An assessment of historic and archaeological resources on the site should be made. We recommend that an archaeological survey be conducted. The State Historic Preservation Office of the Department of Land and Natural Resources should be consulted on this matter.

Coastal Hazards

The Federal Flood Insurance Rate Map (FIRM) designates a significant portion of the site along Honouliuli Stream as a 100-year flood hazard area. CZM policies call for controlling development in areas subject to flood hazard; ensuring that developments comply with requirements of the Federal Flood Insurance Program; and preventing coastal flooding from inland projects. Mitigating measures should be proposed and discussed in the environmental assessment.

CZM Federal Consistency

Because this project will be developed under the Federal Community Development Block Grant (CDBG) program, CZM consistency certification is required from DPED. Although we recently issued a general consistency to the U.S. Housing and Urban Development Honolulu Office for the CDBG program in Hawaii, the subject proposal does not qualify because it falls under several of the exceptions.

Hawaii State Plan

An analysis of appropriate objectives, policies and priority guidelines of the Hawaii State Plan and pertinent State Functional Plans should be conducted to determine the project's consistency with the Hawaii State Plan. The following sections should be included in your review: Population (Section 226-5, HRS), Physical Environment (Sections 226-11 through 226-13, HRS), Facility Systems (Sections 226-15 through 226-17, HRS), Socio-cultural Advancement (Sections 226-19 and 226-23, HRS), Population Growth and Land Resources (Section 226-104, HRS) and Affordable Housing (Section 226-106, HRS).

Thank you for the opportunity to review this EA proposal.

Sincerely,

Murray E. Towill
Roger A. Ulveling

cc: Office of Environmental Quality Control

JOHN WAIHEE
GOVERNOR
ROGER A. ULVELING
DIRECTOR
MURRAY E. TOWILL
DEPUTY DIRECTOR
BARBARA KIM STANTON
DEPUTY DIRECTOR

DEPARTMENT OF BUSINESS AND ECONOMIC DEVELOPMENT

KAMAMALU BUILDING, 250 SOUTH KING ST., HONOLULU, HAWAII
MAILING ADDRESS: P.O. BOX 2359, HONOLULU, HAWAII 96804 TELEX: 10838 HIDPED

Ref. No. P-6871

July 29, 1987

87 JUL 31 AM 11:12
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

The Honorable Mike Moon, Director
Department of Housing and Community Development
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Moon:

Subject: Environmental Impact Statement Preparation Notice for the West Loch Estates Housing Project by the Department of Housing and Community Development, City and County of Honolulu

We have reviewed the subject proposal and have the following comments.

HAWAII COASTAL ZONE MANAGEMENT (CZM) PROGRAM

The project will be situated within the CZM area and, therefore, the Environmental Impact Statement (EIS) should include an assessment and discussion of the project in relation to the CZM objectives and policies. In particular, the following concerns need to be addressed in the EIS.

Coastal Ecosystems

A CZM policy calls for the protection and preservation of valuable coastal ecosystems of significant biological or economic importance. Relative to this, we note that the Honouliuli or West Loch unit of the Pearl Harbor National Wildlife Refuge is situated adjacent to the project site. It serves as habitat, nesting, and feeding grounds for endangered Hawaiian waterbirds and is managed by the U.S. Fish and Wildlife Service (FWS).

After consulting with FWS, we believe that the project will adversely affect the refuge unless appropriate mitigation measures are taken. For example, fencing and buffer strips could help prevent intrusion into the refuge by domestic animals and humans. Measures to lessen impacts from noise, lighting, and surface water runoff should also be proposed and discussed in the EIS.

In addition, there are fish ponds and wetlands located within the project area. Activities which can alter these resources, i.e., dredge and/or fill, must be coordinated with the U.S. Army Corps of Engineers since such activities may require a Department of the Army permit.

Historic Resources

The Hawaii CZM statute, Chapter 205A, provides for the protection, preservation, and, where desirable, restoration of those natural and man-made historic and pre-historic resources in the CZM area. An assessment of historic and archaeological resources on the site should be made. We recommend that an archaeological survey be conducted and that the State Historic Preservation Office of the Department of Land and Natural Resources be consulted on this matter.

Coastal Hazards

The Federal Flood Insurance Rate Map (FIRM) designates a significant portion of the site along Honouliuli Stream as a 100-year flood hazard area. CZM policies call for controlling development in areas subject to flood hazard; ensuring that developments comply with requirements of the Federal Flood Insurance Program; and preventing coastal flooding from inland projects. Mitigating measures should be proposed and discussed in the EIS.

CZM Federal Consistency

Because the project will be developed under the Federal Community Development Block Grant (CDBG) program, the Federal consistency provisions of the National CZM Act will be applicable. The above issues are germane to this certification program and should, therefore, be addressed.

LAND USE DIVISION

Information concerning transfer of title and/or development rights from Campbell Estate should be included in the Draft Environmental Impact Statement (DEIS). This information should provide the purchase price of the property and/or any conditions attached to the transfer of title or development rights. The Preparation Notice (EISPN) states that the 466-acre property is currently Campbell Estate property located in Honouliuli, Ewa, Oahu.

Areas currently utilized for sugar cultivation by Oahu Sugar Company should be identified in the EIS. The project's impact on existing agriculture and potential for production of diversified agricultural crops should be thoroughly discussed.

Transportation impacts addressed in the EIS should include a discussion on regional employment centers, transportation alternatives, and any special transportation needs required for elderly and low-income residents.

The EIS should include a discussion on anticipated potable water requirements, impacts to groundwater quality and potential impacts of increased water runoff into West Loch. A schematic site plan should also be provided which illustrates the location of structures relative to the flood plain and golf course, the proposed beach park, and public access to West Loch.

The EIS should include a general cost breakdown of anticipated infrastructure costs and a breakdown of pricing of different unit types.

Project phasing should be discussed relative to the timing of other Ewa projects.

Potential noise impacts from civilian and military aircraft should be discussed.

Thank you for the opportunity to review this EISPN.

Sincerely,

Roger A. Ulveling

cc: Land Use Division

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU HAWAII 96813
PHONE 523-4181

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT IWASATO
DEPUTY DIRECTOR

September 16, 1987

Mr. Roger A. Ulveling, Director
Department of Planning and Economic Development
P.O. Box 2359
Honolulu, Hawaii 96804

Dear Mr. Ulveling:

Subject: Environmental Impact Statement Preparation Notice for:
West Loch Estates Development, Ewa, Oahu

Thank you for your comments of June 10 and July 29, 1987 relating to the proposed West Loch development.

We are in the process of preparing a Master Plan and an Environmental Impact Statement (EIS) for the proposed development. We are cognizant of the need to protect our coastal ecosystem and will comply with applicable federal, state and county laws and regulations as they relate to the coastal environment, historic resources and flood hazards.

Coastal Ecosystems

Meetings have been held with the U.S. Department of Interior, Fish & Wildlife Service to discuss the proposed project and its' potential impacts on the Wildlife Refuge located nearby. Their concerns have been identified and will be reviewed and analyzed to mitigate the negative impacts to the extent practicable.

Historic Resources

There will be discussion and coordination with the State Historic Preservation Office (SHPO), Department of Land & Natural Resources (DLNR) in the survey of the project site for historical resources. We share that agency's concern over the possibility of significant historical sites and archaeological resources within the project area. Our technical consultant has already met with their SHPO staff for the purpose of formulating a plan to address these concerns.

Coastal Hazards

Coastal Zone Management Federal Consistency will be applicable on the basis of Flood Hazard considerations. The project will be required to comply with all applicable standards which will be identified in the Draft EIS.

Hawaii State Plan

All applicable sections of the Hawaii State Plan will be discussed in the Draft EIS under the section "Relationship to Plans, Policies, and Controls."

Land Use Division

Land acquisition data will be provided to the extent that they are available and can be prudently disclosed at the time the Draft EIS is being developed. Funding for the purchase of the project site, in fee simple, from the Campbell Estate is included in the City's Capital Improvements Project budget for the 1987-1988 Fiscal Year (ORD. No. 87-71 p. 13-14).

An analysis of the agricultural productivity of the lands within the project area will be provided in the Draft EIS. As noted in the EISPN, those lands situated in Increment II and portions of the proposed District Park are still in cultivation and scheduled for fallowing in 1990. The impact of the project on agriculture will be discussed in relation to the State Agricultural Plan.

A Traffic Impact study will also be provided in the Draft EIS that will review the current traffic capacities of the transportation network servicing the project site and discuss the mitigation measures available which address the traffic impacts of the project.

Potable water demands have been reviewed by the Board of Water Supply (BWS) which has provided assurance that adequate potable water will be available to the site, subject to the design and construction of water storage and transmission facilities as a part of the project.

A description of groundwater runoff and probable impact on the West Loch receiving waters will also be provided in the Draft EIS for review by the appropriate agencies.

Onsite and Offsite construction costs will be discussed on the basis of preliminary budget estimates, since more definitive cost estimates are unlikely to be available at the time the Draft EIS is prepared.

A Noise Impact study will be developed and included in the Draft EIS for review and comment by State and Federal agencies. These impacts will discuss the traffic as well as aircraft noise impacts on the proposed residential project.

The proposed golf course and beach park have been separated from the original Environmental Impact Statement Preparation Notice (EISPN) that was submitted on June 30, 1987. It was determined that it would be inappropriate to combine both projects under a single Notice as the projects are not related to one another, will be administered by different departments and involve separate funding.

Please provide all comments relative to the Housing projects to this office and if you have comments specifically concerning the golf course and park, they should be directed to the Department of Parks and Recreation. A separate EISPN has been prepared and submitted to The Office of Environmental Quality Control by that Department.

Your willingness to assist in the planning of this development is greatly appreciated. If you should have any questions or additional comment and suggestions, please direct them to Mr. Howard Murai, Project Manager at 527-5321. Thank you again.

Sincerely yours,

Robert Miyasato

for Mike Moon
Director

SEP 16 1987

JOHN WAIHEE
GOVERNOR

DIRECTOR
EDWARD Y. HIRATA

DEPUTY DIRECTORS
JOHN K. UCHIMA
RONALD N. HIRANO
DAN T. KOCHI

IN REPLY REFER TO
STP 8.2124

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

June 22, 1987

'87 JUN 25 P1:36
DEPT. OF HOUSING & COMM. DEVELOPMENT

Mr. Michael M.H. Moon, Director
Department of Housing and Community Development
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Moon:

West Loch Estates Housing Project

Thank you for your letter dated May 22, 1987 in which you have asked for a preliminary review and comment for the proposed West Loch Estates Housing Project.

Your project's environmental assessment should contain a traffic impact analysis report (TIAR) which addresses the project's local and regional effects on our highway system and any needed mitigation measures.

May we inform you that a portion of Phase II in the vicinity of the intersection of Fort Weaver Road and what appears to be Renton Road is in an area of potential aircraft single event and noise exposures. Accordingly, the assessment should address this matter.

Thank you for providing this opportunity to preliminarily review your project proposal.

Very truly yours,

Edward Y. Hirata
Director of Transportation

JOHN WAIHEE
GOVERNOR

DIRECTOR
EDWARD Y. HIRATA

DEPUTY DIRECTORS
JOHN K. UCHIMA
RONALD N. HIRANO
DAN T. KOCHI

IN REPLY REFER TO
STP 8.2208

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

July 17, 1987

'87 JUL 22 P1:15
DEPT. OF HOUSING & COMM. DEVELOPMENT

Mr. Michael M.H. Moon, Director
Dept. of Housing and Community Dev.
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Moon:

EIS Preparation Notice
Proposed West Loch Estates Subdivision Development
Ewa, Oahu

The development's draft EIS should contain a traffic impact analysis report which addresses the local and regional effects on our highway system and identifies any needed mitigation measures.

Since an existing 40-foot railroad right-of-way is adjacent to Increment II of the development, you should be aware of City Ordinance No. 84-94. This ordinance incorporated a Unilateral Agreement and Declaration for Conditional Zoning and was signed by the owners of the land, Campbell Estate, and the developer, Hirano Brothers, Ltd. In the Unilateral Agreement, it was agreed to respect the railroad right-of-way and to design projects adjacent to this right-of-way in a manner compatible with its use for transportation improvements. Further, the parties agreed that structures would be setback a minimum of 40 feet from this right-of-way. We feel, therefore, that similar conditions should be imposed on the subject development.

We also noted that a portion of Phase II in the vicinity of the intersection of Fort Weaver Road and what appears to be Renton Road is in an area of potential aircraft single event noise exposure. Accordingly, the draft EIS should address this matter.

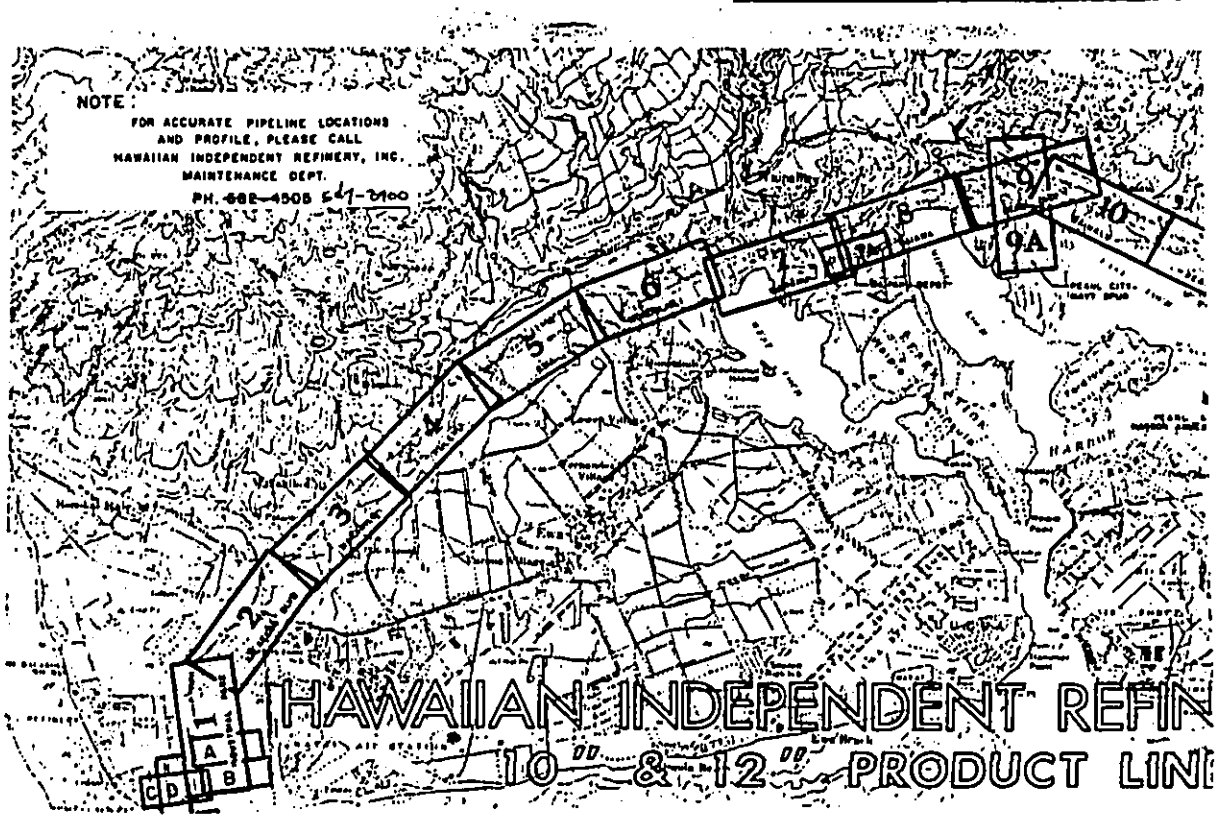
Another condition that will need to be considered is the presence of the energy corridor. We have enclosed a map indicating the corridor's relationship with the proposed development. Please note that the affected areas are located at the northern end of Phase I and the mauka golf course. In this regard, close coordination with our Harbors Division is recommended.

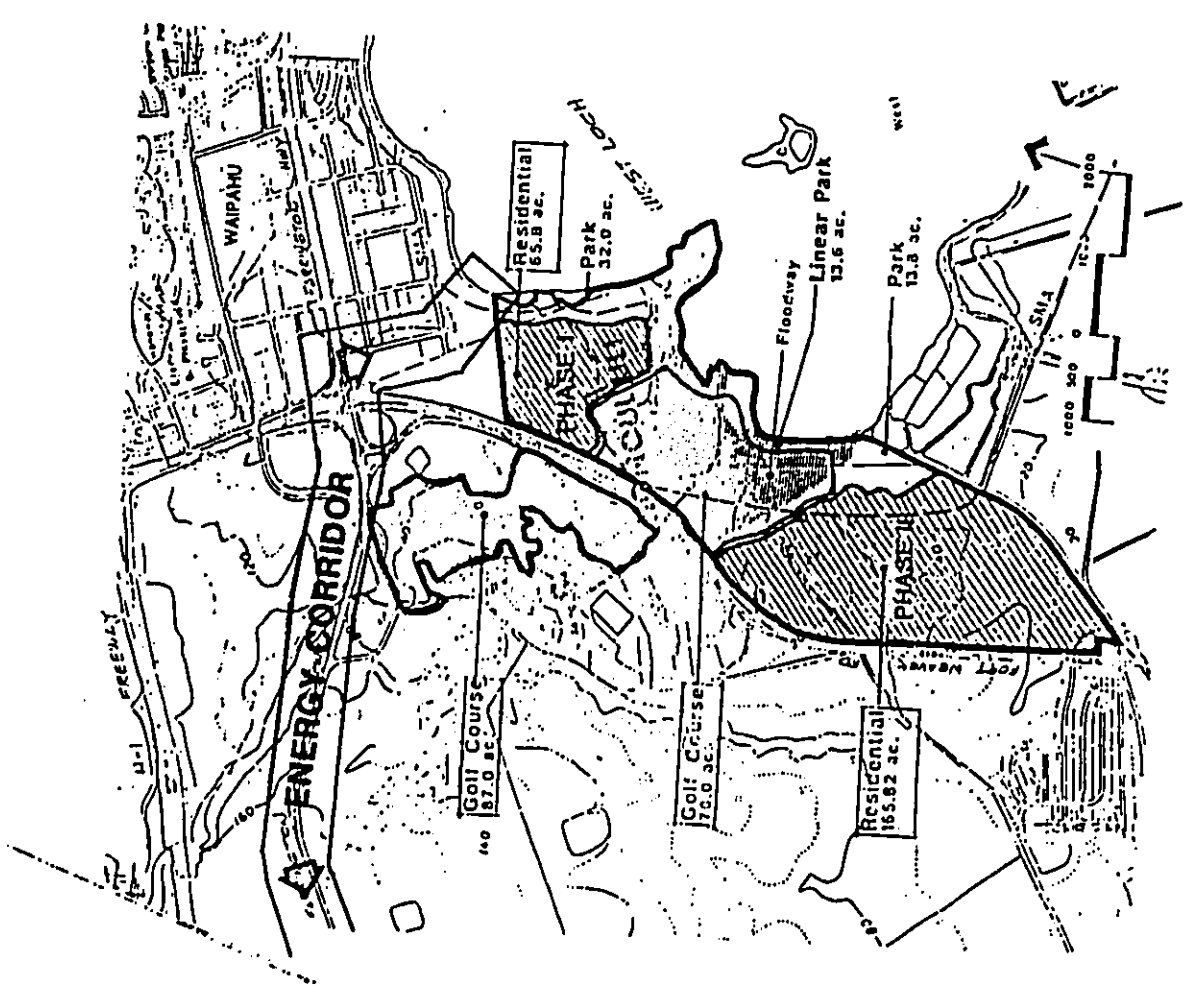
Thank you for this opportunity to provide comments.

Very truly yours,

Edward Y. Hirata
Director of Transportation

Enclosure


NOTE:
FOR ACCURATE PIPELINE LOCATIONS AND PROFILE, PLEASE CALL HAWAIIAN INDEPENDENT REFINERY, INC. MAINTENANCE DEPT.
PH. 682-4508 or 841-2100
HAWAIIAN INDEPENDENT REFIN
10" & 12" PRODUCT LINE


WAIPAHU
Residential 65.8 ac.
Park 12.0 ac.
PHASE I
Floodway
Linear Park 13.6 ac.
Park 13.8 ac.
PHASE II
ENERGY CORRIDOR
Golf Course 87.0 ac.
Golf Course 76.0 ac.
Residential 165.82 ac.
FREEWAY

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4161

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

September 16, 1987

Mr. Edward Y. Hirata, Director
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Hirata:

Subject: Environmental Impact Statement Preparation Notice for:
West Loch Estates Development, Ewa, Oahu

Thank you for your comments of June 22 and July 17, 1987 relating to the proposed West Loch development.

We are in the process of preparing a Master Plan and an Environmental Impact Statement (EIS) for the proposed development and appreciate your comments. As part of our planning efforts, we are preparing a traffic impact analysis report which addresses the development's local and regional effects on the roadway system in the area. The findings of this report will be presented in the EIS.

We will also investigate the potential impact of aircraft noise and present appropriate mitigation measures if such is found necessary. The relationship of the project with the energy corridors (as both defined in the attachment to your letter and that which runs parallell to the OR&L right-of-way) will be examined.

The proposed golf course and beach park have been separated from the original Environmental Impact Statement Preparation Notice (EISPN) that was submitted on June 30, 1987. It was determined that it would be inappropriate to combine both projects under a single Notice as the projects are not related to one another, will be administered by different departments and involve separate funding.

Please provide all comments relative to the Housing projects to this office and if you have comments specifically concerning the golf course and park, they should be directed to the Department of Parks and Recreation. A separate EISPN has been prepared and submitted to The Office of Environmental Quality Control by that Department.

Your willingness to assist in the planning of this development is greatly appreciated. If you should have any questions or additional comment and suggestions, please direct them to Mr. Howard Murai, Project Manager at 527-5321. Thank you again.

Sincerely Yours,

Robert Miyasato
for Mike Moon
Director

SEP 16 1987

STATE OF HAWAII
DEPARTMENT OF PLANNING
AND ECONOMIC DEVELOPMENT

LAND USE COMMISSION

Room 104, Old Federal Bldg. · 335 Merchant Street
Honolulu, Hawaii 96813 · Telephone: 548-4611

JOHN WAIHEE
Governor

TEOFILO PHIL TACBIAN
Chairman

FREDERICK P. WHITTEMORE
Vice Chairman

COMMISSION MEMBERS:

Richard B. F. Choy
Lawrence F. Chun
Everett L. Cuskaden
Toru Suzuki
Robert S. Tamaye
William W. L. Yuen

ESTHER UEDA
Executive Officer

May 27, 1987

Mr. Mike Moon, Director
Department of Housing and
Community Development
City & County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

JUN 1 1987 10:23
DEPT. OF HOUSING & COMM. DEVELOPMENT

Dear Mr. Moon:

Subject: West Lock Estates Housing Project

Thank you for the opportunity to comment on the subject housing project.

Based on the location map submitted with your letter of May 22, 1987, portions of the proposed project appear to impact fishponds which are currently designated in the State Land Use Conservation District.

Should the proposed project include the fishponds, a District Boundary Amendment or Conservation District Use Permit may be required.

Sincerely,

ESTHER UEDA
Executive Officer

EU:to

STATE OF HAWAII
DEPARTMENT OF BUSINESS
AND ECONOMIC DEVELOPMENT

LAND USE COMMISSION

Room 104, Old Federal Bldg. · 335 Merchant Street
Honolulu, Hawaii 96813 · Telephone: 548-4611

JOHN WAIHEE
Governor

TEOFILO PHIL TACBIAN
Chairman

FREDERICK P. WHITTEMORE
Vice Chairman

COMMISSION MEMBERS:

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Sharon R. Himeno
Toru Suzuki
Robert S. Tamaye
Renton L.K. Nip

ESTHER UEDA
Executive Officer

July 24, 1987

Mr. Howard Murai
Department of Housing
and Community Development
650 South King Street
Fifth Floor
Honolulu, Hawaii 96813

JUL 28 1987 11:03
DEPT. OF HOUSING & COMM. DEVELOPMENT

Dear Mr. Murai:

Subject: EIS Preparation Notice for the Proposed
West Loch Estates Subdivision Development

Thank you for the opportunity to comment on this matter. We do not have any comments at this time except that the EIS Preparation Notice indicates the project site is designated within the State Agricultural and Urban Districts. However, our records indicate there are fishponds on the project site that appear to be within the State Conservation District. The Draft EIS should address impacts of the proposed development on these fishponds.

If you have any questions, please contact our office at 548-3039.

Sincerely,

ESTHER UEDA
Executive Officer

EU:to

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4181

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

September 16, 1987

Ms. Ester Ueda
Executive Officer
Land Use Commission
Room 104, Old Federal Building
335 Merchant Street
Honolulu, Hawaii 96813

Dear Ms. Ueda:

Subject: Environmental Impact Statement Preparation Notice for:
West Loch Estates Development, Ewa, Oahu

Thank you for your comments of May 27 and July 24, 1987 relating to the proposed West Loch development.

We are in the process of preparing a Master Plan and Environmental Impact Statement (EIS) for the proposed development and appreciate your comments relating to the current land use classifications of the project site.

Upon finalization of the Master Plan and acceptance of the Environmental Impact Statement, we will be submitting a petition for a district boundary amendment in accordance with the requirements specified by the Commission's recently amended rules implementing Act 93, SLH 1986.

The proposed golf course and beach park have been separated from the original Environmental Impact Statement Preparation Notice (EISPN) that was submitted on June 30, 1987. It was determined that it would be inappropriate to combine both projects under a single Notice as the projects are not related to one another, will be administered by different departments and involve separate funding.

Please provide all comments relative to the Housing projects to this office and if you have comments specifically concerning the golf course and park, they should be directed to the Department of Parks and Recreation. A separate EISPN has been prepared and submitted to The Office of Environmental Quality Control by that Department.

Your willingness to assist in the planning of this development is greatly appreciated. If you should have any questions or additional comment and suggestions, please direct them to Mr. Howard Murai, Project Manager at 527-5321. Thank you again.

Sincerely yours,

Robert Miyasato
for Mike Moon
Director

SEP 16 1987

John Waihee
GOVERNOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
465 SOUTH KING STREET, ROOM 104
HONOLULU, HAWAII 96813

DIRECTOR
TELEPHONE NO.
548-6915

May 28, 1987

87 JUN -4 AM 11:16
DEPT. OF HOUSING & COMM. DEVELOPMENT

Mr. Mike Moon, Director
Department of Housing and
Community Development
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Moon:

Subject: West Loch Estates Housing Project

Our primary concerns regarding the project are the availability of water and traffic impacts regarding the development. Thank you for consulting us on this project.

Sincerely,

for John C. Lewin, M.D.
Director of Health
for Director, OEQC

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4181

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

September 16, 1987

Dr. Marvin T. Miura, Director
Office of Environmental Quality Control
465 South King Street, Room 104
Honolulu, Hawaii 96813

Dear Dr. Miura:

Subject: Environmental Impact Statement Preparation Notice for:
West Loch Estates Development, Ewa, Oahu

Thank you for your comments of May 28, 1987 relating to the proposed West Loch development.

We are in the process of preparing a Master Plan for the proposed development and appreciate your comments relating to traffic impacts and the availability of water for the project.

The Board of Water Supply has advised us that water service can easily be made available at the project site. The necessary approvals are also already being sought from the State Department of Land & Natural Resources. A plan for water storage and distribution will be developed as a part of the master planning process. Further, a traffic impact analysis will also be prepared as a part of this process and the report will be included in the Environmental Impact Statement (EIS).

The proposed golf course and beach park have been separated from the original Environmental Impact Statement Preparation Notice (EISPN) that was submitted on June 30, 1987. It was determined that it would be inappropriate to combine both projects under a single Notice as the projects are not related to one another, will be administered by different departments and involve separate funding.

Please provide all comments relative to the Housing projects to this office and if you have comments specifically concerning the golf course and park, they should be directed to the Department of Parks and Recreation. A separate EISPN has been prepared and submitted to The Office of Envronmental Quality Control by that Department.

Your willingness to assist in the planning of this development is greatly appreciated. If you should have any questions or additional comment and suggestions, please direct them to Mr. Howard Murai, Project Manager at 527-5321. Thank you again.

Sincerely yours,

Robert Meyenberg

for Mike Moon
Director

SEP 16 1987

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

FRANK F. FASI, Mayor
DONNA B. GOTH, Chairman
ERNEST A. WATARI, Vice Chairman
MILTON J. AGADER
SISTER M. DAVILYN AH CHICK, O.S.F.
EDWARD Y. HIRATA
ALFRED J. THEDE
JOHN K. TSUI
KAZU HAYASHIDA
Manager and Chief Engineer

June 9, 1987

'87 JUN 10 P3:39
DEPT. OF HOUSING & COMM. DEVELOPMENT

TO: MICHAEL M. H. MOON, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

FROM: KAZU HAYASHIDA, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

SUBJECT: YOUR MEMORANDUM OF MAY 22, 1987 ON THE WEST LOCH ESTATES HOUSING PROJECT, TMK: 9-1-17: 6, 9-11, 13, 14, 18-32, 34, AND 44

Thank you for the opportunity to review and comment on your proposed housing project.

We have the following comments:

1. The development will require the installation of a storage reservoir and transmission mains. The City will be required to pay a proportionate share for the development of a new source.

2. A Water Master Plan should be submitted for our review and approval.

The comments are in addition to other information sent to you in April 1987 regarding the project.

If you have any questions, please contact Lawrence Whang at 527-6138.

FOR KAZU HAYASHIDA
Manager and Chief Engineer

Pure Water . . . man's greatest need – use it wisely

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

FRANK F. FASI, Mayor
DONNA B. GOTH, Chairman
ERNEST A. WATARI, Vice Chairman
MILTON J. AGADER
SISTER M. DAVILYN AH CHICK, O.S.F.
EDWARD Y. HIRATA
ALFRED J. THEDE
JOHN K. TSUI
KAZU HAYASHIDA
Manager and Chief Engineer

July 10, 1987

'87 JUL 13 P3:36
DEPT. OF HOUSING & COMM. DEVELOPMENT

TO: MICHAEL M. H. MOON, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

FROM: KAZU HAYASHIDA, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

SUBJECT: YOUR LETTER OF JULY 6, 1987 ON THE ENVIRONMENTAL IMPACT STATEMENT (EIS) PREPARATION NOTICE FOR PROPOSED WEST LOCH ESTATES SUBDIVISION DEVELOPMENT PROJECT IN EWA

Thank you for allowing us to review the EIS Preparation Notice.

We concur with the comments on water for the proposed development (page 3).

If you have any questions, please contact Lawrence Whang at 527-6138.

FOR KAZU HAYASHIDA

Pure Water . . . man's greatest need – use it wisely

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4161

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYAGATO
DEPUTY DIRECTOR

September 16, 1987

MEMORANDUM

TO: KAZU HAYASHIDA
MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

FROM: MICHAEL M.H. MOON, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE
FOR: WEST LOCH ESTATES DEVELOPMENT, EWA, OAHU

Thank you for your comments of June 9 and July 10, 1987 relating to the proposed West Loch development.

We are in the process of preparing a Master Plan and Environmental Impact Statement (EIS) for the proposed development and appreciate knowing that water service will be available at the project site. As more detailed information is developed on the project, we will be consulting with your agency as to the specific details for water service. These details are being developed by the Master Planning consultants, and will be provided in the Draft Environmental Impact Statement currently under preparation. We look forward to your review of this document.

The proposed golf course and beach park have been separated from the original Environmental Impact Statement Preparation Notice (EISPN) that was submitted on June 30, 1987. It was determined that it would be inappropriate to combine both projects under a single Notice as the projects are not related to one another, will be administered by different departments and involve separate funding.

Please provide all comments relative to the Housing projects to this office and if you have comment specifically concerning the golf course and park, they should be directed to the Department of Parks and Recreation. A separate EISPN has been prepared and submitted to The Office of Environmental Quality Control by that Department.

Your willingness to assist in the planning of this development is greatly appreciated. If you should have any questions or additional comment and suggestions, please direct them to Mr. Howard Murai, Project Manager at 527-5321. Thank you again.

Robert Miyagato
for Mike Moon
Director

SEP 16 1987

BUILDING DEPARTMENT
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
530 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

HERBERT K. MURAOKA
DIRECTOR AND BUILDING SUPERINTENDENT

PB 87-476

June 2, 1987

'87 JUN -5 A8:17
DEPT. OF HOUSING
& COMM. DEVELOPMENT

MEMO TO: MR. MIKE MOON, DIRECTOR
DEPARTMENT OF HOUSING & COMMUNITY DEVELOPMENT

FROM: HERBERT K. MURAOKA
DIRECTOR AND BUILDING SUPERINTENDENT

SUBJECT: WEST LOCH ESTATES HOUSING PROJECT

Thank you for the opportunity to comment on the proposed West Loch Estates Housing project.

We understand that park-and-ride and child care facilities will be included in this development. We feel that the Enviromental Assessment should address these facilities.

Herbert K. Muraoka
HERBERT K. MURAOKA
Director and Building Superintendent

cc: J. Harada

BUILDING DEPARTMENT
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
530 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

HERBERT K. MURAOKA
DIRECTOR AND BUILDING SUPERINTENDENT

PB 87-714

July 13, 1987

MEMO TO: MICHAEL M. H. MOON, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

FROM: HERBERT K. MURAOKA
DIRECTOR AND BUILDING SUPERINTENDENT

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT (EIS) PREPARATION NOTICE
PROPOSED WEST LOCH ESTATES SUBDIVISION DEVELOPMENT
PROJECT SITUATED IN EWA, OAHU

Thank you for the opportunity to review the Environmental Impact Statement Preparation Notice for the West Loch Estates Subdivision.

We understand the Park and Ride facilities and a Child Care Center will be included in the proposed West Loch Estates Subdivision Development project. The EIS should address the Park and Ride facilities and the Child Care Center.

Herbert K. Muraoka
HERBERT K. MURAOKA
Director and Building Superintendent

cc: J. Harada

'87 JUL 14 P2:38
DEPT. OF HOUSING
& COMM. DEVELOPMENT

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4181

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

September 16, 1987

MEMORANDUM

TO: HERBERT K. MURAOKA, DIRECTOR
BUILDING DEPARTMENT

FROM: MICHAEL M.H. MOON, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE
FOR: WEST LOCH ESTATES DEVELOPMENT, EWA, OAHU

Thank you for your comments of June 2 and July 13, 1987 relating to the proposed West Loch development.

We are in the process of preparing a Master Plan and Environmental Impact Statement (EIS) for the proposed development and appreciate your comments. As more detailed information is developed on the project, we will be consulting with your department as to the specific details for the park and ride and child care facilities. This data will be provided in the Draft Environmental Impact Statement, and we look forward to your review of this document.

The proposed golf course and beach park have been separated from the original Environmental Impact Statement Preparation Notice (EISPN) that was submitted on June 30, 1987. It was determined that it would be inappropriate to combine both projects under a single Notice as the projects are not related to one another, will be administered by different departments and involve separate funding.

Please provide all comments relative to the Housing projects to this office and if you have comments specifically concerning the golf course and park, they should be directed to the Department of Parks and Recreation. A separate EISPN has been prepared and submitted to the Office of Environmental Quality Control by that Department.

Your willingness to assist in the planning of this development is greatly appreciated. If you should have any questions or additional comment and suggestions, please direct them to Mr. Howard Murai, Project Manager at 527-5321. Thank you again.

Robert Miyasato
for Mike Moon
Director

SEP 16 1987

DEPARTMENT OF GENERAL PLANNING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

DONALD A. CLEGG
CHIEF PLANNING OFFICER

GENE CONNELL
DEPUTY CHIEF PLANNING OFFICER

KK/DGP 7/87-2207

July 27, 1987

87 JUL 29 A8:20
DEPT OF HOUSING & DEVELOPMENT

MEMORANDUM

TO: MICHAEL M. H. MOON, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

FROM: DONALD A. CLEGG, CHIEF PLANNING OFFICER
DEPARTMENT OF GENERAL PLANNING

SUBJECT: CHAPTER 343, HAWAII REVISED STATUTES
ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE
FOR THE PROPOSED WEST LOCH ESTATES SUBDIVISION
DEVELOPMENT PROJECT SITUATED IN EWA, OAHU

This is in response to your request for comments on the Environmental Impact Statement Preparation Notice for the proposed West Loch Estates Subdivision development in Ewa.

The following points should be addressed in the preparation of the Draft Environmental Impact Statement:

1. Vehicular Access and Traffic

   The applicant should prepare a traffic study which discusses the proposed development's impact on Fort Weaver and Kunia Roads and its impact on downstream traffic on the H-1 Freeway and Farrington Highway.

2. Sewage Treatment and Disposal

   The availability of capacity at the Honouliuli Wastewater Treatment Plant to service the proposed development should be discussed.

3. Water System

   The water needs of the proposed development and its impact on the water resources in Ewa should be discussed.

4. Drainage System

   The West Loch Estates Subdivision Development may affect the quality and quantity of runoff flowing into Pearl Harbor's West Loch. The drainage impacts should be reviewed.

5. Public Schools

   The Draft EIS should discuss the adequacy of school facilities to support the proposed development.

6. Parks and Recreation

   We concur with the applicant's intent to coordinate plans for the shoreline park with the Navy and the Department of Land and Natural Resources.

7. Other Public Facilities

   The project's impact on solid waste collection and disposal, electric, telephone, police, fire and health care services should be discussed.

8. Social Impacts

   A social impact study should be prepared to include plans for relocating existing residents.

9. Environmental Characteristics

   A. Agriculture: The Draft EIS should address the loss of agricultural land and its impact on the agricultural industry on Oahu.

   B. Environmental Quality: The projects impact on air quality and noise levels should be discussed.

10. Flora, Fauna, Archaeological and Historic Resources

    A survey of the site should be required to protect any rare or endangered plants or animals and to preserve any archaeological or historic sites or remains.

We concur with the applicant's plan to address Corps of Engineers and U.S. Fish and Wildlife Service concerns regarding the alteration of wetlands and impacts on the Pearl Harbor National Wildlife Refuge Honouliuli Unit.

Thank you for giving us an opportunity to comment on this matter.

Donald Clegg
DONALD A. CLEGG
Chief Planning Officer

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU HAWAII 96813
PHONE 523-4181

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

September 16, 1987

MEMORANDUM

TO: DONALD A. CLEGG, CHIEF PLNNING OFFICER
DEPARTMENT OF GENERAL PLANNING

FROM: MICHAEL M.H. MOON, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

SUBJECT: CHAPTER 343, HAWAII REVISED STATUTES ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE FOR THE PROPOSED WEST LOCH ESTATES DEVELOPMENT, EWA, OAHU

Thank you for your comments dated July 27, 1987 relating to the proposed West Loch Estates Development Environmental Impact Statement Preparation Notice. Staff review of the specific comments made in your memorandum have been completed and we will be addressing these concerns in the Draft Environmental Impact Statement (DEIS) currently under preparation.

As you are aware, there have been scheduled meetings with both Cabinet level and senior staff representatives from the appropriate departments as well as the retained consultants responsible for the development of the Project Master Plan and the DEIS. Your office's concerns have been discussed on an ongoing basis with this group and also with concerned Federal and State agencies.

Please be assured that the DEIS will provide specific analysis and adequate discussion on these items.

The proposed golf course and beach park have been separated from the original Environmental Impact Statement Preparation Notice (EISPN) that was submitted on June 30, 1987. It was determined that it would be inappropriate to combine both projects under a single Notice as the projects are not related to one another, will be administered by different departments and involve separate funding.

Please provide all comments relative to the housing projects to this office and if you have comments specifically concerning the golf course and park, should be directed to the Department of Parks and Recreation. A separate EISPN has been prepared and submitted to The Office of Environmental Quality Control by the Parks Department.

Your willingness to assist in the planning of this development is greatly appreciated. If you should have any questions or additional comment and suggestions, please direct them to Mr. Howard Murai, Project Manager at 527-5321. Thank you again.

Robert Magarati
for Mike Moon
Director

SEP 16 1987

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

FRANK F. FASI
MAYOR

JOHN P. WHALEN
DIRECTOR

LU5/87-2577(AC)

'87 JUN -8 P3:36
DEPT. OF HOUSING & COMM. DEVELOPMENT

June 8, 1987

MEMORANDUM

TO: MIKE MOON, DIRECTOR
DEPARTMENT OF HOUSING & COMMUNITY DEVELOPMENT

FROM: JOHN P. WHALEN, DIRECTOR

SUBJECT: WEST LOCH ESTATES HOUSING PROJECT, EWA, OAHU
TAX MAP KEYS: 9-1-17: VARIOUS; 9-4-48: 74

The Department of Land Utilization has completed its review of the above referenced Development Plan public facility amendment and offers the following comments:

1. A portion of the proposed project lies within the Special Management Area (SMA) established in Chapter 33 and will require a Shoreline Management Permit (SMP).

2. The study, An Ornithological Survey of Hawaiian Wetlands Vol. II, indicates that there are significant wetland habitats on the proposed park site. These habitats should be protected. They could be incorporated into the park as wildlife preserves with an effective management program.

3. The proposed park will be located adjacent to the Honouliuli Unit of the Pearl Harbor National Wildlife Refuge. Depending upon the nature of the park design, there may be possible construction related impacts to the Refuge such as drainage diversion, water table modification and disturbance to wildlife due to noise and lights. These potential impacts should be mitigated and solutions coordinated with the U. S. Fish and Wildlife Service.

We hope these comments will be a help to you in your preparation of the environmental assessment. If you have any questions, please contact Art Challacombe of our staff at 523-4648.

JOHN P. WHALEN
Director of Land Utilization

JPW:sl
1014B

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

FRANK F. FASI
MAYOR

JOHN P. WHALEN
DIRECTOR

LU7/87-3366(AC)

'87 JUL 15 A10:29
DEPT. OF HOUSING & COMM. DEVELOPMENT

July 14, 1987

MEMORANDUM

TO: MIKE MOON, DIRECTOR
DEPARTMENT OF HOUSING & COMMUNITY DEVELOPMENT

FROM: JOHN P. WHALEN, DIRECTOR

SUBJECT: CHAPTER 343, HAWAII REVISED STATUTES
ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE (EISPN)
PROPOSED WEST LOCH ESTATES SUBDIVISION DEVELOPMENT PROJECT
EWA, OAHU; TAX MAP KEYS 9-1-17: VARIOUS; 9-4-48: 74;
9-1-20: VARIOUS; 9-1-21: VARIOUS

Thank you for the opportunity to review your preparation notice for the above referenced project. Based upon our review, we offer the following comments:

1. As mentioned in the EISPN, plans for the project could affect coastal wetlands and the Pearl Harbor National Wildlife Refuge Honouliuli Unit. Depending upon the nature of the proposed park design, there may be possible construction related impacts to the Refuge such as drainage diversion, water table modification and disturbance to wildlife due to noise and lights. These potential impacts should be addressed in the Draft Environmental Impact Statement (DEIS).

2. The DEIS should include a study of the project impact on coastal views.

We hope these comments will help you in the preparation of the EIS. If you have any questions, please contact Art Challacombe of our staff at 523-4648.

JOHN P. WHALEN
Director of Land Utilization

JPW:sl
1102B

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4191

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

September 16, 1987

MEMORANDUM

TO: JOHN P. WHALEN, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM: MICHAEL M.H. MOON, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE
FOR: WEST LOCH ESTATES DEVELOPMENT, EWA, OAHU

Thank you for your comments of June 8 and July 14, 1987 relating to the proposed West Loch development.

We are in the process of preparing a Master Plan and Environmental Impact Statement (EIS) for the proposed development and can appreciate your concerns relating to the project impacts on the coastal wetlands, the Honouliuli Wildlife Refuge, and coastal view plane impacts.

Our intent is not to affect any of the ponds located along the coastline except for the clearing of shrubs and grasses which are currently there. We are proposing that these ponds be incorporated into the master plan as part of a shoreline park. We will be complying with the provisions of Ordinance 84-4 relating to Special Management Area for Oahu.

The proposed golf course and beach park have been separated from the original Environmental Impact Statement Preparation Notice (EISPN) that was submitted on June 30, 1987. It was determined that it would be inappropriate to combine both projects under a single Notice as the projects are not related to one another, will be administered by different departments and involve separate funding.

Please provide all comments relative to the Housing projects to this office and if you have comments specifically concerning the golf course and park, they should be directed to the Department of Parks and Recreation. A separate EISPN has been prepared and submitted to The Office of Environmental Quality Control by that Department.

Your willingness to assist in the planning of this development is greatly appreciated. If you should have any questions or additional comment and suggestions, please direct them to Mr. Howard Murai, Project Manager at 527-5321. Thank you again.

Robert Miyasato
for Mike Moon
Director

SEP 16 1987

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

FRANK F. FASI
MAYOR

HIRAM K. KAMAKA
DIRECTOR

WALTER M. OSAWA
DEPUTY DIRECTOR

June 29, 1987

87 JL -1 P3:31
DEPT. OF HOUSING & COMM. DEVELOPMENT

TO: MIKE MOON, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

FROM: HIRAM K. KAMAKA, DIRECTOR

SUBJECT: WEST LOCH ESTATES HOUSING PROJECT - EWA
TAX MAP KEY 9-1-17 AND 9-4-48

We have reviewed the proposed West Loch Estates Housing project and make the following comments.

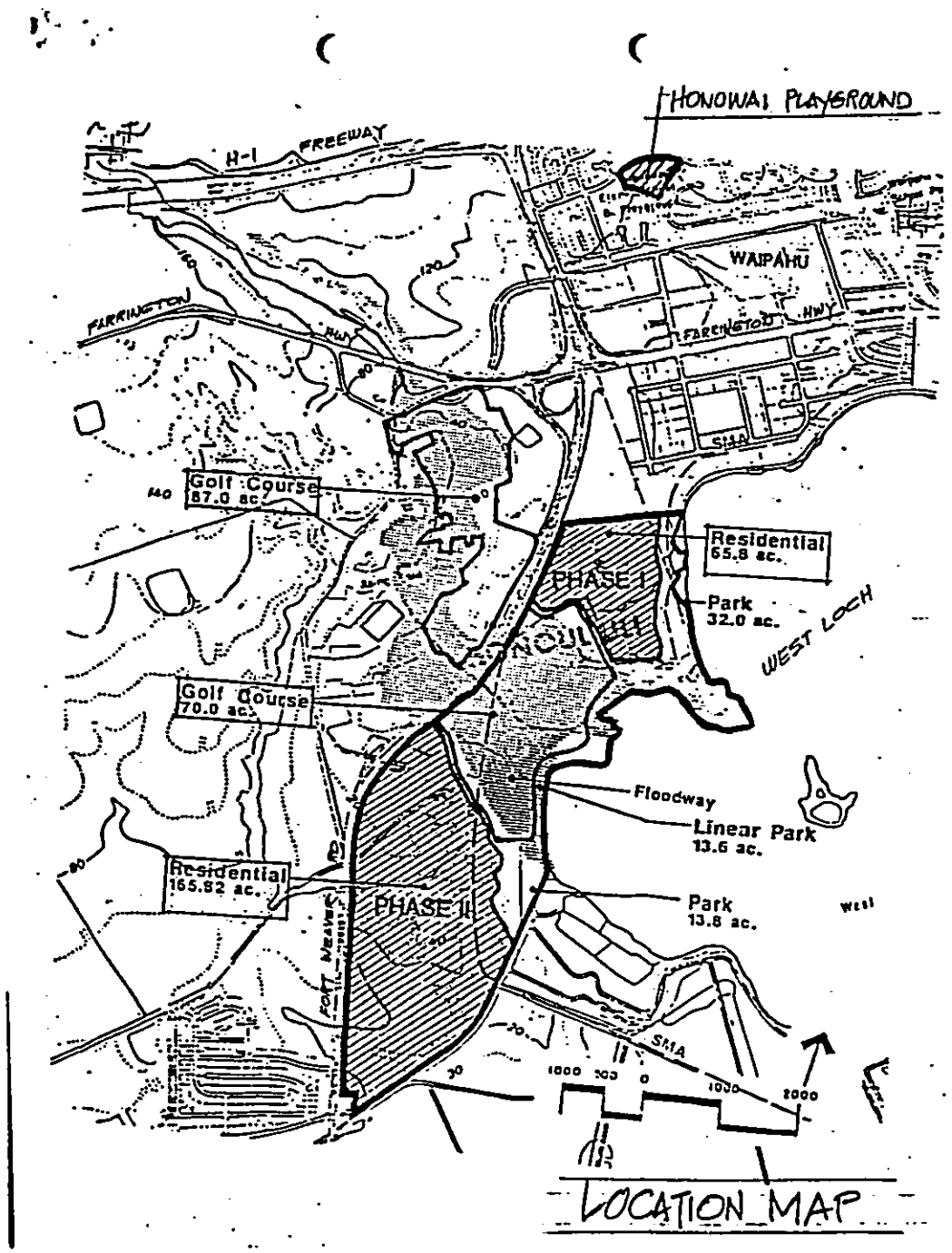
The recreational needs of the proposed West Loch Estates Housing Project have been adressed. Park sites have been included in the project's plan to serve the project and comply with the Park Dedication Ordinance requirements.

Thank you for the opportunity to review the project.

HIRAM K. KAMAKA, Director

HKK:ei

Attach.



LOCATION MAP

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU HAWAII 96813
PHONE 523-4161

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT IWASAKI
DEPUTY DIRECTOR

September 16, 1987

MEMORANDUM

TO: HIRAM K. KAMAKA, DIRECTOR
DEPARTMENT OF PARKS AND RECREATION

FROM: MICHAEL M.H. MOON, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE
FOR: WEST LOCH ESTATES DEVELOPMENT, EWA, OAHU

Thank you for your comments of June 29, 1987 relating to the proposed West Loch development.

We are in the process of preparing a Master Plan and Environmental Impact Statement (EIS) for the proposed development and appreciate your comments. As more detailed information is developed on the project we will be consulting with your department as to the specific details for recreational services and facilities. We look forward to your review of this document.

The proposed golf course and beach park have been separated from the original Environmental Impact Statement Preparation Notice (EISPN) that was submitted on June 30, 1987. It was determined that it would be inappropriate to combine both projects under a single Notice as the projects are not related to one another, will be administered by different departments and involve separate funding.

Please provide all comments relative to the Housing projects to this office and comments specifically concerning the golf course and park, are being directed to the Department of Parks and Recreation for review and response.

Your willingness to assist in the planning of this development is greatly appreciated. If you should have any questions or additional comment and suggestions, please direct them to Mr. Howard Murai, Project Manager at 527-5321. Thank you again.

Robert Miyasato
for Mike Moon
Director

SEP 16 1987

PROPOSED CITY AND COUNTY RECREATION PARK AND FACILITY STANDARDS

	MINI PARKS	NEIGHBORHOOD PARKS	COMMUNITY PARKS	DISTRICT PARKS	OTHER: URBAN PARKS AND SQUARES	CITY AND COUNTY ISLAND WIDE PARKS	LINKAGES
MINIMUM AREA REQUIRED FOR 1,000 POPULATION	← 1/4 mile radius service area (250 sq. ft. dwelling units) →						
SERVICE AREA POPULATION	—	approximately 5,000	approximately 10,000	approximately 25,000			
AVERAGE SITE SIZE		4-6 acres	10 acres	15-20 acres			
SERVICE AREA	¼ mile	½ mile	1 mile	3 miles			
SCHOOL RELATIONSHIP		Joint Use with Elementary School	Possible Joint Use with... Schools	Possible Joint Use with Schools			
BASIC FACILITIES (Can be separate or next facilities, depending upon needs)	Landscaped Areas, Benches, Tables	Children's Play Area 2 Basketball Courts 2 Volleyball Courts 1-2 Softball Fields Comfort Station	Children's Play Area 3-4 Basketball Courts 3-4 Volleyball Courts 1-2 Softball Fields Comfort Station/ Recreation Bldg.	Children's Play Area 3-4 Basketball Courts 3-4 Volleyball Courts 2 Softball Fields 1 Baseball Field 1 Senior/Freestyle Gym/Rec Bldg. 4-6 Tennis Courts 1-25 yd or 25m pool Complex			
ADDITIONAL DESIRABLE FACILITIES	Children's Play Area	Shelter Passive Area	Passive Area 1 Baseball Field	Passive Area Jogging Trail Archery			
RECREATION STAFF REQUIREMENTS	—	0	1 Rec. Director	1 Rec. Director 1 Specialist 1 Pool Supervisor			

BIKEWAYS, PEDESTRIAN WAYS, STREAM/GREENBELT TRAILS, TRANSPORTATION SERVICES

S-9

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

ALFRED J. THIEDE
DIRECTOR AND CHIEF ENGINEER

ENV 87-90

June 5, 1987

87 JUN -8 A8:44
DEPT. OF HOUSING & COMM. DEVELOPMENT

MEMORANDUM

TO: MIKE MOON, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

FROM: ALFRED J. THIEDE, DIRECTOR AND CHIEF ENGINEER

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WEST LOCH HOUSING PROJECT (TAX MAP KEY: 9-1-17:6, 9-11, 13, 14, 18-32, 34, 44, 9-4-48: 74)

In response to your memorandum dated May 22, 1987, regarding the proposed subject project, our comments are as follows:

1. A drainage report should be prepared and submitted to the Drainage Section, Division of Engineering for review and approval.

2. Phase I of the project, consisting of approximately 420 residential units on 65.8 acres may be connected to the existing Waipahu sewer system. However, approximately 1,200 feet of the affected sewer line will have to be relieved.

3. Phase II of the project, consisting of approximately 1,080 residential units on 165.8 acres would require the construction of a wastewater pump station and force main that will be connected to the existing Ewa sewers at Renton Road and Fort Weaver Road. The assessment should discuss the relative location of the pump station in respect to the master plan of the Honouliuli pump station located in the vicinity of the golf course, and how the station will be operated and maintained.

4. In this regard, the assessment should discuss how the ancillary units of the golf course will be connected to the sewer unit.

for ALFRED J. THIEDE
Director and Chief Engineer

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

ALFRED J. THIEDE
DIRECTOR AND CHIEF ENGINEER

ENV 87-106

July 7, 1987

87 JUL -8 A10:25
DEPT. OF HOUSING & COMM. DEVELOPMENT

MEMORANDUM

TO: MIKE MOON, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

FROM: ALFRED J. THIEDE, DIRECTOR AND CHIEF ENGINEER

SUBJECT: EIS PREPARATION NOTICE FOR WEST LOCH HOUSING PROJECT (TAX MAP KEY: 9-1-17:6, 9-11, 13, 14, 18-32, 34, 44, 9-4-48:74)

We have reviewed the subject EISPN and have no additional comments to offer at this time.

for ALFRED J. THIEDE
Director and Chief Engineer

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4161

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

September 16, 1987

MEMORANDUM

TO: ALFRED J. THIEDE
DIRECTOR AND CHIEF ENGINEER
DEPARTMENT OF PUBLIC WORKS

FROM: MICHAEL M.H. MOON, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE
FOR: WEST LOCH ESTATES DEVELOPMENT, EWA, OAHU

Thank you for your comments of June 5 and July 7, 1987 relating to the proposed West Loch development.

We are in the process of preparing a Master Plan and Environmental Impact Statement (EIS) for the proposed development and appreciate your comments. As more detailed information is developed on the project, we will be consulting with your department as to the specific details for the drainage and wastewater improvements. This data will be provided for your review in the Draft Environmental Impact Statement currently under preparation. We look forward to your review of this document.

The proposed golf course and beach park have been separated from the original Environmental Impact Statement Preparation Notice (EISPN) that was submitted on June 30, 1987. It was determined that it would be inappropriate to combine both projects under a single Notice as the projects are not related to one another, will be administered by different departments and involve separate funding.

Please provide all comments relative to the Housing projects to this office and if you have comments specifically concerning the golf course and park, they should be directed to the Department of Parks and Recreation. A separate EISPN has been prepared and submitted to The Office of Environmental Quality Control by that Department.

Your willingness to assist in the planning of this development is greatly appreciated. If you should have any questions or additional comment and suggestions, please direct them to Mr. Howard Murai, Project Manager at 527-5321. Thank you again.

Robert Miyasato
for Mike Moon
Director

SEP 16 1987

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HARTEN
DIRECTOR

JOSEPH M. MAGALDI, JR.
DEPUTY DIRECTOR

5/87-3431

June 15, 1987

87 JUN 15 P3:20
DEPT. OF HOUSING & COMM. DEVELOPMENT

MEMORANDUM

TO: MIKE MOON, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

FROM: JOSEPH M. MAGALDI, JR., ACTING DIRECTOR

SUBJECT: WEST LOCH ESTATES HOUSING PROJECT

Pursuant to your May 22, 1987 request for comments on the West Loch Estates Housing Project, we respond with the following:

1. The requirement for public transit to service the project needs to be discussed. Identification of existing bus service to the area and the anticipated need for future public transit will be of significance. Also, consideration for a park-and-ride facility should be addressed.

2. Longer term rapid transit impacts on the project: Although the proposed West Loch Estates Housing Project is beyond the planned terminus at the Waiawa Interchange, possible construction of a rapid transit rail system would help mitigate some traffic impacts and serve residents of this project. Frequent feeder bus service can be provided residents in the Ewa area to the Waiawa Station. From there, riders would be able to commute to downtown Honolulu in about 25 minutes or be in Waikiki in about 35 minutes. If population growth warrants future expansion of the rail system toward Ewa, service to residents of this development would be improved.

3. Traffic engineering requirements: Due to the magnitude of the project, a traffic study is required. The study should address the following concerns:

   a. The amount of traffic that will be generated by the project and its impact on the surrounding streets. A capacity analysis for the critical intersections that will be impacted is required for the A.M. and P.M. peak hours.

   b. The traffic impact of the project on the arterial system that will be affected.

   c. The need for street improvements, including traffic signalization of critical intersections to accommodate the proposed project.

Should you have further questions, please contact Garrett Goo of my staff at Local 6381.

JOSEPH M. MAGALDI, JR.

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALDI, JR.
DEPUTY DIRECTOR

PL 1.0715
TE-4543

July 23, 1987

'87 JL 30 A8:59

MEMORANDUM

TO: MIKE M. H. MOON, DIRECTOR
DEPARTMENT OF HOUSING AND
COMMUNITY DEVELOPMENT

ATTN: HOWARD MURAI

FROM: JOHN E. HIRTEN, DIRECTOR

SUBJECT: CHAPTER 343, HAWAII REVISED STATUTES
ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE
PROPOSED WEST LOCH ESTATES SUBDIVISION DEVELOPMENT
PROJECT SITUATED IN EWA, OAHU
TMK: 9-1-17, 20, AND 21

This is in response to your July 6, 1987 memorandum.

Yes, we would like to have the opportunity to comment and be consulted during the preparation of this Environmental Impact Statement.

Thank you for allowing us this opportunity to respond.

JOHN E. HIRTEN

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4161

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

September 16, 1987

MEMORANDUM

TO: JOHN E. HIRTEN, DIRECTOR
DEPARTMENT OF TRANSPORTATION SERVICES

FROM: MICHAEL M.H. MOON, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE
FOR: WEST LOCH ESTATES DEVELOPMENT, EWA, OAHU

Thank you for your comments of June 15, 1987 and your request to be a consulted party during the preparation of the Environmental Impact Statement (EIS).

As you know, the retained consultants have been requested to develop a Traffic Impact study that will address the specific traffic concerns you have detailed in your memorandum. The comments from your office have been provided to the consultant for their use and we look forward to your staff review of the Traffic study as it is provided in the Draft Environmental Impact Statement.

The proposed golf course and beach park have been separated from the original Environmental Impact Statement Preparation Notice (EISPN) that was submitted on June 30, 1987. It was determined that it would be inappropriate to combine both projects under a single Notice as the projects are not related to one another, will be administered by different departments and involve separate funding.

Please provide all comments relative to the Housing projects to this office and if you have comments specifically concerning the golf course and park, they should be directed to the Department of Parks and Recreation. A separate EISPN has been prepared and submitted to The Office of Environmental Quality Control by the Parks Department.

Your willingness to assist in the planning, of this development is greatly appreciated. If you should have any questions or additional comment and suggestions, please direct them to Mr. Howard Murai, Project Manager at 527-5321. Thank you again.

for Mike Moon
Director

SEP 16 1987

OFFICE OF HUMAN RESOURCES
CITY AND COUNTY OF HONOLULU

HONOLULU MUNICIPAL BUILDING, 6TH FLOOR
650 SOUTH KING STREET
HONOLULU, HAWAII 96813 • (808) 523-4341

FRANK F. FASI
MAYOR

MARIA VICTORIA R. BUNYE
DIRECTOR

VICTOR D. GUILLERMO, JR.
DEPUTY DIRECTOR

87 JUN 15 A7:17
DEPT. OF HOUSING & COMM. DEVELOPMENT

June 10, 1987

MEMORANDUM

TO : MIKE MOON, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

FROM : MARIA VICTORIA R. BUNYE, DIRECTOR
OFFICE OF HUMAN RESOURCES

SUBJECT: WEST LOCH ESTATES HOUSING PROJECT ENVIRONMENTAL ASSESSMENT

The Office of Human Resources has reviewed the following documents in response to your request:

- Chapter 343, HRS;
- 24 CFR, Part 58;
- 24 CFR, 570.201;
- 40 CFR, Parts 1500-1508; and
- Environmental Assessment Forms.

As a result, we recommend the following:

1. that 44,000 square feet of land be set aside adjacent to the Park-and-Ride facility for a Child Care Center serving 250 children;

2. that an additional thirty (30) rental units be set aside for single parent families with young children;

3. that at least ten (10) of the 150 elderly rental units be designated as group homes; and

4. that an Environmental Impact Statement be prepared for the project.

Thank you for the opportunity to comment.

MVRB:hh

OFFICE OF HUMAN RESOURCES
CITY AND COUNTY OF HONOLULU

HONOLULU MUNICIPAL BUILDING, 6TH FLOOR
650 SOUTH KING STREET
HONOLULU, HAWAII 96813 • (808) 523-4311

FRANK F. FASI
MAYOR

MARIA VICTORIA R. BUNYE
DIRECTOR

VICTOR D. GUILLERMO, JR.
DEPUTY DIRECTOR

87 JUL 22 P3:20
DEPT. OF HOUSING & COMM. DEVELOPMENT

July 22, 1987

MEMORANDUM

TO : MIKE MOON, DIRECTOR
HOUSING AND COMMUNITY DEVELOPMENT

FROM : MARIA VICTORIA R. BUNYE, DIRECTOR
OFFICE OF HUMAN RESOURCES

SUBJECT: WEST LOCH ESTATES SUBDIVISION DEVELOPMENT PROJECT
ENVIRONMENTAL IMPACT STATEMENT

The Office of Human Resources has reviewed all pertinent documents pursuant to Environmental Impact Statements. We recommend the following:

1. that 44,000 square feet of land be set aside adjacent to the planned Park-and Ride facility for a Child Care Center to serve 250 children;

2. that an additional thirty (30) rental units be set aside for single parent families with young children;

3. that at least ten (10) of the 150 elderly rental units be designed as group homes; and

4. that this office have access to, and consultation with, your E.I.S. consultant during the preparation of the document.

Thank you for the opportunity to comment.

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4181

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

September 16, 1987

MEMORANDUM

TO: MARIA VICTORIA R. BUNYE, DIRECTOR
OFFICE OF HUMAN RESOURCES

FROM: MICHAEL M.H. MOON, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE
FOR: WEST LOCH ESTATES DEVELOPMENT, EWA, OAHU

Thank you for your comments of June 10 and July 22, 1987 relating to the proposed West Loch development.

We are in the process of preparing a Master Plan and Environmental Impact Statement (EIS) for the proposed development and appreciate your comments. As more detailed information is developed on the project, we will be consulting with your office as to the specific details for the child care facilities and the development of rental facilities for single parent families and group homes.

The proposed golf course and beach park have been separated from the original Environmental Impact Statement Preparation Notice (EISPN) that was submitted on June 30, 1987. It was determined that it would be inappropriate to combine both projects under a single Notice as the projects are not related to one another, will be administered by different departments and involve separate funding.

Please provide all comments relative to the Housing projects to this office and if you have comments specifically concerning the golf course and park, they should be directed to the Department of Parks and Recreation. A separate EISPN has been prepared and submitted to The Office of Environmental Quality Control by that Department.

Your willingness to assist in the planning of this development is greatly appreciated. If you should have any questions or additional comment and suggestions, please direct them to Mr. Howard Murai, Project Manager at 527-5321. Thank you again.

Robert Miyasato
for Mike Moon
Director

SEP 16 1987

FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU
1455 S. BERETANIA STREET, ROOM 309
HONOLULU, HAWAII 96814

FRANK F. FASI
MAYOR

FRANK K. KAHOOHANOHANO
FIRE CHIEF

LIONEL E. CAMARA
DEPUTY FIRE CHIEF

June 15, 1987

'87 JUN 16 P2:52
DEPT. OF HOUSING & COMM. DEVELOPMENT

TO: MICHAEL M.H. MOON, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

FROM: FRANK K. KAHOOHANOHANO, FIRE CHIEF

SUBJECT: WEST LOCH ESTATES HOUSING PROJECT

We have reviewed the subject material provided. Primary fire protection for the project will be provided by the Waipahu Fire Station consisting of one engine company (5 fire fighters), and one ladder company (6 fire fighters). Secondary fire service would be provided by the Ewa Beach and Pearl City engine companies. A new engine company is planned for Ewa Tenny Village in 1991.

Existing and planned fire service is considered adequate for the project.

Should you have any questions, please contact Battalion Chief Kenneth A. Word at 943-3838.

Frank K. Kahoohanohano
FRANK K. KAHOOHANOHANO
Fire Chief

FKK:KAW:lm

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4181

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

September 16, 1987

MEMORANDUM

TO: FRANK K. KAHOOHANOHANO, FIRE CHIEF
FIRE DEPARTMENT

FROM: MICHAEL M.H. MOON, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE
FOR: WEST LOCH ESTATES DEVELOPMENT, EWA, OAHU

Thank you for your comments of June 15, 1987 relating to the proposed West Loch development.

We are in the process of preparing a Master Plan and Environmental Impact Statement (EIS) for the proposed development and appreciate your comments. As more detailed information is developed on the project, we will forward this information to your office. Finally, we look forward to your review of the Draft Environmental Impact Statement.

The proposed golf course and beach park have been separated from the original Environmental Impact Statement Preparation Notice (EISPN) that was submitted on June 30, 1987. It was determined that it would be inappropriate to combine both projects under a single Notice as the projects are not related to one another, will be administered by different departments and involve separate funding.

Please provide all comments relative the Housing projects to this office and if you have comments specifically concerning the golf course and park, they should be directed to the Department of Parks and Recreation. A separate EISPN has been prepared and submitted to The Office of Environmental Quality Control by that Department.

Your willingness to assist in the planning of this development is greatly appreciated. If you should have any questions or additional coment and suggestions, please direct them to Mr. Howard Mural, Project Manager at 527-5321. Thank you again.

for Mike Moon
Director

SEP 16 '87

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU

1455 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96814 • AREA CODE (808) 955-3111

FRANK F. FASI
MAYOR

DOUGLAS G. GIBB
CHIEF

WARREN FERREIRA
DEPUTY CHIEF

OUR REFERENCE SS-LK

June 2, 1987

'87 JUN -8 A10:52
DEPT. OF HOUSING & COMM. DEVELOPMENT

TO: MIKE M. H. MOON, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

FROM: DOUGLAS G. GIBB, CHIEF
HONOLULU POLICE DEPARTMENT

SUBJECT: WEST LOCH ESTATES HOUSING, HONOULIULI, EWA, OAHU

We have reviewed the project description and location map for the proposed project and offer the following comments.

The above proposed project covers approximately 448.00 acres. Approximately two-thirds of this acreage would be utilized to develop residential single family homes and rental units for the elderly. We expect the need for police services to rise with the increase in population.

Our Pearl City District station, which presently serves the Ewa community, is already operating at near maximum capability. With this project, and other proposals that are being submitted for approval in West Oahu, we expect an even greater demand for police services.

Our ability to provide adequate services for the community will depend primarily on the availability of funding for sufficient personnel, equipment and communications. We can maintain adequate police services for the West Loch area as long as these resources keep pace with the growth.

Thank you for the opportunity to provide comment.

DOUGLAS G. GIBB
Chief of Police

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU

1455 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96814 • AREA CODE (808) 955-3111

FRANK F. FASI
MAYOR

DOUGLAS G. GIBB
CHIEF

WARREN FERREIRA
DEPUTY CHIEF

OUR REFERENCE MF-LK

July 10, 1987

TO: MIKE MOON, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

ATTENTION: HOWARD MURAI, PROJECT OFFICER
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

FROM: DOUGLAS G. GIBB, CHIEF OF POLICE
HONOLULU POLICE DEPARTMENT

SUBJECT: CHAPTER 343, HAWAII REVISED STATUTES
ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE
PROPOSED WEST LOCH ESTATES SUBDIVISION DEVELOPMENT
PROJECT SITUATED EWA, OAHU

We have reviewed the EIS Preparation Notice for the Proposed Development at West Loch Estates, Ewa, Oahu, and request to be consulted during the preparation of this EIS.

We are concerned that a development of this size will affect the traffic flow in the area, the calls for police service, and the Department's ability to answer those calls. Additional manpower and equipment will also have to be allocated to the area.

We would appreciate being involved in the planning for the development as early as possible.

DOUGLAS G. GIBB
Chief of Police

'87 JUL 14 P2:38
DEPT. OF HOUSING & COMM. DEVELOPMENT

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4161

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

September 16, 1987

MEMORANDUM

TO: DOUGLAS G. GIBB, CHIEF OF POLICE
HONOLULU POLICE DEPARTMENT

FROM: MICHAEL M.H. MOON, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE
FOR: WEST LOCH ESTATES DEVELOPMENT, EWA, OAHU

Thank you for your comments of June 2 and July 10, 1987 relating to the proposed West Loch development.

We are in the process of developing a Master Plan and Environmental Impact Statement (EIS) for the proposed development and can appreciate your concerns relating to the project impacts on traffic flow and the need for additional Police service that will be created by this project. We will be providing the detailed planning information in the Draft EIS currently under preparation.

The proposed golf course and beach park have been separated from the original Environmental Impact Statement Preparation Notice (EISPN) that was submitted on June 30, 1987. It was determined that it would be inappropriate to combine both projects under a single Notice as the projects are not related to one another, will be administered by different departments and involve separate funding.

Please provide all comments relative to the Housing projects to this office and if you have comments specifically concerning the golf course and park, they should be directed to the Department of Parks and Recreation. A separate EISPN has been prepared and submitted to The Office of Environmental Quality Control by that Department.

Your willingness to assist in the planning of this development is greatly appreciated. If you should have any questions or additional comment and suggestions, please direct them to Mr. Howard Murai, Project Manager at 527-5321. Thank you again.

Robert Miyasato
for Mike Moon
Director

SEP

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
BUILDING 230
FT. SHAFTER, HAWAII 96858-5440

REPLY TO ATTENTION OF:

June 12, 1987

87 JN 17 P1:46
DEPT OF HOUSING & COMM. DEVELOPMENT

Mike Moon, Director
Department of Housing and
Community Development
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Moon:

Thank you for the opportunity to review and comment on the West Loch Estates Housing Project. The following comments are offered:

a. Shoreline areas of Pearl Harbor are typically Batis/mangrove wetland areas. Any fill within these coastal wetlands for the proposed development should be coordinated with Operations Branch for permit requirements.

b. We provided comments previously on this project in our letter on April 7, 1987. The flood hazard zones are X, D and A.

Sincerely,

Kisuk Cheung
Chief, Engineering Division

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
BUILDING 230
FT. SHAFTER, HAWAII 96858-5440

REPLY TO ATTENTION OF:

July 17, 1987

87 JL 23 P1:59
DEPT OF HOUSING & COMM DEVELOPMENT

Mr. Howard Murai
Department of Housing and
Community Development
650 South King Street, Fifth Floor
Honolulu, Hawaii 96813

Dear Mr. Murai:

Thank you for the opportunity to review and comment on the EIS Preparation Notice for the Proposed West Loch Estates Subdivision Development Project Situated in Ewa, Oahu. The following comments are offered:

a. We are aware that your department consulted with our Operations Branch on June 26, 1987, concerning the Department of the Army permit requirements regarding fill in wetlands. We understand that EIS studies will include a botanical survey to delineate wetland areas for U.S. Army Corps of Engineers' jurisdictional determinations.

b. The parcels under review are shown on the enclosed tax maps for the Honouliuli, Ewa area. According to the Flood Insurance Study for the City and County of Honolulu (September 1980) and the enclosed Flood Insurance Rate Map (Panel 110), the parcels are in the following designated zones:

(1) Zone A. Special flood hazard areas inundated by the 100-year flood. No base flood elevations or flood hazard factors determined.

(2) Zone C. Area of minimal flooding.

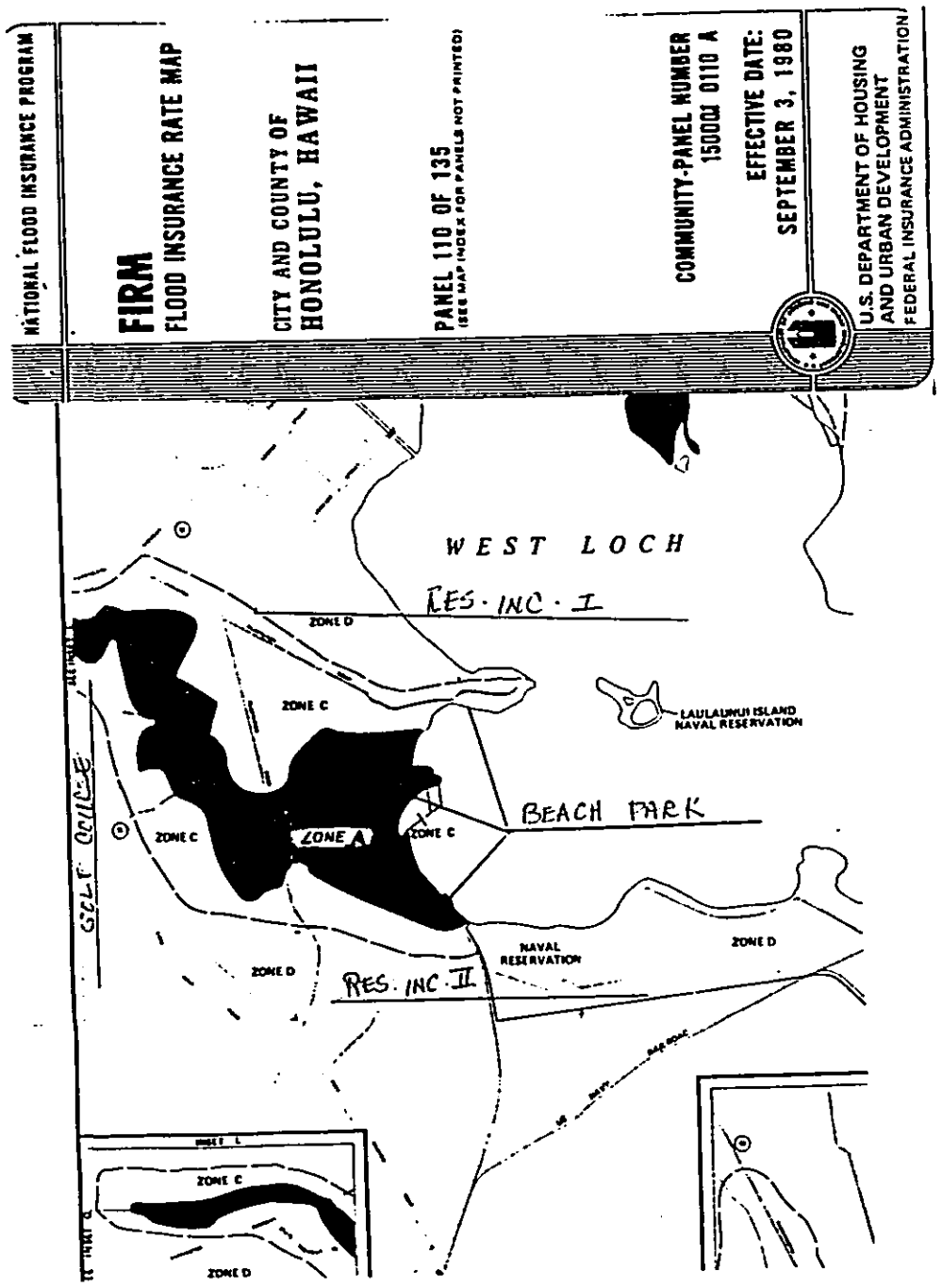
(3) Zone D. Area of undetermined, but possible flood hazard.

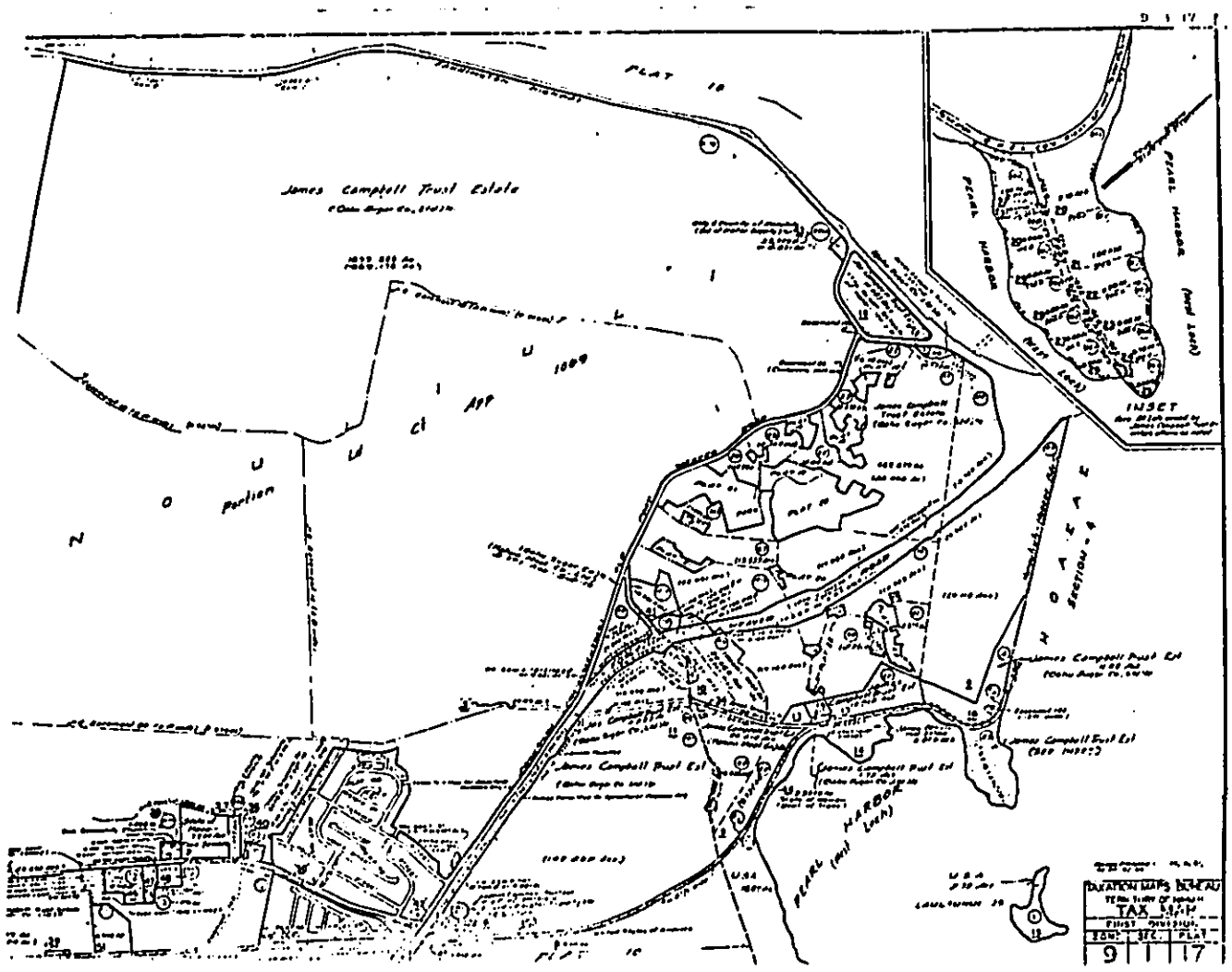
Please contact our Operations Branch for further consultation during preparation of the EIS for this project.

Sincerely,

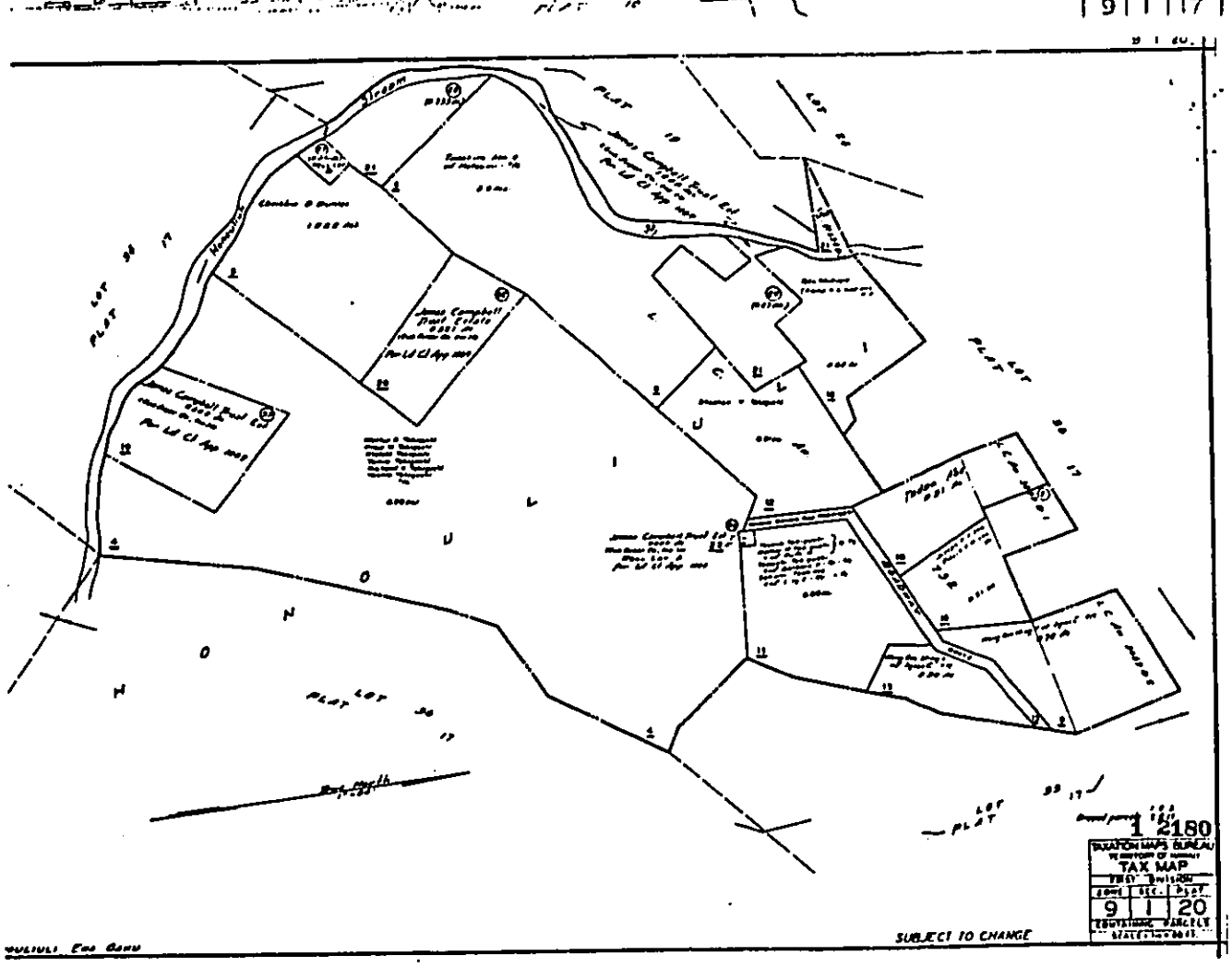
Kisuk Cheung
Chief, Engineering Division

Enclosure





PLAT 18
James Campbell Trust Estate
PEARL HARBOR
INSET
PEARL HARBOR
TAX MAP
9 1 17



PLAT 18
LOT 36 17
PLAT 17
LOT 36 17
PLAT 17
LOT 33 17
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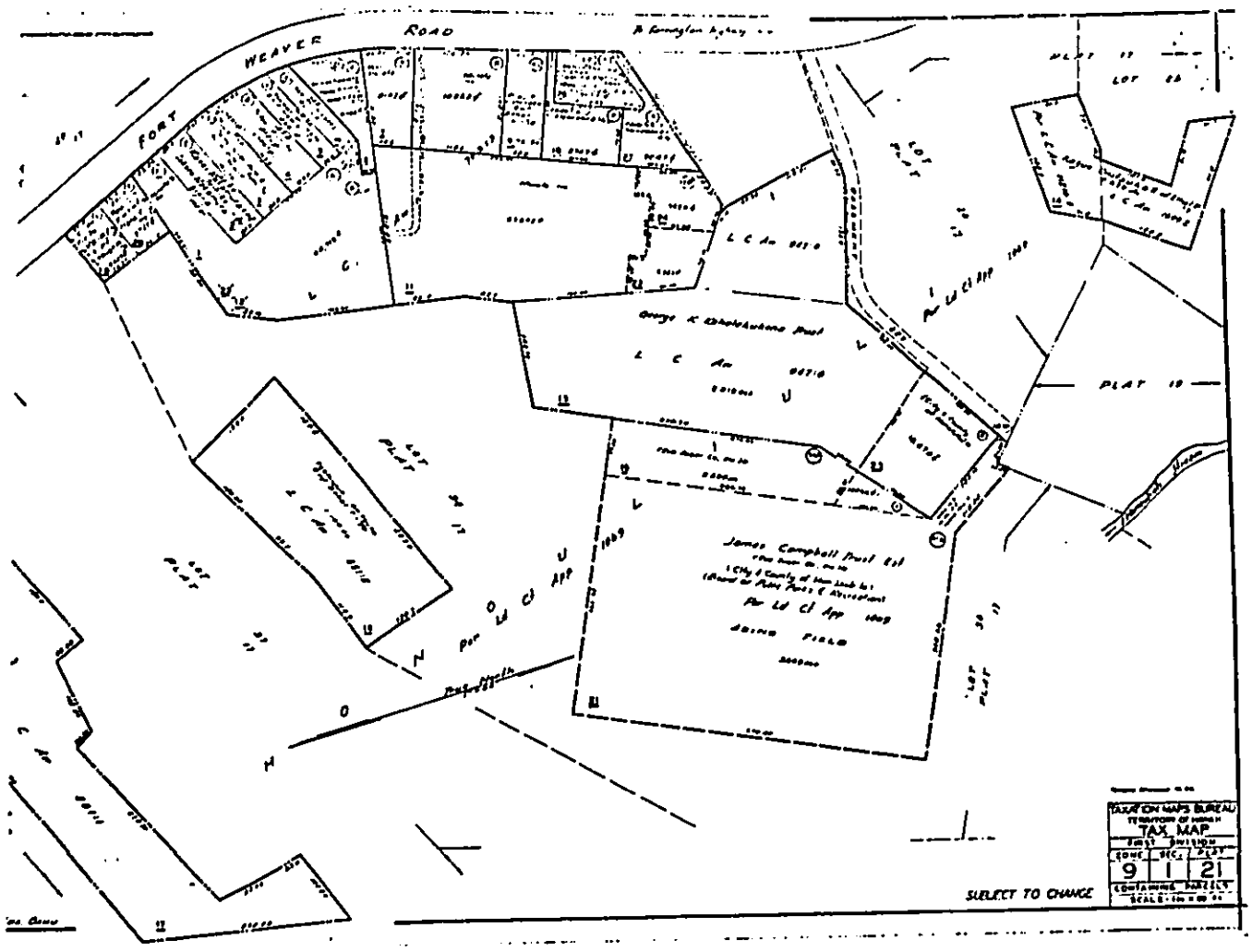
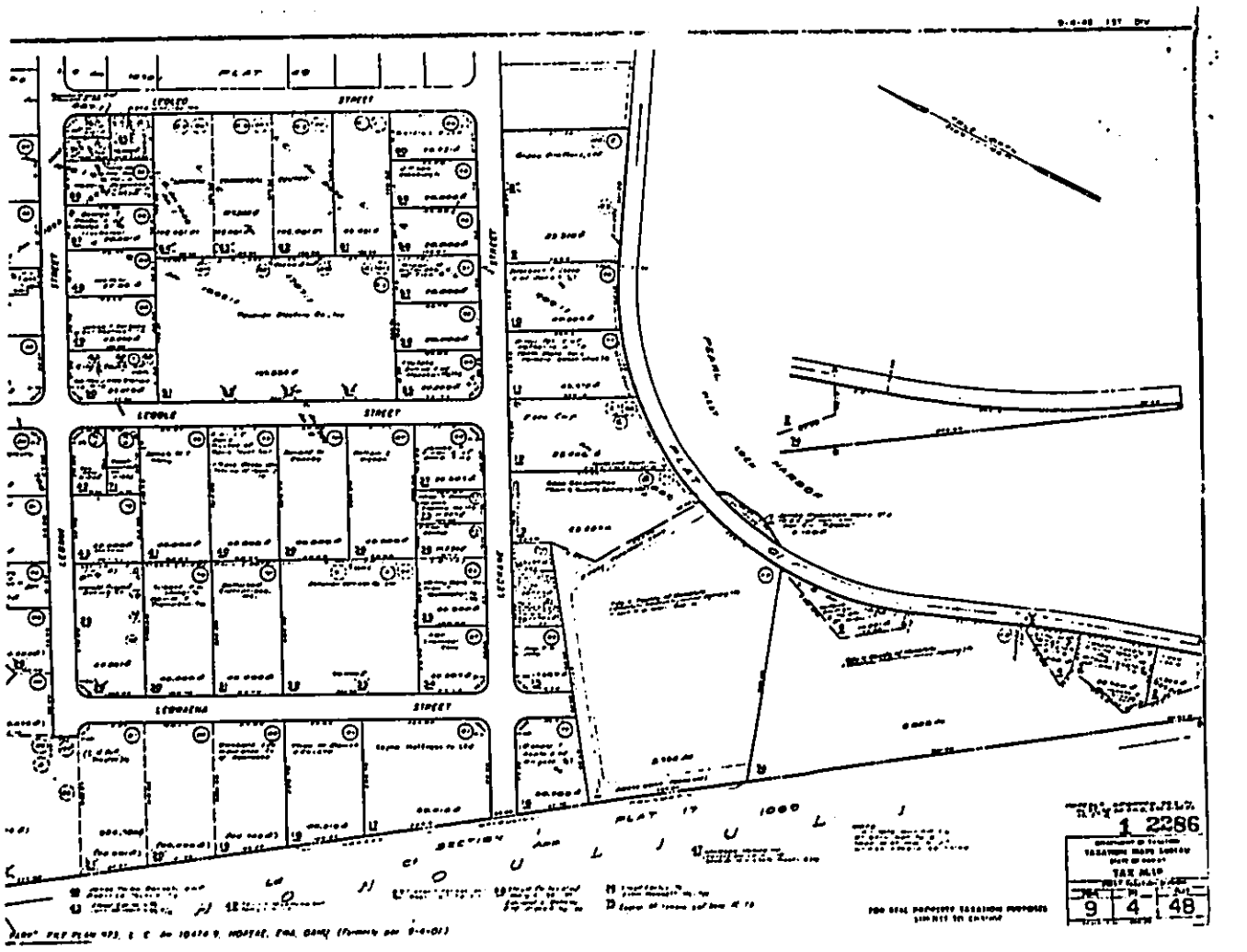
TAX MAP
9 1 20
SUBJECT TO CHANGE


FORT WEAVER ROAD
PLAT 17
LOT 26
LOT PLAT 17
L C Av
George K Kaholokukona Trust
PLAT 19
LOT PLAT 34 17
James Campbell Trust Est
Per Ld Ct App 1069
LOT PLAT 33 17
LOT PLAT 30 17
TAXATION MAPS BUREAU
TAX MAP
FIRST DIVISION
ZONE 9
SEC. 1
PLAT 21
CONTAINING PARCELS
SUBJECT TO CHANGE


PLAT 49
LEOLEO STREET
LEOOLE STREET
LEOWAENA STREET
PEARL HARBOR
PLAT 17 1000
SECTION 1
1 2286
TAX MAP
9 4 48

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4161

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

September 16, 1987

Mr. Kisuk Cheung, Chief
Engineering Division
Department of the Army
U.S. Army Engineering District, Honolulu
Building 230
Fort Shafter, Hawaii 96858-5440

Dear Mr. Cheung:

Subject: Environmental Impact Statement Preparation Notice For:
West Loch Estates Development, Ewa, Oahu

Thank you for your comments of June 12 and July 17, 1987 relating to the proposed West Loch development.

We are in the process of preparing a Master Plan and an Environmental Impact Statement (EIS) for the proposed development. We are cognizant of the need to protect our coastal ecosystem and will comply with applicable federal, state and county regulations as they relate to the coastal environment, historic resources and flood hazards.

The Flood Insurance Study designations will be included in the Draft EIS currently under preparation.

The proposed golf course and beach park have been separated from the original Environmental Impact Statement Preparation Notice (EISPN) that was submitted on June 30, 1987. It was determined that it would be inappropriate to combine both projects under a single Notice as the projects are not related to one another, will be administered by different departments and involve separate funding.

Please provide all comments relative to the housing projects to this office and if you have comments specifically concerning the golf course and park, they should be directed to the Department of Parks and Recreation. A separate EISPN has been prepared and submitted to The Office of Environmental Quality Control by that Department.

Your willingness to assist in the planning of this development is greatly appreciated. If you should have any questions or additional comment and suggestions, please direct them to Mr. Howard Murai, Project Manager at 527-5321. Thank you again.

Sincerely Yours,

Robert Miyasato

for Mike Moon
Director

SEP 16 1987

DEPARTMENT OF THE NAVY
COMMANDER
NAVAL BASE PEARL HARBOR
BOX 110
PEARL HARBOR, HAWAII 96860-5020

IN REPLY REFER TO

11011
Ser N58/1584
26 JUL 1987

87 JUL 22 P1:17
DEPT. OF HOUSING & COMMUNITY DEVELOPMENT

Mr. Mike Moon, Director
Department of Housing and
Community Development
650 South King Street, 5th Floor
Honolulu, HI 96813

Dear Mr. Moon:

WEST LOCH ESTATES SUBDIVISION, EWA, OAHU

In response to the Office of Environmental Quality Control (OEQC) Bulletin (Volume IV, Number 13) of July 8, 1987, we would like to be consulted in the preparation of the Environmental Impact Statement for the West Loch Estates Subdivision.

Sincerely,

R. M. GALLEN
Captain, CEC, U. S. Navy
Base Civil Engineer
By direction of
the Commander

Copy to:
OEQC

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4161

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

September 16, 1987

Capt. R.M. Gallen
Captain, CEC, U.S. Navy
Department of the Navy
Box 110
Pearl Harbor, Hawaii 96860-5020

Dear Capt. Gallen:

Subject: Environmental Impact Statement Preparation Notice For:
West Loch Estates Development, Ewa, Oahu

We acknowledge by this advice your request to be a consulted party during the preparation and processing of the Environmental Impact Statement (EIS) for the West Loch Estates Residential Subdivision, Ewa, Oahu.

The proposed golf course and beach park have been separated from the original Environmental Impact Statement Preparation Notice (EISPN) that was submitted on June 30, 1987. It was determined that it would be inappropriate to combine both projects under a single Notice as the projects are not related to one another, will be administered by different departments and involve separate funding.

Please provide all comments relative to the Housing projects to this office and if you have comments specifically concerning the golf course and park, they should be directed to the Department of Parks and Recreation. A separate EISPN has been prepared and submitted to The Office of Environmental Quality Control by that Department.

Your willingness to assist in the planning of this development is greatly appreciated. If you should have any questions or additional comment and suggestions, please direct them to Mr. Howard Murai, Project Manager at 527-5321. Thank you again.

Sincerely Yours,

for Mike Moon
Director

SEP 16 1987

U.S. Department of Housing and Urban Development
Honolulu Office, Region IX
300 Ala Moana Blvd., Room 3318, Box 50007
Honolulu, Hawaii 96850-4991

87-126

'87 JUL -2 P1:58
DEPT. OF HOUSING & COMM. DEVELOPMENT

June 30, 1987

Mr. Michael M. H. Moon, Director
Dept. of Housing and Community Dev.
City and County of Honolulu
650 South King Street
Honolulu, HI 96813

Dear Mr. Moon:

SUBJECT: West Loch Estates Housing Project

We have reviewed your letter that requests environmental review comments on the subject project to determine the need for an Environmental Impact Statement. We understand that the proposed 448 acre project will provide for 1350 family units, 150 elderly rental units, 59 acres in parks and a 157 acre golf course.

Our comments on the proposed development follow:

1. In order to determine the need for a full Environmental Impact Statement in accordance with HUD criteria, you should refer to 24 CFR Part 58.37 cases when Environmental Impact Statements are required.

2. Noise. There are two major sources of noise that may cause adverse impacts on the proposed project: aircraft operations and vehicular traffic.

   The 60 and 65 LDN contours for Barbers Point NAS and Honolulu International Airport should be plotted on a location map to show their relationship to the project.

   Vehicular traffic on Fort Weaver Road should also be evaluated to determined if mitigative measures would be required. Both automobile and truck/bus traffic volumes should be considered at the time of project completion and projected to the year 2005.

3. The portion of the project located in the Floodplain should be identified. Any HUD assisted activity located within the Floodplain would be subjected to the eight-step process for complying with Executive Order 11988 Floodplain Management. Flood insurance may also be required.

If you have any questions, please feel free to contact Frank Johnson at 541-1326.

Very sincerely yours,

Calvin Lew
Director
Community Planning and
Development Division, 9.2C

U.S. Department of Housing and Urban Development
Honolulu Office, Region IX
300 Ala Moana Blvd., Room 3318, Box 50007
Honolulu, Hawaii 96850-4991

87-160

87 JUL 21 P1:39
DEPT OF HOUSING
CITY & COUNTY OF HONOLULU

July 20, 1987

Mr. Howard Murai
Department of Housing and
Community Development
City and County of Honolulu
650 South Street
Honolulu, HI 96813

Dear Mr. Murai:

SUBJECT: Environmental Impact Statement Preparation Notice
Proposed West Loch Estates Subdivision Development

This responds to your request for comments on the subject project that will provide for 1500 housing units, a golf course and a park on approximately 466 acres.

We find that we do not have any additional concerns that should be considered in the Draft EIS than those that were identified in our letter to Mike Moon dated June 30, 1987.

We appreciate the opportunity to review the Preparation Notice and look forward to receiving a copy of the Draft EIS.

Very sincerely yours,

Calvin Lew
Director
Community Planning and
Development Division

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4161

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

September 16, 1987

Mr. Calvin Lew, Director
Community Planning and Development
Division
U.S. Department of Housing and Urban
Development
Honolulu Office, Region IX
300 Ala Moana Boulevard
Room 3318, Box 50007
Honolulu, Hawaii 96850-4991

Dear Mr. Lew:

Subject: Environmental Impact Statement Preparation Notice
For: West Loch Estates Development, Ewa, Oahu

Thank you for your comments of July 20, 1987 acknowledging your office's review of our Environmental Impact Statement Preparation Notice (EISPN) for the West Loch Estates project. We will keep your agency apprised of the project through the Draft Environmental Impact Statement (DEIS) currently under preparation. We look forward to your review of this document.

The proposed golf course and beach park have been separated from the original Environmental Impact Statement Preparation Notice (EISPN) that was submitted on June 30, 1987. It was determined that it would be inappropriate to combine both projects under a single Notice as the projects are not related to one another, will be administered by different departments and involve separate funding.

Please provide all comments relative to the Housing projects to this office and if you have comments specifically concerning the golf course and park, they should be directed to the Department of Parks and Recreation. A separate EISPN has been prepared and submitted to The Office of Environmental Quality Control by that Department.

Your willingness to assist in the planning of this development is greatly appreciated. If you should have any questions or additional comment and suggestions, please direct them to Mr. Howard Murai, Project Manager at 527-5321. Thank you again.

Sincerely Yours,

for Mike Moon
Director

SEP 16 1987

United States Department of the Interior

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

ES
Room 6307

JUN 22 1987

Mr. Michael Moon, Director
Department of Housing and Community Development
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

'87 JUN 23 P1:43
DEPT. OF HOUSING & COMMUNITY DEVELOPMENT HONOLULU, HI

Re: West Loch Estates Housing Project, Honouliuli, Ewa, O

Dear Mr. Moon:

We have reviewed the preliminary information on the proposed West Loch Estates Housing project and offer the following comments for your consideration.

The Pearl Harbor National Wildlife Refuge, Honouliuli Unit, was established in 1976. The 36.5-acre refuge is on lands owned by the U.S. Navy and is managed for endangered Hawaiian waterbirds by the Service under an inter-agency cooperative agreement. The Honouliuli refuge provides nesting, feeding, and loafing habitat for the endangered Hawaiian Stilt (Himantopus mexicanus knudseni), Hawaiian Coot (Fulica americana alai), Hawaiian Common Moorhen (Gallinula chloropus sandvicensis), and Hawaiian Duck (Anas wyvilliana). In addition, the refuge provides habitat for migratory shorebirds and waterbirds such as the Green-winged Teal (Anas crecca), Northern Shoveler (Anas clypeata), Lesser Golden Plover (Pluvialis dominica), Wandering Tattler (Heteroscelus incanus), Ruddy Turnstone (Arenaria interpres), and Sanderling (Calidris alba).

The Environmental Assessment (EA) should discuss the following points:

a. The Service is concerned that the proposed housing development, particularly the 1,080 units planned for Phase II, may increase local populations of feral and domestic cats, dogs, and mongooses in the project area. Larger populations of these predators may increase predation levels on ground-nesting endangered waterbirds that use the Pearl Harbor National Wildlife Refuge at Honouliuli. This refuge is separated from Phase II by a 13.8-acre park.

At the May 8, 1987 joint agency site visit to the Honouliuli refuge, several methods to control domestic and feral pets from entering the refuge were discuased. These alternatives included:

(1) Implementing subdivision covenants that banned the ownership of dogs and cats in the housing development;

(2) Constructing additional fences and moats around the refuge;

(3) Enforcing existing leash laws; and,

(4) Trapping feral animals that wander into the refuge.

From the refuge management aspect, the banning of pets as a subdivision covenant appears the most effective. It was our understanding at the May 8, 1987 site visit that Mr. Jeremy Harris would investigate the legal aspects of a subdivision covenant restricting the ownership of pets. Fences and moats are moderately effective barriers; however, these structures will not keep a determined dog from digging under the fence or swimming across the moat. The effectiveness of leash laws depends on citizen compliance with the law and active enforcement by police. Trapping animals that wander into the refuge generates additional work for the refuge manager since the captured animal is taken to an animal shelter. In addition, trapping of pets on the refuge may generate community ill-will towards the refuge.

Methods to control feral and domestic pets within the project area should be discussed in the EA.

b. The Phase II residential development, if not properly buffered from the refuge, may reduce the biological productivity of the refuge by increasing levels of human disturbances, noise, and lighting. Methods to buffer the refuge from the housing development include visual barriers of shrubbery and trees, fencing, and reducing line-of-sight vision between the housing development and refuge. If properly designed, the shoreline park will partially buffer the Phase II development from the refuge.

c. In our April 22, 1987 letter to Mr. Donald Clegg, we recommended that the proposed shoreline park incorporate the fishponds within the site as habitat for endangered waterbirds. This proposal would include buffer areas around the ponds, interpretive displays and viewing areas, and would enhance the educational value of the park for residents and visitors. We continue to offer our assistance in designing appropriate waterbird habitats and interpretive displays for the park.

d. Endangered Hawaiian coots are known to use golf course greens and water traps at the Princeville golf course on Kauai. It is likely that Hawaiian coots and migratory shorebirds may be attracted to the proposed golf course greens and water areas at times.

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

There have been several cases of accidental pesticide poisoning of waterbirds on golf courses in the continental U.S. The Service is concerned that endangered Hawaiian waterbirds and migratory shorebirds may be accidentally poisoned while feeding or loafing on the proposed golf course and water areas. However, this potential adverse impact may be reduced by controlled and judicious use of pesticides and the selection of pesticides with low acute and chronic toxicities to waterbirds and aquatic organisms. The Service is willing to review the pesticides that may be used on the golf course and provide recommendations on their suitability.

e. The EA should discuss the drainage plan for the housing development. We recommend that runoff be contained on-site by using golf courses, parks, and open areas as sediment basins.

We appreciate this opportunity to comment. Please feel free to contact our office for further information.

Sincerely,

Ernest Kosaka

Ernest Kosaka
Project Leader, Environmental Services
Pacific Islands Office

cc: RW
DLNR

DGP 4/87 1850

United States Department of the Interior

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

ES
Room 6307

APR 22 1987

Mr. Donald A. Clegg
Chief Planning Officer
Department of General Planning
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Re: Development Plan Public Facility Amendment for Central Oahu,
West Loch Regional Park -- 87/E-1012 (IC), Oahu

Dear Mr. Clegg:

We have reviewed the Development Plan Public Facility Amendment for the proposed park along West Loch and offer the following comments for your consideration.

The proposed shoreline park and West Loch Estates housing development were discussed with representatives from the City and County of Honolulu and the Service on April 7, 1987. At this meeting, we discussed Service concerns regarding potential impacts from the proposed housing development to the Pearl Harbor National Wildlife Refuge, Honouliuli Unit. In addition, we discussed mitigation measures (buffers, fencing, moats, trapping, etc.) that would reduce potential adverse impacts to endangered Hawaiian waterbirds that depend on this refuge. Many of the concerns regarding the housing development also apply to the proposed shoreline park.

The proposed shoreline park encompasses several fishponds that provide loafing and feeding habitat for endangered Hawaiian waterbirds. The educational value of the park would be enhanced if these fishponds were managed as endangered waterbird habitat and interpretive displays and viewing areas of these ponds were provided. This would provide residents and park visitors with an easily accessible site to observe and learn about endangered Hawaiian waterbirds. We would be happy to work with the City and County of Honolulu to develop an educational and management program for these fishponds.

We would like to invite interested staff members to a guided tour of this refuge. This visit will give us a first-hand opportunity

CONSERVE AMERICA'S ENERGY

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to discuss the concerns regarding the proposed housing development and shoreline park. For further coordination, please contact Andy Yuen (541-2761) of my staff.

We appreciate the opportunity to comment.

Sincerely,

Ernest Kosaka
Project Leader
Office of Environmental Services

cc: RW
DLNR

United States Department of the Interior

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

ES
Room 6307
AUG 7 1987

Mr. Howard Murai
Department of Housing and Community Development
City and County of Honolulu
650 South King Street, Fifth Floor
Honolulu, HI 96813

'87 AUG 10 A9:12
DEPT. OF HOUSING & COMM. DEVELOPMENT

Re: Environmental Impact Statement Preparation Notice, Proposed West Loch Estates Housing Project, Ewa, Oahu

Dear Mr. Murai:

We appreciate the opportunity to work closely with the City and County of Honolulu to eliminate potential adverse impacts from the proposed housing project to the Pearl Harbor National Wildlife Refuge, Honouliuli Unit. We believe early coordination with the affected agencies will substantially reduce potential conflicts and impacts associated with the proposed project.

For a discussion of our concerns, please refer to the April 22, 1987 letter to Mr. Donald Clegg (enclosure 1) and the June 22, 1987 letter to Mr. Michael Hoon (enclosure 2). We would appreciate being consulted during the preparation of the Draft Environmental Impact Statement.

We appreciate the opportunity to comment.

Sincerely,

Ernest Kosaka
Project Leader, Environmental Services
Pacific Islands Office

Enclosures

cc: RW
DLNR

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU HAWAII 96813
PHONE 523-4161

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

September 16, 1987

Mr. Ernest Kosaka
Project Leader, Environmental Services
Pacific Islands Office
United States Department of the Interior
Fish and Wildlife Service
300 Ala Moana Boulevard
P.O. Box 50167
Honolulu, Hawaii 96850

Dear Mr. Kosaka:

Subject: Environmental Impact Statement Preparation Notice
For: West Loch Estates Development, Ewa, Oahu

Thank you for your comments dated June 22 and August 7, 1987 on the Environmental Impact Statement Preparation Notice (EISPN) prepared for the proposed West Loch Estates Residential Subdivision, Ewa, Oahu. We also would like to express our appreciation for your time and effort in our preliminary meetings and early coordination regarding the potential impacts on the Honouliuli Wildlife Refuge from the proposed West Loch Estates project.

The proposed golf course and beach park have been separated from the original Environmental Impact Statement Preparation Notice (EISPN) that was submitted on June 30, 1987. It was determined that it would be inappropriate to combine both projects under a single Notice as the projects are not related to one another, will be administered by different departments and involve separate funding.

Please provide all comments relative to the Housing projects to this office and if you have comments specifically concerning the golf course and park, they should be directed to the Department of Parks and Recreation. Prior comments relative to the Wildlife Refuge have been provided to the Parks Department. A separate EISPN has been prepared and submitted to The Office of Environmental Quality Control by that Department.

Your willingness to assist in the planning of this development is greatly appreciated. If you should have any questions or additional comment and suggestions, please direct them to Mr. Howard Murai, Project Manager at 527-5321. Thank you again.

Sincerely Yours,

Robert Miyasato

for Mike Moon
Director

SEP 16 1987

EWA NEIGHBORHOOD BOARD NO. 23
P.O. BOX 2282
EWA BEACH, HAWAII 96706

87 JUN 18 P3:31
DEPT. OF HOUSING & COMM. DEVELOPMENT

June 18, 1987

Mr. Michael Moon, Director
Department of Housing and Community Development
City and County of Honolulu
650 S. King Street
Honolulu, HI 96813

Dear Mr. Moon:

Subject: Environmental Assessment for West Loch Estates Housing Project

At its regular meeting on June 16, 1987, the Ewa Neighborhood Board No. 23 discussed the above project. The following are the concerns we would like to see addressed in the Environmental Assessment:

1. The feasibility of the City versus private business developing this type of housing in this area.
2. What will be the relative cost of the development if it is done by the City versus private business?
3. The overall financing of the project.
4. What will be the sequencing of the development of the housing and golf courses for this project?
5. The adequacy of the infrastructure to support this project.
6. The adequacy, and plans for meeting the increased need for police and fire protection that this development will bring to the community.
7. The ability of the schools to meet the needs that this development will bring to the community.
8. The traffic impacts that this development will have on Ft. Weaver Road, and if there are plans for any other access to the development.
9. Impacts that this development will have on the Second City development.

10. The adequacy of the water supply for this development.
11. Assurances that the City, if it is the developer of this project, will follow all guidelines and requirements that would be required of a private developer.
12. Providing of adequate parks and other recreational facilities to meet the needs of the community.
13. Ability of the area to be evacuated in the event of a tsunami.

The Board would like to note that as we did not have sufficient time to fully discuss this issue in order to meet your response deadline, we would like to reserve the right to provide additional comments at a future date.

Thank you for giving us the opportunity to provide comments on this subject.

Sincerely,

Emogene Martin

Emogene Martin
Chairman

cc: Jeremy Harris, Managing Director
Representative Paul Oshiro
Representative Mike Crozier
Waipahu Neighborhood Board No. 22
Dick Beamer, Ewa Beach Community Association
Neighborhood Commission

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU HAWAII 96813
PHONE 523 4161

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

September 16 1987

Mrs. Emogene Martin, Chairman
Ewa Neighborhood Board No. 23
P.O. Box 2392
Ewa Beach, Hawaii 96706

Dear Mrs. Martin:

Subject: Environmental Impact Statement Preparation Notice For:
West Loch Estates Development, Ewa, Oahu

Thank you for your Board's comments dated June 18, 1987 on the proposed West Loch Estates Residential Subdivision Environmental Impact Statement Preparation Notice (EISPN). These comments have been provided to the consultants responsible for the preparation of the Project Master Plan and Environmental Impact Statement (EIS). You will be pleased to know that there are weekly meetings with the consultants as well as the specific City departments who will be responsible for the proper planning and review of the Master Plan and Draft Environmental Impact Statement (DEIS).

The thirteen (13) items that your Board has noted as their areas of specific concern will be included in the DEIS currently under preparation. We are acknowledging your request to be a consulted party during the preparation of the EIS and look forward to your comments.

The proposed golf course and beach park have been separated from the original Environmental Impact Statement Preparation Notice (EISPN) that was submitted on June 30, 1987. It was determined that it would be inappropriate to combine both projects under a single Notice as the projects are not related to one another, will be administered by different departments and involve separate funding.

Please provide all comments relative to the Housing projects to this office and if you have comments specifically concerning the golf course and park, they should be directed to the Department of Parks and Recreation. A separate EISPN has been prepared and submitted to The Office of Environmental Quality Control by that Department.

Your willingness to assist in the planning of this development is greatly appreciated. If you should have any questions or additional comment and suggestions, please direct them to Mr. Howard Murai, Project Manager at 527-5321. Thank you again.

Sincerely,

Robert Miyasato

Mike Moon
Director

SEP 1 [illegible]

HAWAII'S THOUSAND FRIENDS

Ke aloha o ko kākou 'āina, 'O ia ka mana kū pa'a. Pānoanoa ka 'āina, Mānoanoa ka po'e.
The Love of our land, is the power for us to stand fast. Rare is the land, many are the people.

'87 JUL 17 P1:38
DEPT. OF HOUSING & COMM. DEVELOPMENT

July 16, 1987

Mr. Mike Moon, Director
Department of Housing and Community Development
650 So. King St., 5th Floor
Honolulu, HI 96813

Dear Mr. Moon,

Hawaii's Thousand Friends, a non-profit land use planning organization, requests that it be consulted in the preparation of the Environmental Impact Statement for the proposed West Loch Estates Subdivision, Ewa O'ahu.

We look forward to participating in this interesting project.

Sincerely,

Muriel B. Seto

Muriel B. Seto
Executive Director

MBS:dy

941 River Street Suite 202 Honolulu, Hawai'i 96817 (808) 538-1296

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4181

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

September 16, 1987

Ms. Muriel B. Seto
Executive Director
Hawaii's Thousand Friends
941 River Street, Suite 202
Honolulu, Hawaii 96817

Dear Ms. Seto:

Subject: Environmental Impact Statement Preparation Notice For:
West Loch Estates Development, Ewa, Oahu

Thank you for your comments of July 16, 1987 relating to the proposed West Loch development.

We are in the process of preparing a Master Plan and Environmental Impact Statement (EIS) for the proposed development and appreciate your organization's interest in the project.

The proposed golf course and beach park have been separated from the original Environmental Impact Statement Preparation Notice (EISPN) that was submitted on June 30, 1987. It was determined that it would be inappropriate to combine both projects under a single Notice as the projects are not related to one another, will be administered by different departments and involve separate funding.

Please provide all comments relative to the Housing projects to this office and if you have comments specifically concerning the golf course and park, they should be directed to the Department of Parks and Recreation. A separate EISPN has been prepared and submitted to The Office of Environmental Quality Control by that Department.

Your willingness to assist in the planning of this development is greatly appreciated. If you should have any questions or additional comment and suggestions, please direct them to Mr. Howard Murai, Project Manager at 527-5321. Thank you again.

Sincerely,

Robert Miyasato

for Mike Moon
Director

SEP 16 1987

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4191

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

September 16, 1987

Mr. William Balfour
President and General Manager
Oahu Sugar Company
P.O. Box O
Waipahu, Hawaii 96792

Attention: Mr. William R. DeMent

Dear Mr. Balfour:

Subject: West Loch Estates
Environmental Impact Statement (EIS)

Although you have not submitted any comments in response to the Environmental Impact Statement Preparation Notice on the above subject project that is being proposed for development in Honouliuli, Ewa, Oahu, nor asked to be a consulted party, we will be forwarding copies of the Draft EIS to you for review and possible comment. Inasmuch as you have major holdings in the area, we believe the opportunity for review and comment can be mutually beneficial in avoiding conflicts with your operating requirements in the area.

The proposed golf course and beach park have been separated from the original Environmental Impact Statement Preparation Notice (EISPN) that was submitted on June 30, 1987. It was determined that it would be inappropriate to combine both projects under a single Notice as the projects are not related to one another, will be administered by different departments and involve separate funding.

Please provide all comments relative to the Housing projects to this office and if you have comments specifically concerning the golf course and park, they should be directed to the Department of Parks and Recreation. A separate EISPN has been prepared and submitted to The Office of Environmental Quality Control by that Department.

If you should have any questions or desire additional information, please call Mr. Howard Mural of this Department at 527-5321.

Thank you very much.

Sincerely,

Robert Miyasato

Mike Moon, Director

SEP 16 1987

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE: 523-4191

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

September 16, 1987

Mr. Oswald Stender, Chief Executive Officer
The Estate of James Campbell
828 Fort Street Mall, Suite 500
Honolulu, Hawaii 96813

Dear Mr. Stender:

Subject: West Loch Estates
Environmental Impact Statement (EIS)

Although you have not submitted any comments in response to the Environmental Impact Statement Preparation Notice on the above subject project that is being proposed for development in Honouliuli, Ewa, Oahu, nor asked to be a consulted party, we will be forwarding copies of the Draft EIS to you for review and possible comment. Inasmuch as you have major holdings in the area, we believe the opportunity for review and comment can be mutually beneficial in avoiding conflicts with your operating requirements in the area.

The proposed golf course and beach park have been separated from the original Environmental Impact Statement Preparation Notice (EISPN) that was submitted on June 30, 1987. It was determined that it would be inappropriate to combine both projects under a single Notice as the projects are not related to one another, will be administered by different departments and involve separate funding.

Please provide all comments relative to the Housing projects to this office and if you have commments specifically concerning the golf course and park, they should be directed to the Department of Parks and Recreation. A separate EISPN has been prepared and submitted to The Office of Environmental Quality Control by that Department.

If you should have any questions or desire additional information, please call Mr. Howard Murai of this Department at 527-5321.

Thank you very much.

Sincerely,

Robert Miyasato
for Mike Moon, Director

SEP 16 1987

XII. LIST OF ORGANIZATIONS AND AGENCIES CONSULTED DURING DEIS REVIEW

12.1 ORGANIZATIONS AND AGENCIES

Agency	Date of Comment	Date Comment Received	Response to Comment
State			
Dept. of Agriculture	11/23/87	11/24/87	12/11/87
Housing Finance and Development Corporation	11/06/87	11/12/87	12/11/87
Dept. of Business and Economic Development	11/17/87	11/23/87	12/11/87
Dept. of Defense	10/23/87	10/27/87	NRN
Dept. of Education	10/21/87	10/28/87	12/11/87
Dept. of Health	11/19/87	11/23/87	12/11/87
Dept. of Land and Natural Resources	11/30/87	12/02/87	12/11/87
Dept. of Transportation	-------	-------	-------
Land Use Commission	-------	-------	-------
OEQC	11/24/87	11/25/87	12/11/87
University of Hawaii			
Environmental Center	11/23/87	11/24/87	12/11/87
City and County			
Board of Water Supply	10/28/87	10/30/87	12/11/87
Building Department	11/04/87	11/05/87	NRN
Dept. of General Planning	11/12/87	11/12/87	12/11/87
Dept. of Land Utilization	11/03/87	11/04/87	12/11/87
Dept. of Parks & Recreation	10/23/87	10/27/87	12/11/87
Dept. of Public Works	10/19/87	10/20/87	12/11/87
Dept. of Transportation Services	-------	-------	-------
Office of Human Resources	-------	-------	-------
Fire Department	11/09/87	11/10/87	NRN
Police Department	10/26/87	10/27/87	12/11/87
Federal			
Dept. of the Army Engineering District	11/17/87	11/25/87	12/11/87
Dept. of the Navy	10/27/87	10/29/87	12/11/87

Agency	Date of Comment	Date Comment Received	Response to Comment
U.S. Dept. of Interior Fish and Wildlife Services	11/23/87	11/24/87	12/11/87
U.S. Dept. of Interior Geological Survey, Water Resources Div.	10/27/87	10/28/87	NRN
Private Agencies			
Hawaiian Electric Company	11/03/87	11/05/87	12/11/87
Hawaii's Thousand Friends	11/23/87	11/24/87	12/11/87

XIII. COMMENTS AND RESPONSES FOR DEIS REVIEW

JOHN WAIHEE
GOVERNOR

'87 NOV 24 PM 1 28

SUZANNE D. PETERSON
CHAIRPERSON, BOARD OF AGRICULTURE

DEPUTY TO THE CHAIRPERSON

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

Mailing Address:
P. O. Box 22159
Honolulu, Hawaii 96822-0159

November 23, 1987

MEMORANDUM

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

Subject: Draft Environmental Impact Statement (DEIS) for
West Loch Estates Subdivision
Department of Housing and Community Development (DHCD)
TMK: 9-1-17: various
9-1-20: various
9-4-48: 74 West Loch, Ewa, Oahu
Acres: 466

The Department of Agriculture has reviewed the Draft EIS and has the following comments to offer.

The DHCD proposes to develop an "affordable residential community" for the "gap group housing market" on the subject property.

In our review of the EIS Preparation Notice for the subject project, we listed several concerns for the applicant to address (DEIS, Section XI). The responses to our concerns as found in the DEIS show a good faith effort to address each of our concerns. We would like specifically to request that the soils information contained in the DEIS be mapped to show the Land Study Bureau and Agricultural Lands of Importance to the State of Hawaii (ALISH) classifications within the subject property. We would also like to comment further on the following two points made in the DEIS:

1. "...the West Loch Estates - individually or in combination with other major projects planned and proposed for Ewa and Central Oahu -- will not adversely affect the economic viability of OSCo, nor will it involve layoffs of sugar workers. This assumes the continuation of historic development rates for housing projects - rates which would allow sufficient time to increase yields and thereby

partially or completely compensate for the reduced acreage with little or no loss in production." Furthermore, maintenance of economies of scale in the face of acreage reductions could be accommodated by operating one mill rather than two. (DEIS, page V-21)

We question whether Oahu Sugar Company can realistically maintain its profitability in the future if available acreage is reduced to the point where there is little or no leeway to alter the total area available for sugarcane cultivation, especially if high-yield lands are removed from production. Increased sugar yields can generally only occur with additional production costs for capital, labor, management, energy, and/or research. A recent statement from Oahu Sugar Company concerning another project indicates that if all the pending projects on the drawing boards [affecting its lands] culminate collectively and out of a desirable sequence, they <u>will adversely affect the economic viability of OSCo.</u> (emphasis added)

2. "...it is extremely doubtful that this [the loss of agricultural use of the subject area] will adversely affect the growth of diversified agriculture in Hawaii." This assessment is based on: "(1) an extensive amount of prime-agricultural land and water has been freed from sugar and pineapple production because of past mill closings and reductions in operations; (2) a very real possibility exists that additional land and water will be freed from sugar production given the outlook for low sugar prices; (3) some - if not most or even all - of the sugar operations will make their lands available for profitable replacement crops to the extent that such crops are available; and, (4) compared to the available supply, a very small amount of land and water is required to grow proven and promising crops to achieve a realistic level of food and animal-feed self-sufficiency, and to increase exports." (DEIS, pages V-21 to 22 and Appendix J, pages iii and iv).

The third point is highly problematic. While there may be a reduction in sugarcane acreage, the fallowed lands do not necessarily become available for other agricultural uses if landowners wish to pursue other activities that promise higher returns, or hold their lands off the market. Our records show more than 270 individuals searching for suitable farm land to begin, expand or relocate their diversified farming activities. It would be useful if these "freed" lands could be identified in terms of location, their specific availability to farmers for sale or lease, and at what prices and terms.

The Department of Agriculture is compelled by the State Constitution to "...conserve and protect agricultural lands, promote diversified agriculture, increase agricultural self-sufficiency and assure the availability of agriculturally suitable lands". On Oahu, it happens that the lands most suitable for agricultural use are situated in the areas (Ewa and Central Oahu) that are under the greatest pressure for housing expansion. We take the perspective that agriculturally suitable land is a resource in its own right rather than simply an economic commodity that should be used for the highest private return. Agriculturally suitable lands once developed for higher uses will remain unavailable for agricultural use. Thus, while there may be more important agricultural lands in total on Oahu than can be fully utilized over the next decade, we feel it should be the policy of the State and the City and County to allocate the best agricultural lands to agricultural use to the fullest extent possible. Alternative uses (such as the subject project) should be directed to lands of lesser value for agricultura wherever possible. That is why it will be helpful to see maps of the Land Study Bureau and ALISH classifications of the property in the Final EIS.

The Department of Agriculture is well aware and supportive of the need to develop affordable housing for Hawaii's residents. As noted in the DEIS, the State Agriculture Functional Plan contains Implementing Action B(5)(c) which states: "Until standards and criteria to conserve and protect important agricultural lands are enacted by the Legislature, important agricultural lands should be classified in the State Agricultural District and zoned for agricultural use, except where, by the preponderance of the evidence presented, injustice or inequity will result or overriding public interest exists to provide such lands for other objectives of the Hawaii State Plan." (emphasis added)

If it is determined that the proposed project falls within the definition of "overriding public interest", that interest (in the location and magnitude of affordable housing development in Ewa and Central Oahu) should be articulated in a coherent regional land use plan.

To summarize, we request that the following be included in the Final EIS:

1. Maps showing the Land Study Bureau and ALISH classifications for the subject property.

2. Specific identification of the "extensive amount of prime agricultural land and water [that] has been freed from sugar and pineapple production" and is "available for profitable replacement crops".

Thank you for the opportunity to comment. We hereby request a copy of the Final EIS as soon as it is available.

Suzanne D. Peterson

SUZANNE D. PETERSON
Chairperson, Board of Agriculture

cc: Mr. Mike Moon, DHCD
Mr. William Balfour, OSCo
OSP
OEQC
DGP

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4181

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

December 11, 1987

Ms. Suzanne D. Peterson, Chairperson
Department of Agriculture
P.O. Box 22159
Honolulu, Hawaii 96822-0159

Dear Ms. Peterson:

Subject: Draft Environmental Impact Statement (DEIS) for the West Loch Estates Subdivision, Ewa, Oahu

Dear Ms. Peterson:

Thank you for the comments contained in your letter of November 23, 1987 on the Draft Environmental Impact Statement (DEIS) prepared for the West Loch Estates Subdivision. The staff and consultants have reviewed your comments and respond as follows:

1. The specific request to provide the appropriate soils data contained in the Land Study Bureau and Agricultural Lands of Importance to the State of Hawaii (ALISH) maps will be complied with in the Final EIS.

2. The Department of Agriculture's (DOA) concern as to whether the Oahu Sugar Company (OSCo) could continue to function as a viable sugar operation in view of the reduction in acreage, was reviewed by Decision Analysts Hawaii, Inc. who provided this response: "The following statements about OSCo were drafted after discussions with OSCo and were reviewed by them. After release of the DEIS, OSCo expressed concerns over two proposed projects other than West Loch Estates - they had not expressed concern about West Loch Estates. It is known that at least one of these other projects is being coordinated with OSCo so as to result in a design and development sequence which would result in the least disruption to OSCo's operations, thereby assuring that it does not adversely affect the long-term economic viability of OSCo. Furthermore, it is very doubtful that all of the planned and proposed projects will in fact, be approved and developed within a time period that would affect OSCo."

3. Decision Analysts Hawaii, Inc. also examined the comment that fallowed

lands are not necessarily being made available to individuals searching for suitable farm land to begin, expand, or relocate activities in diversified agriculture. They responded: "Two compelling arguments support the position that ...(this) point is not problematic: first, common sense argues that landowners would convert their lands to a more profitable use; and second, as Amfac testified on the Waikele project before the State Land Use Commission, one of the components of the OSCo's "Survival Plan" is to find profitable replacement crops before OSCO is forced by outside economic factors to cease operations."

With regard to the point about making land available to small farmers, the full text of the Decision Analyst Hawaii, Inc. (Appendix J) contained in the DEIS discusses this matter and explains why lands are not always available to small farmers (pages 16 and 17) which, in summary form, notes that due largely to regulatory requirements, such activities cannot be profitably undertaken. With regard to identifying the "freed" lands, we agree that it would be useful to the DOA to have these "freed" lands identified and the terms of obtaining use, and believe that this would be of great statewide benefit. However, this is a large project which is more appropriately within the purview of the State as an ongoing effort. Most of the "freed" lands would include but not be limited to those released by the closing of four sugar operations since 1970 (Kilauea on Kauai, Kahuku on Oahu, and Kohala and Puna on Hawaii), and pineapple operations on Molokai and Kauai.

4. The conflicting policies of agricultural land preservation versus the need for affordable housing are recognized. Decision Analysts Hawaii, Inc. notes that: "The State and City & County embrace conflicting policies on agriculture vs. housing: preserve prime agricultural lands; provide affordable housing (which, on Oahu, requires development of agricultural lands); and a City & County policy of developing a secondary urban center in Ewa, most of which is planted in sugar. The issue is not preservation of prime agricultural land for the sake of preservation, but rather what is best for the people of Hawaii. It is argued in the DEIS that the proposed West Loch Estates is in the best interest of the people of Hawaii: the project would provide badly needed affordable housing while not adversely affecting the viability of OSCo nor the growth of diversified agriculture."

5. Finally, Decision Analysts Hawaii, Inc. examined the comment from DOA regarding the need to articulate by a coherent land use plan whether this project (or any other similar project) falls within the definition of "overriding public interest," and responded:

"The General Plan for the City & County of Honolulu and the Ewa Development Plan, which are updated periodically, already exist and

provide a coherent regional land use plan which calls for directing growth to Ewa. These plans indicate an overriding public interest to urbanize some agricultural lands in order to provide housing."

Thank you for your comments and continuing interest.

Robert Meyenate
for Mike Moon
Director

JOHN WAIHEE
GOVERNOR

RUSSELL N. FUKUMOTO
Acting Executive Director

STATE OF HAWAII
Department of Business and Economic Development
Housing Finance and Development Corporation
P. O. BOX 17907
HONOLULU, HAWAII 96817

IN REPLY REFER
TO:
87:PLNG/4815JT

November 6, 1987

'87 NOV 12 P2:07
DEPT. OF HOUSING & COMM. DEVELOPMENT

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

Dear Mr. Whalen:

Re: Draft Environmental Impact Statement (dEIS)
for West Loch Estates

We have reviewed the subject dEIS and offer the following comment:

We support the provision of affordable housing opportunities available to gap group and elderly households. However, in light of the 34,506 low and moderate income households on Oahu who pay an excessive amount for rent (Housing Assistance Plan), we believe the project should also include a cluster of housing units affordable to this target group. This action would assist in achieving an overall objective of dispersing lower income housing units, in relatively compact and manageable pockets, to all communities.

Thank you for the opportunity to comment.

Sincerely,

RUSSELL N. FUKUMOTO
Acting Executive Director

cc: Mr. Mike Moon, Director

FRANK F. FASI
MAYOR

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4191

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

December 11, 1987

Mr. Russell N. Fukumoto
Acting Executive Director
Department of Business and Economic
Development
Housing Finance and Development
Corporation
P.O. Box 17907
Honolulu, Hawaii 96817

Dear Mr. Fukumoto:

Subject: Draft Environmental Impact Statement (DFIS) for West Loch Estates, Ewa, Oahu, Hawaii

This is to acknowledge receipt of your letter dated November 6, 1987, commenting on the subject DEIS.

In response to your suggestion that affordable rental units be included in the West Loch Estates Project, please be advised that the 150 unit elderly housing project is designed to provide such low cost rentals. The development of the elderly housing project is strongly supported by the Waipahu community.

Thank you for your comments.

for Mike Moon
Director

JOHN WAIHEE
GOVERNOR
ROGER A. ULVELING
DIRECTOR
MURRAY E. TOWILL
DEPUTY DIRECTOR
BARBARA KIM STANTON
DEPUTY DIRECTOR

DEPARTMENT OF BUSINESS
AND ECONOMIC DEVELOPMENT

KAMAMALU BUILDING, 250 SOUTH KING ST., HONOLULU, HAWAII
MAILING ADDRESS: P.O. BOX 2359, HONOLULU, HAWAII 96804 TELEX: 74-8520 HIDPED

Ref. No. P-7642

November 17, 1987

'87 NOV 23 A10:51
DEPT. OF HOUSING & COMM. DEVELOPMENT

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

Dear Mr. Whalen:

Subject: Draft Environmental Impact Statement for the West Loch Estates Housing Project by the Department of Housing and Community Development, City and County of Honolulu

We have reviewed the subject DEIS and have the following comments.

1. The Hawaii Coastal Zone Management (CZM) law calls for controlling development in areas subject to flood hazard; ensuring that developments comply with requirements of the Federal Flood Insurance Program; and preventing coastal flooding from inland projects. We noted in our comments on the EIS Preparation Notice that portions of the project site are within a flood hazard area and that mitigating measures should be proposed and discussed in the EIS. This information was not included in the DEIS. Furthermore, we note that the Federal Flood Insurance Rate Map (FIRM) data presented on Page IV-2 is not entirely accurate on the basis of the latest FIRM dated September 4, 1987. Portions of the project site appear to be in zone AE and zone x-shaded, not zone A and zone x-unshaded as reported in the DEIS. This is also inappropriately included under the soils section.

2. The applicant has inaccurately stated (DHCD letter dated 9/16/87) that CZM Federal consistency will be applicable on the basis of flood hazard considerations. This project will also be subject to CZM consistency certification if any Federal funds, such as CDBG or HUD housing program funds, are involved or if any Federal permits are required. Although we issued a general consistency to HUD's Honolulu Office for its CDBG and housing programs in Hawaii, this project does not qualify because it meets several of the exception criteria.

3. The final EIS should indicate the source of the potable water necessary for the project. We note that the projected water demand for the development is 800,000 gallons per day and will be withdrawn from the Waipio Heights III Well. This well source is located within the Koolau subarea of the PHGWCA which has only 90,000 gpd available for further allocation as indicated on page IV-1.

4. The final EIS should address the special transportation needs of elderly individuals to be served by the community. If the park and ride facility is included, a transportation coordinator should also be considered to facilitate ride-sharing or other transportation alternatives.

5. The final EIS should also address projected regional impacts on the H-1 and Farrington Highway traffic corridors.

6. The final EIS should provide a more detailed site plan which indicates the location of structures relative to the flood plains and public access to West Loch.

7. Project phasing should be discussed relative to the timing of other Ewa projects.

8. If the golf course site is comprised of lands related "A" or "B" by the Land Study Bureau system of land classification, consideration should be given to inclusion of the golf course area within the proposed Urban district. Golf courses within the State Agriculture district are a permitted use only if the proposed site does not contain lands rated "A" or "B."

Thank you for the opportunity to review this DEIS and provide our comments. Please feel free to contact our CZM office at 548-5973 if there are any questions.

Sincerely,

Murray E. Towill

Roger A. Ulveling

cc: Mr. Mike Moon, Director
Department of Housing and Community Development
City and County of Honolulu

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4181

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

December 11, 1987

Mr. Murray E. Towill
Deputy Director
Department of Business and Economic Development
P.O. Box 2359
Honolulu, Hawaii 96804

Dear Mr. Towill:

Subject: Draft Environmental Impact Statement (DEIS) for the West Loch Estates Subdivision, Ewa, Oahu

Thank you for the comments contained in your letter of November 17, 1987 regarding the Draft Environmental Impact Statement (DEIS) for the West Loch Estates project. The staff and consultants have reviewed your comments and we respond as follows:

1. The listed flood hazard designations for the project site as specified on pp. IV-2 have been updated to conform with the recently issued Federal Flood Insurance Rate Map. Page IV-2 will now show the newly designated Zones.

   Page V-2: Paragraph 2 (refering to the soil types located in the flood plain to be used for the golf course) will be deleted in entirety. This matter will be fully discussed in the EIS for the golf course and shoreline park now being separately prepared.

2. We regret having omitted reference to the applicability of CZM consistency certification for the planned use of HUD/FHA housing programs in our letter of September 16, 1987, and will make the necessary corrections to the Final EIS.

3. Potable water requirements for the West Loch Estates will be met by the Waipio Heights III Well. The reference on page IV-1 to an unallocated 90,000 gpd in the Koolau sub-area is that remaining after allocation of the 800,000 gpd required for this project.

4. Including a transportation coordinator as a part of developing the Park and Ride facility is under consideration and consultation with the City Department of Transportation Services is on-going.

5. At completion, the West Loch Estates project will not itself have a significant impact on Farrington Highway and the H-1 Freeway. The long-term cumulative impact of the project on these regional transportation facilities cannot, however, be realistically assessed since adequate information regarding the schedule for development of other planned and proposed projects in the Leeward and Ewa areas is not available.

6. A detailed site plan is not available at this early stage of the planning process. Applicable restrictions on the construction of structures in the flood plain will be fully observed. Public access to the shoreline will be provided both through the residential subdivision and through jogging and bike paths extending beyond the project area.

7. The phasing of the project in relation to other developments in Ewa is difficult to discuss at this time, particularly in view of recent public announcements which seem to question the policy of directing growth to this area of Oahu. We have established a development schedule for the project that is described on pages III-6 and 7 and are confident that it can be achieved.

8. The area planned for development as a golf course is comprised of isolated pockets of prime agricultural land which will be processed under Special Use Permit procedures and the authority of the counties to amend the district boundary in other than conservation districts, when the land area involved is less than 15 acres.

Thank you for your comments and continuing interest.

Robert Miyasato
for Mike Moon
Director

'87 OCT 27 P3:06
DEPT OF HOUSING
& COMM DEVELOPMENT

October 23, 1987

Engineering Office

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

Dear Mr. Whalen:

West Loch Estates
West Loch, Ewa, Oahu

Thank you for providing us the opportunity to review the above subject project.

We have no comments to offer at this time regarding this project.

Yours truly,

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

cc: Mr. Mike Moon, Director, Dept. of
Housing & Community Development

NO RESPONSE NEEDED

JOHN WAIHEE
GOVERNOR

CHARLES T. TOGUCHI
SUPERINTENDENT

'87 OCT 28 AM 10 25

DEPT OF LAND UTILIZATION
CITY & COUNTY OF HONOLULU

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

OFFICE OF THE SUPERINTENDENT

October 21, 1987

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

Dear Mr. Whalen:

SUBJECT: West Loch Estates
Ewa, Oahu - EIS

Our review of the EIS report indicates that the comments sent to Mr. Mike Moon on June 8, 1987, are still valid. A copy of the aforementioned correspondence is attached for your perusal.

Should you require further clarifications, please contact Mr. Richard Inouye at 737-4743.

Sincerely,

Charles T. Toguchi
Superintendent

CTT:jl

attach.

cc E. Imai, OBS
M. Moon, Dept. of Housing & Comm. Devel.

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

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

OFFICE OF THE SUPERINTENDENT

June 8, 1987

Mr. Mike Moon, Director
Department of Housing and Community Development
City and County of Honolulu
650 S. King Street
Honolulu, Hawaii 96813

Dear Mr. Moon:

SUBJECT: West Loch Estates Housing Project

Our review of your proposed housing project indicates that it may generate the following additional enrollment in our area schools:

SCHOOL	GRADES	APPROXIMATE ENROLLMENT
Ewa Elementary	K-6	240 - 480
Ilima Intermediate	7-8	90 - 170
Campbell High	9-12	160 - 240

Schools at all levels in this service area are operating at capacity. Budgeting for additional classrooms will be necessary to accommodate the anticipated enrollment growth at Ilima Intermediate and Campbell High School.

A site for a new elementary school should be identified within the project. Additional classrooms at Ewa Elementary or bussing to nearby elementary schools will be necessary during the initial phase of the project.

Please keep us informed of any changes to your development plans so that we may be able to adjust to changing needs.

Sincerely,

Charles T. Toguchi
Superintendent

CTT:jl (MRI)
cc E. Imai, OBS
E. Nakano, Leeward Dist.

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4161

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT IWASATO
DEPUTY DIRECTOR

December 11, 1987

Mr. Charles T. Toguchi
Superintendent
Department of Education
P.O. Box 2360
Honolulu, Hawaii 96804

Dear Mr. Toguchi:

Subject: Draft Environmental Impact Statement (DEIS) for West Loch Estates, Ewa, Oahu, Hawaii

This is in response to your letter dated October 21, 1987 commenting on the subject DEIS.

The issues you have raised regarding the need for additional facilities, are addressed in Sections 3.1.3 and 4.2.8 Schools of the DEIS which specifically recognized the need to establish an elementary school in the area. We will keep your facilities planning personnel advised as the project progresses through the land use approval process.

Thank you for your comments and continuing interest.

Robert Meyasato
for Mike Moon
Director

JOHN WAIHEE
GOVERNOR OF HAWAII

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

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

In reply, please refer to:
EPHSO

November 19, 1987

MEMORANDUM

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

From: Deputy Director for Environmental Health

Subject: Draft Environmental Impact Statement for West Loch Estates, Ewa, Oahu

Thank you for allowing us to review and comment on the subject DEIS. We provide the following comments:

Air Pollution

The study for the DEIS indicated that the state standards for carbon monoxide may be exceeded at the intersections of Fort Weaver Road with Project Access Road "A," Project Access Road "B," and Renton Road. The DEIS should present those mitigating measures which shall be implemented to prevent the exceedances from occurring.

Noise

1. Concerns toward this proposed development were addressed in previous comments to the environmental assessment (June 12, 1987) and EIS Preparation Notice (July 16, 1987).

2. The applicant has included a detailed study of vehicular traffic noise impact along with possible mitigative measures.

3. Potential impacts from aircraft noise were addressed; study showing that the proposed development is situated outside Ldn 55 noise contour. However, it should be noted that when the calculated Ldn value is influenced by a series of isolated events such as aircraft flyover noise, this source of noise intrusion tend to be more pronounced to the impacted community.

4. The applicant has indicated that the average Ldn values of cane haul trucks during the harvesting season are in the "Moderate Exposure Acceptable" category. However, it should be noted that noise from individual or series of trucks may impact residents while travelling along the cane haul route, particularly during nighttime hours. Since complaints regarding such activities have been received by the Department of Health, mitigative measures must be incorporated to minimize such disturbances.

NOV 23 1987

5. The following concerns and regulatory requirements addressed on earlier comments were not included in the DEIS:

   a. Noise from activities associated with recreational areas, particularly from the proposed golf course.

   b. Noise associated with the construction plans of the proposed project.

6. There are additional concerns that should be addressed in the final EIS. Mitigative measures to minimize potential noise impacts from these identified concerns must be included.

   a. Noise from activities associated with industrial-type facilities located within the Waipahu Industrial Park area, north of the proposed development.

   b. Noise from activities associated with the proposed commercial center within the development, including stationary equipment (air conditioning/ventilation units, exhaust units, refrigeration compressors) and vehicles utilized for deliveries and services.

   c. Noise from agricultural field operations in areas surrounding the proposed development.

   d. Noise associated with school activities, particularly recreational type.

   e. Vehicular noise associated with the park and ride facility.

Bruce S. Anderson
BRUCE S. ANDERSON, Ph.D.

cc: Mr. Mike Moon

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4161

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYABATO
DEPUTY DIRECTOR

December 11, 1987

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

Dear Dr. Anderson:

Subject: Draft Environmental Impact Statement (DEIS) for the West Loch Estates, Ewa, Oahu, Hawaii

Thank you for the comments contained in your letter of November 19, 1987 on the subject Draft Environmental Impact Statement (DEIS). We have reviewed your comments and respond as follows:

Air Pollution

The Air Quality Study prepared for the project, (pp. 13, Appendix D, Air Quality Impact Report West Loch Estates, September 28, 1987) discussed the available mitigation measures, many of which are being incorporated as a part of the project, and listed then at Section 9.6 (pg. 13) of the Study, which included intersection improvements, increased bus services, and measures which encourage the use of mass transit and multiple ridership of private vehicles.

Noise

We appreciate your having acknowledged that we responded to the concerns of your department regarding the noise impacts of vehicular traffic and the aircraft which overfly the area.

Relative to the other matters you have raised, we respond as follows:

a. The continued use of the major cane haul road that traverses the project site, is a recognized problem and mitigation of its noise, dust and other related impacts is incorporated in the subdivision design through the use of setbacks, noise attenuation walls, and/or landscaping.

b. The noise impacts of activities associated with the adjoining recreational areas are not considered a serious enough problem to require mitigation since the Community Noise Regulations require reduction in noise levels after 10:00 p.m. By this time of the evening, play on the golf course will have stopped.

c. Control of construction related noise will be the responsibility of the general contractor engaged to work on the site. Compliance with the applicable noise code regulations will be a specific requirement of the construction contract awarded for the project. If it is necessary to exceed the noise levels permitted during normal construction periods, a permit from the Department of Health must be obtained by the contractor.

d. Similarly, the noise levels from the various other types of activities commonly associated with or adjacent to residential areas are all subject to Department of Health regulations. The responsibility for compliance rests with the operator or owner of the noise source. At the same time, however, the importance of careful design planning to isolate higher noise activity areas such as the commercial center and the Park and Ride facility, are recognized.

Thank you for your continuing interest and comments.

Robert Miyabato
for Mike Moon
Director

LU 12/87-6815 '87-

JOHN WHALEN
GOVERNOR OF HAWAII

'87 DEC 2 AM 10 06

ZATION
OLULU

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

WILLIAM W. PATY, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

LIBERT H. LANDGRAF
DEPUTY

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

NOV 30 1987

DOC. NO.: 2000E
FILE NO.: 88-151

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

Dear Mr. Whalen:

SUBJECT: West Loch Estates EIS review Honouliuli, Ewa, Oahu
TMK: 9-1-17: various and 9-1-22

Thank you for the opportunity to review the Draft EIS cited above. We offer the following comments:

DOFAW Concerns

The EIS should include more detailed information as to the development plans for the lands adjacent to the wetlands. Development plans for lands beyond the 300-foot buffer zone set aside for the U. S. Fish and Wildlife Service's refuge should also be clarified. In addition, mitigating measures as stated on page VIII-2 item 8 is not sufficient.

It is recommended that the U. S. Fish and Wildlife Service be consulted in the planning of buffer zones, landscaping and fencing or other mitigating measures.

Aquatic Resources Concerns

The aforementioned regional district park and municipal golf course were formerly part of this proposal. We have previously commented on the project when residential and recreational developments were proposed together (comments dated 7/28/87). The County has since separated the residential development (this proposal) from the recreational development. Since the proposed housing project would be located inland of shoreline, adverse impacts to aquatic resources are not expected to be significant provided precautions are taken to prevent debris, construction materials, petroleum products, sediments, and other contaminants from entering coastal waters.

Historic Sites Concerns

The archaeological reconnaissance completed on the Increments I and II (residential) areas covers 232 acres, approximately 1/3 of the acreage involved in the entire project. The reconnaissance survey report, by PHRI, is attached to the Draft EIS as Appendix E.

We agree with the significance assessments for the four historic sites that were located in the survey. Only one (T-3, an early 20th century cemetery) is significant.

Two concerns exist for mitigation of historic sites. One, the cemetery needs to be appropriately mitigated. As the preferred option, the cemetery should be preserved in place. The second option is disinterment, scientific recordation and analysis, and appropriate reburial in accordance with State Health Department regulations.

The second mitigation concern is for archaeological monitoring in selected areas, to cover the slight possibility that unknown significant historic remains might be uncovered. The applicant's consulting archaeologist recommended selective archaeological monitoring of initial grubbing activity and/or vegetation clearing. However, a definition of "selective" was not included, nor were areas specified or a rationale for monitoring offered. The Draft EIS does not include the background information on land use in this area that PHRI obtained from historic maps of the area. Our office and County officials were briefed on these findings several months ago. The maps, dating back to 1825, indicate that native Hawaiian historic era housing along the coastal portion of project area was fairly dense. We suspect that in pre-Western contact times this was also true of the area. Because of this history of occupation, even given the fact that much of the area has been in sugar cane production, we would strongly recommend that initially, continuous archaeological monitoring be carried out in these areas, as we are not convinced that the possibility of subsurface remains is remote.

Thank you for your consideration of our concerns.

Very truly yours,

WILLIAM W. PATY, Chairperson
Board of Land and Natural Resources

cc: Honorable Mike Moon, Director, C&C DHCD

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU HAWAII 96813
PHONE 523-4181

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

December 11, 1987

Mr. William W. Paty, Chairperson
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Paty:

Subject: Draft Environmental Impact Statement (DEIS) for the West Loch Estates Subdivision, Ewa, Oahu

We are in receipt of the comments contained in your letter of November 30, 1987 on the Draft Environmental Impact Statement (DEIS) prepared for the West Loch Estates residential subdivision. The comments were received on December 2, 1987, after the 45-day deadline of November 23, 1987. However, the concerns expressed in your letter are similar to those of the U.S. Fish & Wildlife Service, State Department of Business and Economic Development, and City & County Department of Land Utilization. We believe our responses to these agencies address your concerns.

Thank you for your comments and continuing interest.

Robert Miyasato
for Mike Moon
Director

JOHN WAIHEE
GOVERNOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
465 SOUTH KING STREET, ROOM 104
HONOLULU, HAWAII 96813

MARVIN T. MIURA, PH.D.
DIRECTOR

TELEPHONE NO.
548-6915

November 24, 1987

Mr. Mike Moon, Director
Dept. of Housing & Community Development
City & County of Honolulu
650 S. King St.
Honolulu, Hawaii 96813

'87 NOV 25 A8:20
DEPT. OF HOUSING & COMM. DEVELOPMENT

Dear Mr. Moon:

Re: West Lock Estates, Ewa Oahu
Draft EIS Comments

The traffic problems we were concerned about appear to be solved with the construction of access roads to this community. Also, the cul-de-sacs within the housing area will minimize speeding and ensure the safety of the children.

As for our other concern, the Board of Water Supply feels that the wells servicing the Pearl Harbor area will be adequate to meet the project demand of 0.8 MGD and it may not be necessary to tap Waipio Heights Well III, which is located almost five miles away.

Thank you for this opportunity to comment and for giving our concerns serious consideration.

Sincerely,

Marvin Miura

Marvin T. Miura, PH.D.
Interim Director

George S. Brosky

George S. Brosky
Planner

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4181

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

December 11, 1987

Dr. Marvin T. Miura
Interim Director
Office of Environmental Quality Control
465 South King Street, Room 104
Honolulu, Hawaii 96813

Dear Dr. Miura:

Subject: Draft Environmental Impact Statement (DEIS) for the West Loch Estates Subdivision, Ewa, Oahu

Thank you for the comments contained in youer letter of November 24, 1987 on the Draft Environmental Impact Statement (DEIS) on the proposed West Loch Estates. We have reviewed your comments and respond as follows:

1. Your comments that traffic concerns have been satisfactorily addressed, are appreciated.

2. The Waipio Heights III Well has an allocation of 0.8 MGD that will increase the capacity of the Board of Water Supply system to permit servicing of the West Loch Estates project. When viewed as a water supply "system," the specific location of the new well source is not a significant issue. The project will simply "tap" into the existing system at an adjacent section of Waipahu and thereby utilize the additional capacity provided by the Waipio Heights III Well.

Thank you for your comments.

Robert Miyasato
for Mike Moon
Director

University of Hawaii at Manoa

Environmental Center
Crawford 317 • 2550 Campus Road
Honolulu, Hawaii 96822
Telephone [illegible]

November 23, 1987
RE:0480

87 NOV 24 P1:18
DEPT. OF HOUSING & COMM. DEVELOPMENT

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

Dear Mr. Whalen:

Draft Environmental Impact Statement
West Loch Estates
Ewa, Oahu

The above mentioned document proposes the construction of 1,500 residential units on 255 acres. Along with the residential development there will be various recreational amenities, a commercial center, a day care facility and a park and ride facility. This develcpment is proposed by the Department of Housing and Community Development which will market 60 percent of the homes to low income buyers and 40 percent will be sold at a fair market price. This review was prepared with the assistance of Jon Matsuoka, Social Work and Steven Armann, Environmental Center.

The Draft Environmental Impact Statement (EIS) is inadequate in its discussion of the displacement and relocation of present residents. Many of the potentially effected residents of Hoaeae Point live a subsistence lifestyle which is not possible in a residential urbanized community. Rent subsides will allow them a place to live, however, their source of nutrition will be limited. The displacement policy discussed in the Draft EIS does not mention any assistance which will be offered, other than rent subsides. The final document should discuss this topic thoroughly.

Various studies have indicated that the Ewa area has one of the highest levels of solar radiation on Oahu. This makes the area a prime location for the installation of solar water heaters. The installation of solar water heaters during the construction phase should result in substantial long term savings to the property owner and significant fuel savings to the utility company. Furthermore, considering that the units could be mass produced, it is quite possible that the home owner's return on investment will be shortened; hence, the savings increased. We suggest that the long term cost and benefits of the installation of solar water heaters, during the construction phase, be studied.

AN EQUAL OPPORTUNITY EMPLOYER

Thank you for the opportunity to comment on this Draft EIS. We hope our comments will help in the preparation of the final document.

Yours truly,

Jacquelin N. Miller
Associate Environmental Coordinator

cc: OEQC
Mike Hoon, DHCD
L. Stephen Lau
Jon Matsuoka
Steven Armann

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4181

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

December 11, 1987

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

Dear Ms. Miller:

Subject: Draft Environmental Impact Statement (DEIS) for the West Loch Estates Subdivision, Ewa, Oahu

Thank you for the comments contained in your letter of November 23, 1987 on the Draft Environmental Impact Statement (DEIS) on the West Loch Estates project. Your comments have been reviewed by our staff and consultants and we respond as follows:

1. The legal requirements and policies relating to displacement and relocation of households caused by governmental action are discussed in Section 5.9.5 (pp. V-16 and V-17). A description of the type and nature of the assistance that will be made available, is provided in the same section.

   The possibility of providing additional assistance such as replacement housing is a matter that is still being discussed with the residents of the Hoae'ae Point at this time.

2. The use of solar powered energy conservation devices is desirable; however, in view of the fact that such devices do result in additional costs, it is believed that the prospective home purchaser should have the option to decide if it can be accommodated within the household budget.

Thank you very much.

Robert Miyasato
for Mike Moon
Director

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

October 28, 1987

'87 OCT 30 P1:41
DEPT. OF HOUSING & COMM. DEVELOPMENT

TO: JOHN P. WHALEN, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM: KAZU HAYASHIDA
MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

SUBJECT: DRAFT EIS FOR WEST LOCH ESTATES TMK: 9-1-17

Thank you for the opportunity to review and comment on the proposed housing development. We have the following comments:

1. A water master plan for the water system for the golf course, shoreline park, and the West Loch housing project should be submitted for our review and approval.

2. Page V-18, Section 5.10.1 Potable Water: The last sentence on the pending water allocation should clearly indicate that it refers to the brackish water source for the irrigation system.

3. Appendix I: A map showing the location of the various borings should be included in the text. Also, on page 6, there is no mention that alluvial water may be encountered or that capillary action near the shore will cause salt/brackish water to rise with the potential to adversely affect imported vegetation.

If you have any questions, please contact Lawrence Whang at 527-6138.

Kazu Hayashida

cc: Michael M. H. Moon,
Department of Housing and Community Development

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU HAWAII 96813
PHONE 523-4181

FRANK F. FASI
MAYOR

MICHAEL M. H. MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

December 11, 1987

MEMORANDUM

TO: KAZU HAYASHIDA, MANAGER & CHIEF ENGINEER
BOARD OF WATER SUPPLY

FROM: MICHAEL M. H. MOON, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) FOR THE WEST LOCH ESTATES SUBDIVISION EWA, OAHU

This is in response to your memorandum dated October 28, 1987 commenting on the subject DEIS.

1. The Water Master Plan will be provided to your office for review and approval as the planning process continues. The engineering consultants will work with your agency to ensure compliance with prevailing requirements and design standards.

2. Section 5.10.1, Potable Water on pg. V-18 has been modified at the end of the subject paragraph to clarify that an allocation of non-potable water for irrigation purposes is being sought from the State Department of Land and Natural Resources: "An approved allocation for the use of non-potable water is required from the State Department of Land and Natural Resources and an application will be submitted to that agency."

3. The requested map from GeoLabs-Hawaii identifying the locations of the various borings conducted for their preliminary soil study will be provided to your agency. Inasmuch as the map is very large, a copy will be made available for inspection by the general public at this Department during regular business hours, upon request.

Salt tolerant vegetation will be utilized for landscaping purposes where appropriate to deal with potential problems of tidal interaction with

groundwater levels and capillary action which can result in salt intrusion. The golf course architects and landscaping consultants are aware of this as a potential problem and are taking steps to ensure proper mitigation.

Thank you for your comments.

Robert Meyerato
for Mike Moon
Director

Enclosure

KU 11/87-5492

BUILDING DEPARTMENT

CITY AND COUNTY OF HONOLULU

HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

'87 NOV 5 PM 1 41

FRANK F. FASI
MAYOR

DEPT OF LAND UTILIZATION
HONOLULU

HERBERT K. MURAOKA
DIRECTOR AND BUILDING SUPERINTENDENT

PB 87-1078

November 4, 1987

MEMO TO: MR. JOHN P. WHALEN, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM: HERBERT K. MURAOKA
DIRECTOR AND BUILDING SUPERINTENDENT

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR
WEST LOCH ESTATES

We have reviewed the subject draft EIS and have no comments.

Thank you for the opportunity to review the document.

Herbert K. Muraoka
HERBERT K. MURAOKA
Director and Building Superintendent

cc: J. Harada
Dept. of Housing &
Comm. Development

NO RESPONSE NEEDED

DEPARTMENT OF GENERAL PLANNING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

DONALD A. CLEGG
CHIEF PLANNING OFFICER

GENE CONNELL
DEPUTY CHIEF PLANNING OFFICER

KK/DGP 10/87-3480

November 12, 1987

'87 NOV 12 P3:43
DEPT. OF HOUSING & COMM. DEVELOPMENT

MEMORANDUM

TO: JOHN P. WHALEN, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM: DONALD A. CLEGG, CHIEF PLANNING OFFICER
DEPARTMENT OF GENERAL PLANNING

SUBJECT: CHAPTER 343, HAWAII REVISED STATUTES
DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE PROPOSED
WEST LOCH ESTATES PROJECT SITUATED IN EWA, OAHU

We have reviewed the subject Draft Environmental Impact Statement (EIS) and have found that the concerns we presented on the EIS Preparation Notice have been addressed.

Thank you for giving us an opportunity to comment on this matter.

DONALD A. CLEGG
Chief Planning Officer

cc: Department of Housing and Community Development
R.M. Towill Corporation

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4191

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

December 11, 1987

MEMORANDUM

TO: DONALD A. CLEGG, CHIEF PLANNING OFFICER
DEPARTMENT OF GENERAL PLANNING

FROM: MICHAEL M.H. MOON, DIRECTOR
DEPARTMENT OF HOUSING & COMMUNITY DEVELOPMENT

SUBJECT: CHAPTER 343, HAWAII REVISED STATUTES DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE PROPOSED WEST LOCH ESTATES PROJECT SITUATED IN EWA, OAHU

This is to acknowledge receipt of your memorandum dated November 12, 1987 regarding the subject Draft Environmental Impact Statement (DEIS). Thank you for your timely response.

for Mike Moon
Director

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

FRANK F. FASI
MAYOR

JOHN P. WHALEN
DIRECTOR

87/EIS-9(AC)

November 3, 1987

MEMORANDUM

TO: MICHAEL MOON, DIRECTOR
DEPARTMENT OF HOUSING & COMMUNITY DEVELOPMENT

FROM: JOHN P. WHALEN, DIRECTOR

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) FOR WEST LOCH ESTATES SUBDIVISION DEVELOPMENT, EWA, OAHU, TAX MAP KEYS: 9-1-17: VARIOUS

The Department of Land Utilization (DLU) has reviewed the above-referenced Draft Environmental Impact Statement (DEIS) and offers the following comments:

(1) Subsection 4.1.6, Wildlife: A paragraph should be included which describes the mitigative approaches to resolving the concerns of the U. S. Fish and Wildlife Service. Specifically, the Final EIS should address the impacts of noise and light on the adjacent National Wildlife Refuge and the methods by which these impacts will be controlled during construction and after completion of the project.

(2) Subsection 4.1.9, Historic and Archaeological Resources: This subsection should describe how the identified historic sites would be preserved if deemed significant in value.

(3) Subsection 4.2.6, Police and Fire Protection: This subsection should address how future police services will keep pace with the demand generated by the project.

(4) As a general comment, the EIS should include material requested in the Consultation comments. Much of the information is in the appended studies, but it should also be summarized in the EIS text.

(5) The Final EIS should also incorporate point-by-point responses to all concerns raised by various agencies and groups during the EIS review process. This will expedite acceptance of the Final EIS.

I hope these comments will be helpful to you in preparation of the Final EIS. If you have any questions, please feel free to contact Art Challacombe at extension 4648.

JOHN P. WHALEN
Director of Land Utilization

JPW:sl
14168

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4181

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

December 11, 1987

MEMORANDUM

TO: JOHN P. WHALEN, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM: MICHAEL M.H. MOON, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) FOR WEST LOCH ESTATES SUBDIVISION DEVELOPMENT, EWA, OAHU

This is in response to your memorandum dated November 3, 1987 commenting on the subject DEIS. Your comments were reviewed by our staff and consultants who prepared the following responses:

1. Subsection 4.1.6, Wildlife: A review of the final report prepared by our wildlife consultant, Dr. Andrew J. Berger indicates that noise and light as negative impacts on the birds that reside in the National Wildlife Refuge are not significant. Berger cites his own findings as well as those of U.S. Environmental Protection Agency (1971, 1980); E. Kridler (in Doty, 1969) and Ronald L. Walker, State Fish & Wildlife (1976) who found that birds are tolerant of noise, human activity, traffic, aircraft, boats, and construction noise.

   The possibility of prohibiting pet ownership (dogs and cats) within the West Loch Estates Subdivision, as was discussed with Managing Director Jeremy Harris, during a meeting with U.S. Fish and Wildlife Service on May 8, 1987, has been fully researched and found to be unfeasible. Enforcement is likely to be both difficult and expensive for the homeowners' association who would have to seek remedy through litigation. Such restrictions are also likely to be viewed as being unreasonable by homeowners having pets and/or those wishing to acquire a dog for security purposes. This group could very well initiate their own litigation against the homeowner's association and prevail.

   A variety of alternatives have also been examined and discarded on the basis of infeasibility. As example, installation of fencing or construction

of a moat around the Refuge would be costly, adversely impact the project's affordable housing objectives, and have limited effectiveness. The Fish and Wildlife Service staff had previously advised that animals will always be able to access the refuge through entry gates in fences and/or bridges over moats which are necessary for maintenance and servicing purposes.

As present, providing a substantial landscaped area as a buffer between the residential subdivision and the Refuge to discourage intrusion by stray dogs and cats as well as unsupervised children, will be the primary mitigation utilized. This will supplement the existing chain link fence and "nesting islands" which currently safeguard its inhabitants. The local Fish and Wildlife Service office has also been asked to assist by identifying cost effective mitigation measures that have been utilized in other states.

2. Subsection 4.1.9, Historic and Archaeological Resources: A review of the report prepared by Paul H. Rosendahl, Ph.D., Inc. provided the final conclusions that the residential portions of the proposed West Loch Estates do not contain sites of archaeological significance with the exception of a cemetary site. It has been recommended that this site be preserved "as is," if at all possible. If this course is found to be unfeasible, the appropriate Department of Health regulations covering proper disinterment and reburial would be utilized.

3. Subsection 4.2.6, Police and Fire Protection: The need for additional resources to maintain an adequate level of police protection and services in a region slated to undergo major population growth is a recognized concern that is expected to be addressed as a part of the budget planning process of both the City and State governments.

4&5. Point by point responses to comments raised by commenting agencies will be included in the narrative portions of the EIS as you have suggested. Wherever possible or practical, excerpts from the consultants' studies will also be included in the Final Environmental Impact Statement.

Thank you for your comments.

Robert Miyasato
for Mike Moon
Director

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

FRANK F. FASI
MAYOR

HIRAM K. KAMAKA
DIRECTOR

WALTER M. OZAWA
DEPUTY DIRECTOR

October 23, 1987

'87 OCT 27 P3:10
DEPT OF HOUSING & COMM. DEVELOPMENT

TO: JOHN P. WHALEN, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM: HIRAM K. KAMAKA, DIRECTOR

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT
WEST LOCH ESTATES - EWA
TAX MAP KEY 9-1-17 AND 9-1-22

We have determined that the Environmental Impact Statement for the West Loch Estates is acceptable.

The recreational needs of the proposed project have been addressed by the establishment of a district park and a 39-acre shoreline park.

Thank you for the opportunity to review the EIS.

HIRAM K. KAMAKA, Director

HKK:ei

cc: Mike Moon, Dept. of Housing & Community Development

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU HAWAII 96813
PHONE 523 4181

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

December 11, 1987

MEMORANDUM

TO: HIRAM K. KAMAKA, DIRECTOR
DEPARTMENT OF PARKS AND RECREATION

FROM: MICHAEL M. H. MOON, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) FOR THE WEST LOCH ESTATES SUBDIVISION EWA, OAHU

The comments contained in your memorandum dated October 23, 1987 to the Department of Land Utilization have been received and are acknowledged. We appreciate your timely response.

Robert Miyasato
for Mike Moon
Director

ENV 87-208

October 19, 1987

MEMORANDUM

TO: JOHN P. WHALEN, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM: ALFRED J. THIEDE, DIRECTOR AND CHIEF ENGINEER

SUBJECT: DRAFT EIS FOR WEST LOCH ESTATES, EWA, OAHU, HAWAII
(TMK: 9-1-17:6, 9-11, 18, 34; 9-1-22:12, 13

87 OCT 20 P3:30
DEPT OF HOUSING & COMM DEVELOPMENT

The subject Draft EIS was reviewed and we have the following comments:

1. The drainage master plan should be submitted to the Drainage Section, Division of Engineering, for review and approval.

2. The status of the proposed wastewater pump station that will be constructed at or near Increment II should be clarified. The Division of Wastewater Management will operate and maintain the station only if it is built according to City and County standards.

Sam Callejo
for ALFRED J. THIEDE
Director and Chief Engineer

cc: DHCD

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4181

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

December 11, 1987

MEMORANDUM

TO: ALFRED J. THIEDE, DIRECTOR AND CHIEF ENGINEER
DEPARTMENT OF PUBLIC WORKS

FROM: MICHAEL M.H. MOON, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) FOR WEST LOCH ESTATES, EWA, OAHU, HAWAII

This is in response to your memorandum dated October 19, 1987 commenting on the subject DEIS

1. The Drainage Master Plan will be submitted to the Drainage Section, Division of Engineering, for review and approval as the project planning process continues. The engineering consultants will work with your department to ensure compliance with prevailing requirements and design standards.

2. Section 5.10.2, Sanitary Sewer System on pp. V-18 and V-19 has been clarified to reflect plans for utilization of a sewerage pump station that complies with City requirements. The additional language to be included in the Final EIS will explicitly state that: "All proposed improvements will be designed, built, and/or installed to meet City standards for capacity, operating efficiency, maintenance and economy."

Thank you for your calling these to our attention.

Robert Miyasato
for Mike Moon
Director

67-11-5130

HONOLULU FIRE DEPARTMENT
1455 S. Beretania Street, Room 305
Honolulu, Hawaii 96814

November 9, 1987

87 NOV 10 P2:50
DEPT OF HOUSING & COMM. DEVELOPMENT

TO: JOHN P. LEHALEN, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM: FRANK K. KAHOOHANOHANO, FIRE CHIEF

SUBJECT: WEST LOCH ESTATES
ENVIRONMENTAL IMPACT STATEMENT (EIS)

We have reviewed the West Loch Estates EIS and have no additional comments at this time.

Should you have any questions, please contact Battalion Chief Kenneth Hara at 943-3838.

We are returning the EIS to the Office of Environmental Quality Control.

FRANK K. KAHOOHANOHANO
Fire Chief

FKK/KAH:sb

cc: Mike Hoon, Director
Dept. of Housing & Community Development

NO RESPONSE NEEDED

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU

1455 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96814 - AREA CODE (808) 955-3111

FRANK F. FASI
MAYOR

DOUGLAS G. GIBB
CHIEF

WARREN FERREIRA
DEPUTY CHIEF

OUR REFERENCE SS-LK

October 26, 1987

'87 OCT 27 P3:10
DEPT. OF HOUSING & COMM. DEVELOPMENT

TO: JOHN P. WHALEN, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM: DOUGLAS G. GIBB, CHIEF OF POLICE
HONOLULU POLICE DEPARTMENT

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT FOR WEST LOCH ESTATES, WEST LOCH, EWA, OAHU

We have reviewed the environmental impact statement for the West Loch Estates and have no additional comments to make regarding the housing development. Our concerns were stated in previous responses of June 2 and July 10, 1987, copies of which are contained in Section X of this EIS.

Thank you for the opportunity to be involved in the planning of this development.

DOUGLAS G. GIBB
Chief of Police

By Warren Ferreira
WARREN FERREIRA
Deputy Chief of Police

cc: Housing and Community Development

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4181

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

December 11, 1987

MEMORANDUM

TO: DOUGLAS G. GIBB, CHIEF OF POLICE
HONOLULU POLICE DEPARTMENT

FROM: MICHAEL M. H. MOON, DIRECTOR
DEPARTMENT OF HOUSING & COMMUNITY DEVELOPMENT

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) FOR THE WEST LOCH ESTATES SUBDIVISON EWA, OAHU

The comments contained in your memorandum dated October 26, 1987 to the Department of Land Utilization have been received and are acknowledged. We appreciate your timely response.

Robert Miyasato
for Mike Moon
Director

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
BUILDING 230
FT. SHAFTER, HAWAII 96858-5440

November 17, 1987

REPLY TO ATTENTION OF:

Planning Branch

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

'87 NOV 25 A8:25
DEPT OF HOUSING & COMM. DEVELOPMENT

Dear Mr. Whalen:

Thank you for the opportunity to review the Draft Environmental Impact Statement (DEIS) for West Loch Estates. The following comments are offered.

a. Based on review of the DEIS and meetings between Operations Branch and the City and County of Honolulu, the proposed housing development does not involve work in waters of the U.S. or adjacent wetlands, and no Department of the Army (DA) permit is needed.

b. The proposed shoreline park and golf course involve work in wetlands and/or shorewaters and may require a DA permit. This proposal is being handled as a separate project (Department of Housing and Community Development announcement letter dated September 16, 1987; Corps' response dated October 7, 1987). Operations Branch is continuing to meet with the City and County of Honolulu to establish jurisdiction.

c. Prior comments regarding flood hazard zones for this project (letter dated June 12, 1987), are no longer valid. The flood hazard zones have changed (Flood Insurance Rate Map dated September 4, 1987; copy of relevant portion enclosed). The project parcels are in the following zones:

'87 NOV 20 PM 1 58
DEPT OF HOUSING & COMM. DEVELOPMENT

1) Zone D. Represents unstudied areas under the Federal Flood Insurance Program and is an area of undetermined but possible flood hazards.

2) Zone AE. Special flood hazard area inundated by the 100-year flood, with base elevations ranging from [illegible] to 13 feet.

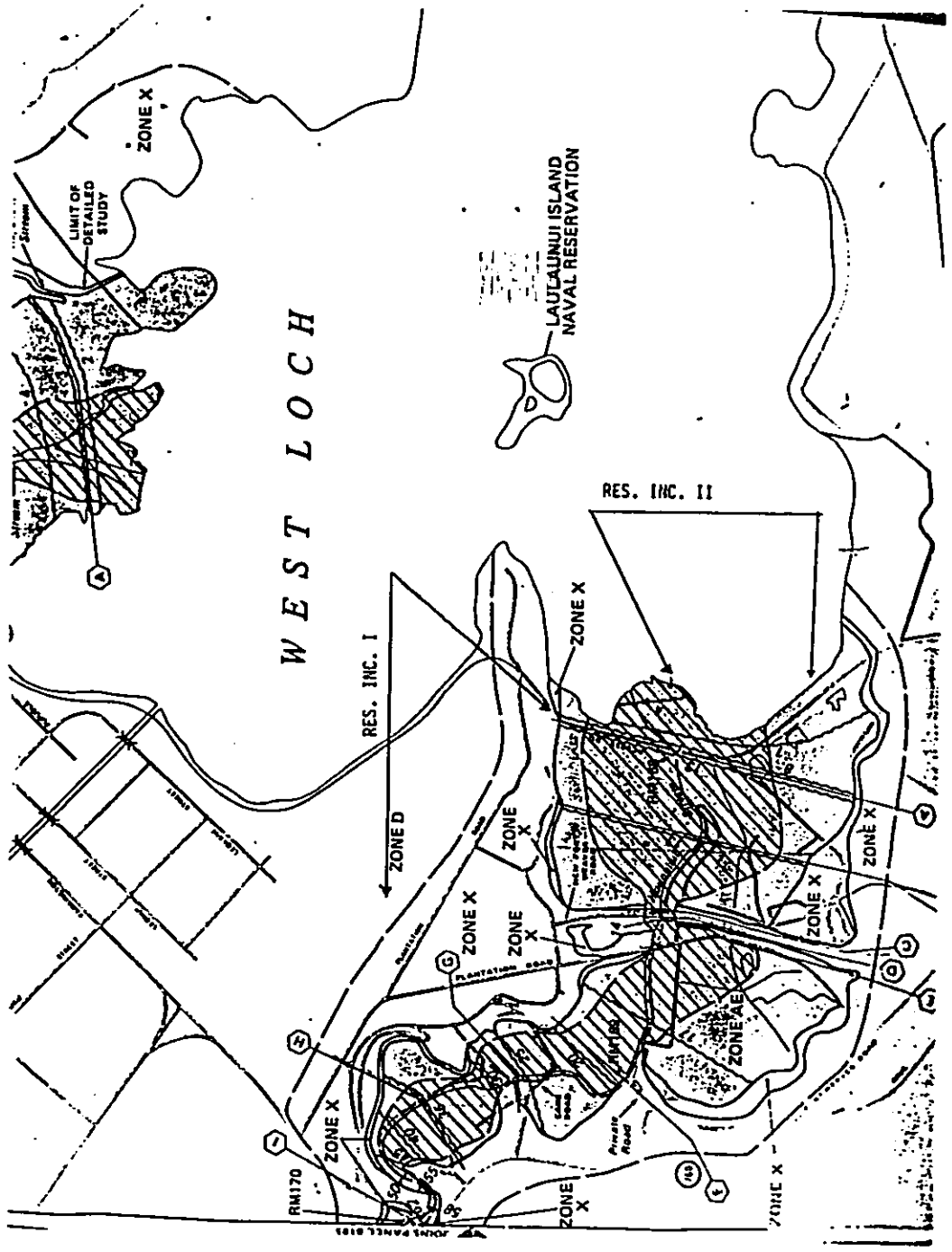
3) Zone X (shaded portion). Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot. Because each county administers its own flood hazard prevention ordinances, applicant is advised to coordinate with the appropriate county office regarding this particular area.

4) Zone X (unshaded portion). Areas outside of the 500-year flood plain.

Sincerely,

Kisuk Cheung
Chief, Engineering Division

Enclosure



DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4181

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

December 11, 1987

Mr. Kisuk Cheung
Chief, Engineering Division
Department of the Army
U.S. Army Engineer District, Honolulu
Building 230
Ft. Shafter, Hawaii 96858-5440

Dear Mr. Cheung:

Subject: Draft Environmental Impact Statement (DEIS) for the West Loch Estates Subdivision, Ewa, Oahu

Thank you for the comments contained in your letter of November 17, 1987 on the Draft Environmental Impact Statement (DEIS) on the proposed West Loch Estates project. We appreciate the updating of the wetlands criteria affecting the project and also, the acknowledgement that the residential portions of the total project do not involve work in waters of the United States or adjacent wetlands.

Your specific references to the recent changes in the Flood Insurance Rate Maps will be incorporated in the Final EIS at page IV-2.

Our special thanks for your comments and continuing interest.

Robert Miyasato
for Mike Moon
Director

DEPARTMENT OF THE NAVY
COMMANDER
NAVAL BASE PEARL HARBOR
BOX 110
PEARL HARBOR, HAWAII 96860-5020

IN REPLY REFER TO
11010
Ser N5B(202)/2499
27 OCT 1987

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

Dear Mr. Whalen:

DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)
WEST LOCH ESTATES, CITY AND COUNTY OF HONOLULU DEPARTMENT OF
HOUSING AND COMMUNITY DEVELOPMENT (OCTOBER 1987)

The subject draft EIS has been provided to Navy by transmittal letter dated October 7, 1987, from the State Office of Environmental Quality Control. Because the question of the proposed West Loch Golf Course and Shoreline Park is being addressed in a separate EIS, Navy comments on that subject are being provided to Mr. Hiram K. Kamaka, Director, Department of Parks and Recreation, in response to the EIS Preparation Notice.

The Navy has reviewed the subject draft EIS and has no special comments to make. It is understood that Mr. Howard Murai, of the Department of Housing and Community Development, may be meeting with Navy representatives at a later date to discuss the subject after the West Loch Golf Course and Shoreline Park EIS Preparation Notice is complete. However, the Navy wishes to receive two copies of the Final EIS upon completion.

Thank you for the opportunity to comment on this Draft EIS. The Navy point of contact is Mr. Bill Liu, phone 471-3703 (changed to 471-3324 after October 22).

Sincerely,

R. M. GALLEN

Copy to:
Mr. Mike Moon, Director
Department of Housing and Community Development
650 South King Street, 5th Floor
Honolulu, HI 96813

87 OCT 29 P3:52
DEPT OF HOUSING & COMM. DEVELOPMENT

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4181

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

December 11, 1987

Captain R.M. Gallen
Department of the Navy
Base Civil Engineer
Naval Base Pearl Harbor
Box 110
Pearl Harbor, Hawaii 96860-5020

Dear Captain Gallen:

Subject: Draft Environmental Impact Statement (DEIS) for the West Loch Estates Subdivision, City and County of Honolulu Department of Housing and Community Development (October, 1987)

The comments in your letter dated October 27, 1987 have been reviewed by staff and we acknowledge your position on the separation of the housing components from that of the golf course and district park.

Thank you for your comments and continuing concern.

Robert Miyasato
for Mike Moon
Director

LLU*/87- 6699

United States Department of the Interior

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

IN REPLY REFER TO:
ES
Room 6307
NOV 23 1987

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

Re: Draft Environmental Impact Statement for the West Loch Estates Housing Project, Ewa, Oahu

Dear Mr. Whalen:

We have reviewed the referenced Draft Environmental Impact Statement (EIS) and offer the following comments for your consideration.

General Comments

The Service has already expressed its concern that the proposed housing project poses environmental risks to the Pearl Harbor National Wildlife Refuge at Honouliuli to representatives of the City and County of Honolulu (County) and its consultants. We provided letters discussing environmental issues to the County on March 13, 1987; April 8, 1987; April 22, 1987; June 22, 1987; August 7, 1987, and met with various County representatives and consultants on April 7, 1987; May 8, 1987; and July 30, 1987. Despite this extensive coordination, the Draft EIS has apparently overlooked several of the major environmental impacts of this housing development.

Specific Comments

a. The Service believes that the proposed development will lead to an increased number of stray cats, dogs, and wild mongooses on the refuge. We stated our concern that larger populations of these predators may increase the level of predation on the ground-nesting endangered waterbirds that use the Honouliuli refuge in letters to County officials of March 13, 1987 and June 22, 1987 and in meetings on April 7, 1987 and May 8, 1987. We discussed methods to minimize this adverse impact in our letters of April 8, 1987, April 22, 1987 and June 22, 1987; and meetings on April 7, 1987, May 8, 1987 and July 30, 1987. Neither this adverse impact, nor suitable mitigation measures were discussed in the Draft EIS.

In our June 22, 1987 letter, we recommended the following measures to control dog and cat populations:

'87 NOV 24 PM 1 26

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

(1) Implement subdivision covenants that ban the ownership of dogs and cats in the housing development.

(2) Construct additional fences and moats around the refuge.

(3) Enforce existing leash laws.

(4) Trap dogs and cats that wander into the refuge.

Each of these measures has various drawbacks that limit their effectiveness (see our June 22, 1987 letter for a discussion). The EIS should discuss this problem and explore alternate ways of avoiding the risks posed by dogs and cats to wildlife resources on the refuge.

b. The importance of buffering the refuge from disturbances associnted with the Phase II residential development was discussed in our letters of March 13, 1987 and June 22, 1987 and at meetings held on April 7, 1987; May 8, 1987 and July 30, 1987. We are concerned that increased levels of certain human activities, noise, and lighting may reduce the biological productivity of the refuge. In our June 22, 1987 letter and at the May 8, 1987 and July 30, 1987 meetings with the County, we offered several methods to buffer the refuge from the housing development. However, the Draft EIS states only that "greenbelt buffer areas providing adequate setback distances sufficient to prevent impacts" on endangered waterbirds will be provided. We recommend that the width of the setback distance, the use of the shoreline park and golf course as buffers, visual barriers of trees, shrubs, and fencing along the housing development at the 20-ft. contour, and reducing line-of-sight vision between the refuge and housing development also be discussed in the EIS.

c. Page II-9. Impacts and Mitigating Measures. We disagree with the statement, "The proposed project is not expected to have any significant adverse environmental impact, nor will it be environmentally controversial." This section could be enhanced by presentation of the Service's concerns.

d. Pages III-3 and III-5. We are pleased that the golf course and shoreline park will be used to retain and settle surface run-off from the residential community and the upland drainage areas.

e. Page IV-9. Wildlife. This section should discuss the use of Apokeo fish ponds and other wetlands in the project area by endangered Hawaiian waterbird and migratory waterfowl.

f. A map showing the distribution of wetlands within the project site and their location relative to the housing developments, golf course, and shoreline park would be valuable in determining potential impacts to these habitats.

g. Appendix B. At least four nests of the endangered Hawaiian Duck (Anas wyvilliana), three pairs of the endangered Hawaiian Moorhen (Gallinula chloropus sandvicensis), at least 25 Hawaiian Coots (Fulica americana alai), and at least 18 Hawaiian Stilts (Himantopus mexicanus knudseni) were observed by refuge staff at the Honouliuli refuge in 1987. In addition, sightings of endangered waterbirds have also been made in the fishponds and wetlands near the refuge. Wetlands in the Pearl Harbor area do provide habitat for these endangered Hawaiian waterbirds.

Summary Comments

We ask that the Draft EIS be revised to address the concerns raised in this letter. Please contact staff biologist Andy Yuen (541-2749) for additional information.

Sincerely,

Ernest Kosaka

Ernest Kosaka, Field Supervisor
Environmental Services
Pacific Islands Office

cc: RW
DLNR
CZM, DBED
Land Use Division, DBED
Land Use Commission

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4181

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

December 11, 1987

Mr. Ernest Kosaka, Field Supervisor
Environmental Services
U. S. Department of Interior
Fish and Wildlife Service
P.O. Box 50167
Honolulu, Hawaii 96850

Dear Mr. Kosaka:

Subject: Draft Environmental Impact Statement (DEIS) for the West Loch Estates Subdivision Ewa Oahu, Hawaii

Thank you for the comments contained in your letter of November 23, 1987 on the Draft Environmental Impact Statement (DEIS) for the proposed West Loch Estates. The comments have been reviewed by Dr. Andrew J. Berger the wildlife consultant and our staff and we respond as follows:

1. General Comments

The extensiveness of the prior consultation as described in your letter is acknowledged. It is indicative of our efforts to ensure that the impact of the project on the Wildlife Refuge is minimized or appropriately mitigated.

2. Specific Comments

The liklihood of increased numbers of stray cats, dogs and wild mongooses is a recognized concern, however, identifying mitigation measures that are both cost-effective and practical, is extremely difficult.

At present, we note that the Refuge is surrounded by a chain-link fence and that recent changes increasing the use of "nesting islands" should discourage intrusion and predation by feral animals. These measures would be supplemented by the substantial landscaped area that will act as a buffer between the Refuge and the residential subdivision to further discourage entry and minimize any adverse effects of light, noise and activity associated with urbanization. We

also note, however, that Dr. Berger has cited in his study (attached as Appendix B) his own findings as well as those of Ronald L. Walker (State Division of Fish & Wildlife), that endangered species at Kanaha Pond, Paiko Lagoon, and Keehi Lagoon "are highly tolerant of human activities in the vicinity of their feeding and resting areas." (pp. 23, 24 Berger's study). Berger further states that "small nesting islets within the Refuge provide the vital ingredient of safe nesting sites for the birds." These will reduce the overall potential for predation by pet dogs and cats. Page V-9 will be revised to reflect these responses.

The recommended mitigation measures were reviewed by Dr. Berger and found to be either infeasible due to the difficulty of enforcement, costs and liability or result in an undesirable effect upon the relationship between the Refuge and the adjacent community. Each is separately discussed below:

(1) Covenants prohibiting the ownership of cats and dogs are, as a practical matter, unenforceable and subject to legal challenge, particularly from homeowners with pets, or those wishing to acquire dogs for security purposes.

(2) Construction of an additional fenceline and/or a moat around the refuge would entail acceptance of a major cost by the project which would adversely impact its affordable housing objectives.

(3) Enforcement of existing leash laws is an ongoing problem that is subject to resource limitations of the Humane Society and the Honolulu Police Department.

(4) Trapping of pet dogs and cats could create ill-feeling toward the Refuge and result in a backlash and vandalism.

b) The concerns regarding the need for an adequate buffer zone and landscaping to provide a visual and auditory screen for the Refuge have been provided to the project consultants. They will be formulating design alternatives that will be considered within the constraints of cost and practicality. At present, the use of smaller lots and higher densities is already necessary to minimize costs and alleviate the need for affordable housing.

c) Page II-9: Impacts and Mitigating Measures. The statement contained in this section were made based on the summary conclusions of our technical consultant's findings; further, the preliminary design providing for a substantial buffer is viewed as being the most practical and cost effective mitigation measure available at this time. As noted earlier, identifying appropriate mitigation measures for use as a part of this project is difficult. We are therefore very much appreciative of your agreement to survey FWS offices

elsewhere to determine whether other feasible alternatives are available for consideration.

d) Pages III-3, 5: Your comments are acknowledged.

e) Page IV-9, Wildlife: The future use of the Apokeo fish ponds will be discussed in the separate EIS currently being prepared for the Golf Course and Shoreline Park.

f) The housing components of the West Loch Estates project do not impinge upon wetland areas. The Honouliuli flood plain which contain these wetland areas is being developed as a golf course and shoreline park which, as noted above, will be discussed in a separate EIS that is currently being prepared.

g) The information regarding staff sightings of endangered birds has been provided to Dr. Berger by copy of this letter. We appreciate your sharing this information with us.

We appreciate the comments offered by your agency and plan to continue working closely with your office as the planning of this project continues. Thank you very much.

Robert Mizuguchi for
Mike Moon
Director

LU 1484-5026

United States Department of the Interior

GEOLOGICAL SURVEY

WATER RESOURCES DIVISION 87 OCT 28 PM 1 59
P.O. Box 50166
Honolulu, Hawaii 96850 [illegible]

October 27, 1987

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

Dear Mr. Whalen:

Subject: West Loch Estates, West Loch, Ewa, Oahu

The subject draft environmental impact statement was reviewed by our staff. We have no comments to make at this time.

We appreciate the opportunity to review the subject report and are returning it for your future use.

Sincerely,

Dana R. Davis
Acting District Chief

Enclosure

cc: Mr. Mike Moon, Dept. of Housing & Community Development, HI 96813

NO RESPONSE NEEDED

Hawaiian Electric Company, Inc. • PO Box 2750 • Honolulu, HI 96840-0001

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NOV 5 PM 1 58
OF LAND UTILIZATION
HONOLULU

November 3, 1987

Brenner Munger, Ph.D., P.E.
Manager
Environmental Department
(808) 548 6880

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

Dear Mr. Whalen:

Subject: Draft Environmental Impact Statement for West Loch Estates, West Loch, Ewa, Oahu, Hawaii

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

1. HECO has no existing 138KV transmission lines crossing or in close proximity to the subject development. However, our present route selection study for the proposed Waiau-CIP 138KV line indicates that it may be impacted by the subject development.

2. The proposed Ewa Nui Substation appears to be within the boundaries of this project.

Sincerely,

Brenner Munger

cc: Mr. Mike Moon, Director
Department of Housing and
Community Development

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4181

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

December 11, 1987

Dr. Brenner Munger, Manager
Environmental Department
Hawaiian Electric Company, Inc.
P. O. Box 2750
Honolulu, Hawaii 96840-0001

Dear Dr. Munger:

Subject: Draft Environmental Impact Statement (DEIS) for West Loch Estates, Ewa, Oahu, Hawaii

This is in response to your letter dated November 3, 1987 commenting on the subject DEIS.

Your comments have been made available to our engineering consultants for use in the planning of the project. They will be in contact with your firm as the design engineering progresses to ensure that all utility requirements are properly met.

Thank you very much.

Robert Miyasato
for Mike Moon
Director

HAWAII'S THOUSAND FRIENDS

Ke aloha o ke kāko'o 'āina, 'O ia ka mana i kū pa'a. Pilikoa ka 'āina, Mānoa ka po'e.
The Love of our land, is the power for us to stand fast. Rare is the land, many are the people.

November 23, 1987

'87 NOV 24 P1:19
DEPT. OF HOUSING & COMM. DEVELOPMENT

Mr. John P. Whalen, Director
Department of Land Utilization
650 South King Street
Honolulu, Hawai'i 96813

Re: West Loch Estates Draft Environmental Impact Statement (DEIS)

Dear Mr. Whalen:

Hawaii's Thousand Friends is a non-profit land use planning organization appreciative for the opportunity to comment on this project, but disappointed that it was recently separated from its golf course and seaward park components. We believe these elements are intrinsic parts of the total community you have planned, no matter who funds which, and regardless of which administrative agency is responsible for overview. It is most difficult to assess cumulative impacts when parts are piece-mealed. We urge that you merge the segments in a supplemental environmental impact statement, and find in-house solutions for the reasons which have led you to separate them.

Hawaii's Thousand Friends is a supporter of the "Second City" concept and endorses, in general, the intent of this plan.

However, in developing the FEIS, we also hope that you will alter the plan's existing mix of housing needs to include a substantial percentage of housing (perhaps 10 percent) to meet the desparate needs of many residents for low cost housing. We are sure many of the Waiola applicants would deeply appreciate an opportunity to qualify for such housing dispersed throughout the West Loch project. Such amalgamation has proven to increase desire for self-reliance, and to increase perception of self-worth for the poor of other communities, to the benefit of society. This would also allow for relocation of Ho'ae'ae tenants, many of whom are poor, thus mitigating many of their problems, fears, and the trauma of disruption.

We do not believe you have been served well with you consultant's wildlife review, as he has not addresses cumulative impacts for the island ecosystem. Too many havens for migratory waterfowl have been altered, filled, or developed on O'ahu, intensifying the need for care being given to the remaining havens. Native waterfowl are also reducing in numbers, increasing the need for protecting even pockets of habitat which may remain. Dr. Berger regrets the past; it is up to enlightened planners to now more sensitively address the future. We hope that Mr. Kosaka (USFWS) has since taken you on the tour he has suggested. It should be noted that ponds and shoreline of the golf course might also be attractive to waterbirds; therefore, the whole project should be evaluated together. Will any work in the floodplain to develop the golf course or shoreline park require fill? What will be the role of the ancient fishponds? Will they be filled, or utilized as features of the course?

941 River Street Suite 202 Honolulu, Hawai'i 96817 (808) 538-1296

We are concerned with the paucity of archaeological work done, and the conclusions drawn. In the nearby Ewa plain, many sites were found sub-surface in cavities: all are to be destroyed by fill for resort. It is our hope that additional work can be effected to ensure that features likely to be found can be protected and their heritage incorporated into the new neighborhoods.

We are pleased that amenities such as the park and ride, senior housing, child care facilities, etc., have been recognized as essential, and commend you for their inclusion. We are less sure that the Navy will happily accept this civilian "encroachment," but trust that some amicable solutions may be found.

Thank you again for the opportunity to comment on this project.

Sincerely,

Muriel B. Seto

Muriel B. Seto,
Executive Director,

cc: Mike Moon, Director, Dept. of Housing & Community Development

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4181

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYABATO
DEPUTY DIRECTOR

December 11, 1987

Mrs. Muriel B. Seto
Executive Director
Hawaii's Thousand Friends
941 River Street, Suite 202
Honolulu, Hawaii 96817

Dear Mrs. Seto:

Subject: Draft Environmental Impact Statement (DEIS) for the West Loch Estates Subdivision, Ewa, Oahu

Thank you for the comments contained in your letter of November 23, 1987 on the Draft Environmental Impact Statement (DEIS) on the proposed West Loch Estates project. We have reviewed your comments and respond as follows:

1. Preparation of Separate EIS Documents

   The decision to prepare separate EIS documents for the residential and golf course/shoreline park components of the project, though based largely on administrative considerations, also recognized that development within the wetland areas would pose a number of environmental issues requiring specialized study and evaluation. The fact that the project components will eventually interact and result in cumulative impacts is recognized. However, preparation of separate EIS documents will provide a better opportunity to address the individual impacts which are significant with respect to each component.

2. This project is consistent with, and enhances the concept of, the Second Urban Center. We apreciate your endorsement and support.

3. The West Loch Estates is intended to address the housing needs of the gap-group which represents a very substantial segment of Honolulu's population. The needs of lower income households are also recognized and the development of the elderly housing has been planned as a means of addressing the needs of this group. The relocation needs of those residing at Ho'ae'ae Point are also being addressed and discussions currently underway with them.

As a final matter, the affordable housing objectives of this project are targeted for largely the same income groups that the Waiola Estates Subdivision project would have served had it been approved. We anticipate that many "Waiola applicants" will finally be able to purchase a home in the West Loch Estates.

4. We believe your comments regarding wildlife, water fowl and the U.S. Fish and Wildlife Service Refuge are appropriate subjects for discussion in the EIS being prepared for the Golf Course and Shoreline Park.

5. The archaeological consultant, Dr. Paul H. Rosendahl found that the residential areas of the project do not contain any sites of significant archaeological or historic value. He has been conducting field survey work in the Honouliuli flood plain as a part of preparing the EIS for the golf course and a park, and his findings will be included in that document. You can be assured that any findings of significance will be handled within guidelines provided by the State Historic Preservation Office.

6. We appreciate your favorable comments on the community facilities planned for the residential component of the project. We have been meeting with the U.S. Navy regularly and believe their concerns can be satisfactorily resolved.

Thank you again for your comments and continuing interest.

Robert Miyabato
for Mike Moon
Director

XIV. REFERENCES

1. Bureau of the Census, 1971, 1980 census of Population and Housing, PHC 80-2-183, U.S. Department of Commerce.

2. Department of Education, 1986, "Enrollment Projections of the Public Schools in Hawaii 1985-1990, State of Hawaii.

3. Department of Housing and Community Development, 1986, Final Environmental Impact Statement, Waiola Estates Subdivision, City and County of Honolulu.

4. Department of Planning and Economic Development, 1986, Data Book 1986: A Statistical Abstract, State of Hawaii.

5. Foote, Donald E. etal, 1973, Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii. Soil Conservation Service, U.S. Department of Agriculture.

6. Land Study Bureau, 1972, Detailed Land Classification-Island of Oahu, University of Hawaii, Honolulu, Hawaii.

7. National Flood Insurance Program, 1987, FIRM Flood Insurance Rate Map City and County of Honolulu, Hawaii, Federal Emergency Management Agency.

XV. LIST OF PREPARERS

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XVI. APPENDICIES

APPENDIX A

Botanical Survey
West Loch Estates
Ewa District, Island of Oahu

by

Winona P. Char

CHAR & ASSOCIATES

September 1987

BOTANICAL SURVEY

WEST LOCH ESTATES

'EWA DISTRICT, ISLAND OF O'AHU

by

Winona P. Char

CHAR & ASSOCIATES
Botanical/Environmental Consultants
Honolulu, Hawaii

Prepared for: R. M. TOWILL CORPORATION
September 1987

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BOTANICAL SURVEY
WEST LOCH ESTATES
'EWA DISTRICT, ISLAND OF O'AHU

INTRODUCTION

The Department of Housing and Community Development, City and County of Honolulu, plans to develop approximately 450 acres of land in the 'Ewa District. The proposed West Loch Estates Development will include residential units, a golf course, and a number of waterfront parks along its West Loch boundary. The proposed project will require the preparation of an Environmental Impact Statement (EIS) in accordance with Chapter 343 of the Hawaii Revised Statutes. A flora survey to describe the major vegetation types; inventory the species; search for rare, threatened and endangered species; and identify areas of probable environmental problems or concerns was conducted on 30 and 31 July 1987. The findings of this survey will be incorporated into the EIS.

The project area consists largely of gently sloping lands, most of which are presently under sugar cane cultivation by Oahu Sugar Company. Abandoned cane fields covered by weedy species occupy the northern portion of the project area. Scattered patches of scrub vegetation are generally found along the margins of the cane fields. Pasturelands are found in the middle portion of the property and wetlands, composed of mangrove swamp and cattail-bulrush marsh, occur along the West Loch margin.

The vegetation types found on the project area are composed primarily of introduced (or alien) species. Of a total of 164 species inventoried during this survey, 142 or 86.6% are introduced species. No federal and/or state listed, proposed or candidate endangered and threatened plant species were found on the project area.

SURVEY METHODS

Prior to undertaking the field survey, a search was made of the pertinent literature to familiarize the principal investigator with other botanical studies in the general area.

Existing topographic maps and recent aerial photographs were examined to determine access, terrain characteristics, and potential logistical and technical problems. The major access onto most parts of the project area was provided by the unpaved roads which run through the site. Tentative vegetation types were delineated from the aerial photographs and later ground-checked.

A walk-through survey method was employed. Species identifications were made in the field; plants which could not be positively identified were collected for later determination in the laboratory and herbarium. Notes were made of the species present in each vegetation type. The species recorded are indicative of the time and environmental conditions under which the survey was conducted. A survey taken during the rainy season (November through January) would no doubt yield variations in abundance ratings, especially of the annual species. Slight differences in the number of species inventoried would also be expected.

DESCRIPTION OF VEGETATION TYPES

A number of botanical surveys have been made in the 'Ewa Plains area. Two studies pertinent to the West Loch Estates Development are discussed below. The U. S. Fish and Wildlife Service (USFWS) funded a general botanical reconnaissance survey (Char and Balakrishnan 1979) of the entire 'Ewa Plains area which also included the proposed West Loch Estates Development. The focus of this survey was to locate and map listed, proposed or candidate threatened and endangered plant species. The nearby West Loch Branch of Naval Magazine Lualualei (NAVMAG LLL) was recently surveyed during the Navy's biological and water resources studies (Hawaiian Agronomics 1986).

Most of the vegetation types described in these two reports also occur

on the West Loch Estates Development area. Sugar cane fields cover areas which are actively cultivated, while vegetation types dominated by introduced species, mostly koa-haole and kiawe, occur on the more or less undisturbed sites. No threatened and endangered plant species were recorded from the proposed West Loch Estates Development site in the USFWS report and none were found on the nearby NAVMAG LLL, West Loch Branch.

In this botanical survey report, seven major vegetation types are recognized on the project area and are discussed in detail below.

Abandoned Cane Fields (aC)

A large parcel of land formerly under sugar cane cultivation is found on the northern sector of the project area adjacent to Waipahu town. Roughly 65.8 acres of this parcel is planned for residential use; the remaining acreage will be incorporated into the planned waterfront park.

The vegetation on the abandoned cane fields is composed primarily of Guinea grass (Panicum maximum), which forms dense clumps up to 3 to 4 ft.high. Other commonly occurring grass species are buffelgrass (Cenchrus ciliaris), swollen fingergrass (Chloris inflata), and sourgrass (Tricachne insularis).

Scattered frequently throughout the grass cover are small, shrubby plants such as 'uhaloa (Waltheria indica var. americana), hoary abutilon (Abutilon incanum), weedy achyranthes (Achyranthes aspera), spiny amaranth (Amaranthus spinosus), fuzzy rattlepod (Crotalaria incana), indigo (Indigofera suffruticosa), and cow-pea (Macroptilium lathyroides). In some places, these shrubby species, especially the last three mentioned above, may form localized patches and be the dominant plant cover.

Along the edges of these abandoned cane fields, woody, perennial species have become established. Scattered plants of koa-haole (Leucaena leucocephala) are occasional. A few saplings of kiawe (Prosopis pallida) and 'opiuma (Pithecellobium dulce) trees can also be found here.

The network of cane-haul roads and irrigation systems which once serviced

the fields are still evident, although overgrown in some places. Small clumps of dried out sugar cane plants (Saccharum officinarum) are found scattered throughout the abandoned fields.

A number of species used in landscaping have become established in this vegetation type, usually in low numbers. These plants are associated with the trash and yard trimmings which have been dumped alongside the roads. Some of these plants include coconut (Cocos nucifera), mango (Mangifera indica), be-still tree (Thevetia peruviana), spineless opuntia (Nopolea sp.), cassava (Manihot esculenta), and monkeypod (Samanea saman).

Cane Fields (C)

The sugar cane fields which lie on the southern sector of the project area, along with their associated network of cane-haul roads and irrigation and drainage systems, cover approximately 165.8 acres. These fields are actively cultivated by Oahu Sugar Company; the lease on these fields will expire in 1990.

The cane fields occur on gently sloping, well-drained soils of alluvial origin.

Agricultural lands are geared to more or less intensive crop production and generally support monodominant stands of plants. Weedy species associated with these cultivated areas are often annual species adapted to the frequent disturbances related to cultivation practices. They are often found along the margins of fields, drainage ditches, and roads.

On the project area, weedy species frequently found in the cane fields include wild bittermelon (Momordica charantia var. pavel), little bell (Ipomoea triloba), swollen fingergrass (Chloris inflata), Bermuda grass (Cynodon dactylon), nutgrass (Cyperus rotundus), two species of amaranth (Amaranthus spinosus, Amaranthus viridus), red pua-lele (Emilia fosbergii), and hairy spurge (Euphorbia hirta). Along the drainage ways, shrubby species such as koa-haole (Leucaena leucocephala), castor bean (Ricinus communis), Chinese violet (Asystasia gangetica), and Indian pluchea (Pluchea indica) predominate. Grasses often associated with the drainage ways include Californiagrass (Brachiaria mutica), buffelgrass (Cenchrus

ciliaris), Guinea grass (Panicum maximum), and Job's tears (Coix lachryma-jobi).

Pasturelands

Pasturelands which provide forage for cattle, horses, and goats are found in the middle portion of the project area. Two types of pastureland are recognized based on the most abundant plant species. Mixed grass and herb pastures generally occur on fill lands, while Brachiaria or Californiagrass pastures are found in the Honouliuli Stream drainage area.

1. Mixed grass-herb pastures (mgh) - The largest of these pasture areas lies mauka (inland) of the Apokeo Fish Ponds; a smaller mixed grass-herb pasture lies below the highway near some homes.

A mixture of various grass and herbaceous species characterizes this vegetation type, no single species is dominant. The most common grass components are Bermuda grass (Cynodon dactylon), buffelgrass (Cenchrus ciliaris), Guinea grass (Panicum maximum), and sourgrass (Tricachne insularis); the most frequent herbaceous plants encountered are nettle-leaved goosefoot (Chenopodium murale), golden crown-beard (Verbesina encelioides), hairy horseweed (Erigeron bonariensis), hairy spurge (Euphorbia hirta), and little mallow (Malva parviflora). Patches of bare soil with a few, low-growing, matted plants of Australian saltbush (Atriplex suberecta) and kipukai (Heliotropium curassavicum) are also occasionally observed.

Two pluchea species (Pluchea indica, Pluchea odorata) occur as scattered shrubs throughout the pastures. Around the margins of the pastures, the pluchea along with koa-haole (Leucaena leucocephala) may form extensive thickets.

2. Brachiaria (Californiagrass) pastures (B) - These pastures occur in the Honouliuli Stream drainage area and the soils here are wetter. A number of smaller streams and drainages cross these pasturelands and a few wetland species are found here.

Californiagrass (Brachiaria mutica) is a spreading, long-lived perrenial species widely planted for forage throughout the tropics (Whitney et al 1939). In the Hawaiian Islands, it is one of the most important pasture grasses of lowland areas, growing best in wet localities. Californiagrass forms a dense cover which often excludes most other species.

On the project area, pastures which have been recently grazed have grass cover 1 to 2 ft. high; pastures which have not been grazed for a while may have dense mats of Californiagrass up to 4 ft. tall.

Large shrubs and trees of koa-haole (Leucaena leucocephala), Christmas berry (Schinus terebinthifolius), Indian pluchea (Pluchea indica), and kiawe (Prosopis pallida), as well as napiergrass (Pennisetum purpureum), form somewhat dense clusteres on the margins of these pastures and on elevated areas within the pastures. Where the Brachiaria pastures adjoin the Typha (cattail)-Scirpus (bulrush) marsh, scattered plants of cattail and bulrush can be found in the dense grass cover.

Wetlands

In this report, wetlands have been defined as those areas in which obligate plant species are the dominant component of the vegetation. Obligate wetland species or obligate hydrophytes are plant species which generally (more or less greater than 99% of the time) are found only in wetlands under natural conditions. Obligate species are often characterized by a number of morphological features which indicate their ability to occur in wet areas. These include pneumatophores; adventitious roots; spongy leaves, stems or roots; and floating leaves. Obligate wetland species which occur in the Hawaiian Islands have been inventoried in Elliott and Hall's Wetlands and Wetland Vegetation of Hawaii (1977).

The wetlands on the project area may be divided into marsh and swamp depending on the vegetation present. Marshes are wet areas dominated by herbaceous or nonwoody plants, frequently grasses and sedges (Fosberg (1960). Swamps are dominated by woody plants, shrubs and trees. Both types of wetland are present on the project area.

1. Rhizophora (mangrove) swamp (Rs) – The mangrove (Rhizophora mangle), a native of tropical America, was introduced into the Hawaiian Islands in 1902 on the island of Moloka'i. Since then it has spread rapidly into estuaries and sheltered coastal areas. Many of Pearl Harbor's coastal areas have become overgrown with mangrove swamps. Mangrove is considered a noxious weed by the State Department of Agriculture, Plant Pest Control Branch, as it blocks coastal and harbor waterways.

On the project area, mangrove may reach 40 ft. in height. Prop roots and aerial roots form a dense, tangled, impenetrable thicket. The mangrove swamps themselves support very few other species. Most of the other species occur along the margins of the mangrove swamp where there is more available light. These species usually include pickleweed (Batis maritima), Guinea grass (Panicum maximum), and Indian pluchea (Pluchea indica). Fruits of Rhizophora mangle germinate while still on the parent tree, this is known as vivipary. The young plants then fall to the mud or water below. In some parts of the mangrove swamp, the area beneath the larger trees is covered with a mass of young plants.

2. Typha (cattail)- Scirpus (bulrush) marsh (T-Sm) – This vegetation type occurs primarily along the margins of the Apokeo Fish Ponds; somewhat smaller areas lie in the Honouliuli Stream drainage basin.

Cattail (Typha latifolia) and bulrush (Scirpus validus) propagate rapidly by creeping underground rhizomes (or stems) and often form large, monodominant stands.

A number of obligate wetland species are associated with this vegetation type. These include Eleocharis geniculata, makai sedge (Scirpus maritimus var. paludosus), seashore paspalum (Paspalum vaginatum), duckweed (Lemna minor), and primrose willow (Ludwigia octivalvis). Widgeon grass (Ruppia maritima), an aquatic flowering plant, was found in one of the Apokeo ponds.

The cattail-bulrush marsh on the project area provides cover for aquatic wildlife including a number of endangered Hawaiian waterbirds as well

as migratory waterfowl.

Scrub (s)

Scattered throughout the project area are patches of scrub vegetation. These usually occur as irregularly-shaped strips bordering other vegetation types. The scrub vegetation generally consists of koa-haole shrubs (Leucaena leucocephala), 12 to 18 ft. tall, with scattered trees of kiawe (Prosopis pallida) and 'opiuma (Pithecellobium dulce) up to 30 or 40 ft. tall. In some places, however, the kiawe and 'opiuma trees may form somewhat dense forests. Guinea grass (Panicum maximum) often forms a dense cover beneath the taller trees and shrubs.

Old house sites are often associated with the scrub vegetation and a number of ornamental, landscape species are found in small numbers here. For example, the scrub located on a small bluff in the middle of the cane fields contains plants such as mango (Mangifera indica), date palms (Phoenix dactylifera), tamarix (Tamarix apylla), night-blooming cereus (Hylocereus undatus), pomegranate (Punica granatum), alokon (Allaeanthus sp.), red hibiscus (Hibiscus rosa-sinensis), and plumeria (Plumeria rubra).

RARE, THREATENED AND ENDANGERED SPECIES

Two officially listed federal and state endangered plant species are known from the 'Ewa Plains area. These two species are the 'Ewa Plains 'akoko (Euphorbia skottsbergii var. kalaeloana) and Achyranthes rotundata. Both species, however, are restricted to the Campbell Industrial Park and Naval Air Station, Barbers Point.

During this survey no federal and/or state listed, proposed or candidate threatened and endangered species (U.S. Fish and Wildlife Service 1980; Herbst 1987) were found on the proposed West Loch Estates Development. Other botanical surveys which have included the project area and nearby areas (Char and Balakrishnan 1979; Hawaiian Agronomics 1986) have also recorded similiar findings. No species considered "Rare" (Fosberg and Herbst 1975) occur on the project site.

RESULTS AND DISCUSSION

The vegetation on the proposed West Loch Estates Development is dominated by introduced (or alien) species. Of a total of 164 plant species inventoried, 86.6% or 142 species are introduced; 16 are indigenous, i.e., native to the islands and elsewhere; 1 is endemic, i.e., native only to the islands; and 5 are of early Polynesian introduction. There is little of botanical interest on the project site. The native species are found in similar environmental habitats throughout the islands. Some plants, such as the koali (Ipomoea cairica), koali-'awania (Ipomoea indica), 'uhaloa (Waltheria indica), and hoary abutilon (Abutilon incanum) are considered rather "weedy" natives which do well in open, more or less disturbed areas. None of the native species are considered rare, threatened or endangered. The proposed project is not expected to have a significant impact on the total island populations of these species.

While the wetlands do not contain any species of botanical significance, they do provide habitat for a number of endangered Hawaiian waterbirds. The cattail-bulrush marsh around the Apokeo Fish Ponds is especially valuable as wetland habitat. A cooperative program to manage these pond areas for wildlife should be established with the U. S. Fish and Wildlife Service.

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APPENDIX 1. PLANT SPECIES LIST, WEST LOCH ESTATES DEVELOPMENT, 'EWA DISTRICT, ISLAND OF O'AHU

In the plant species list which follows, families are listed alphabetically within each of two groups of flowering plants: Monocotyledons and Dicotyledons. Taxonomy and nomenclature follow St. John (1973) except where more recently accepted names have been used. Hawaiian names used are in accordance with Porter (1972) or St. John (1973). The following information is provided:

1. Scientific name with author citation.
2. Common English or Hawaiian name, when known.
3. Biogeographic status of the species. The following symbols are used:

   E = endemic = native only to the Hawaiian Islands

   I = indigenous = native to the Hawaiian Islands and also to one or more other geographic areas

   P = Polynesian = plants of Polynesian introduction; all those plants brought by the Polynesian immigrants prior to contact with the Western world

   X = introduced or alien = not native to the islands; brought here intentionally or accidentally after Western contact.

4. Vegetation types. Seven major vegetation types are recognized on the project area and are discussed in detail in the text. They are:

   1 = abandoned Cane fields (aC)

   2 = Cane fields (C)

   3 = mixed grass and herb pastures (mgh)

   4 = Brachiaria (Californiagrass) pastures (B)

   5 = Rhizophora (mangrove) swamp (Rs)

   6 = Typha (cattail)-Scirpus (bulrush) marsh (T-Sm)

   7 = Scrub (s)

5. Relative abundance within the different vegetation types. These ratings reflect the abundance or absence (-) of a particular species within the project area and are not applicable to areas outside the project. The following symbols are used in each vegetation type column:

A = abundant = the dominant species in a given vegetation type

C = common = distributed throughout a given vegetation type in large numbers

L = locally abundant = found in localized patches where it occurs in large numbers but otherwise occasional or uncommon in a given vegetation type

O = occasional = distributed widely throughout a given vegetation type in moderate numbers

U = uncommon = observed infrequently but more than 10 times within a given vegetation type

R = rare = observed less than 10 times within a given vegetation type.

SCIENTIFIC NAME	COMMON NAME	STATUS	VEGETATION TYPES 1	2	3	4	5	6	7
MONOCOTYLEDONS									
ARACEAE (Arum Family)									
Colocasia esculenta var. antiquorum (Schott) Hubb. & Rehd.	taro, kalo	P	-	-	-	R	-	-	-
CANNACEAE (Canna Family)									
Canna indica L.	canna	X	-	-	-	-	-	-	R
COMMELINACEAE (Spiderwort Family)									
Commelina benghalensis L.	hairy honohono	X	U	-	-	-	-	-	-
Commelina diffusa Burm. f.	honohono	X	-	-	-	O	-	-	-
CYPERACEAE (Sedge Family)									
Cyperus alternifolius L.	umbrella plant	X	-	-	-	R	-	-	-
Cyperus gracilis R. Br.	McCoy grass	X	-	-	-	R	-	-	R
Cyperus rotundus L.	nutgrass	X	U	O	-	-	-	-	R
Cyperus sp.		X	-	-	-	-	-	-	R
Eleocharis geniculata (L.) R. & S.		X	-	-	-	-	-	R	-
Scirpus maritimus var. paludosus (A. Nels.) Kuk.	makai	I	-	-	-	-	-	L	-
Scirpus validus Vahl	great bulrush, 'aka'akai, neki	I	-	-	-	O	-	A	-
GRAMINEAE (Grass Family)									
Brachiaria mutica (Forsk.) Stapf	Californiagrass	X	-	L	-	A	L	L	L
Brachiaria reptans (L.) Gard. & C. E. Hubb.		X	R	-	-	-	-	-	-
Cenchrus ciliaris L.	buffelgrass	X	C	O	C	-	-	-	O
Cenchrus echinatus L.	common sandbur	X	-	R	-	-	-	-	-
Chloris inflata Link	swollen fingergrass, mau'ulei	X	C	L	-	-	-	-	L
Coix lachryma-jobi L.	Job's tears	X	-	U	-	U	-	-	U
Cynodon dactylon (L.) Pers.	Bermuda grass, manienie	X	-	O	C	U	-	L	L

SCIENTIFIC NAME	COMMON NAME	STATUS	VEGETATION TYPES 1	2	3	4	5	6	7
Echinochloa colona (L.) Link	jungle-rice	X	-	-	-	U	-	-	R
Echinochloa sp.		X	-	-	-	-	-	R	-
Eleusine indica (L.) Gaertn.	goosegrass, wiregrass	X	-	U	-	-	-	-	U
Eragrostis cilianensis (All.) Vigno-Lutati	stinkgrass	X	-	-	-	-	-	-	R
Leptochloa uninervia (Presl.) Hitchc. & Chase	leptochloa	X	-	-	-	R	-	-	U
Panicum maximum Jacq. var. maximum	Guinea grass	X	A	L	O	L	O	U	A
Paspalum vaginatum Sw.	seashore paspalum	X	-	-	-	-	-	L	-
Pennisetum clandestinum Hochst. ex Chiov.	kikuyugrass	X	-	R	-	-	-	-	-
Pennisetum pupureum Schumach.	napiergrass, elephantgrass	X	-	-	-	L	-	U	-
Rhynchelytrum repens (Willd.) C. E. Hubb.	Natal redtop	X	-	O	-	-	-	-	O
Saccharum officinarum L.	sugar cane, ko	P	R	A	-	R	-	-	R
Setaria verticillata (L.) Beauv.	bristly foxtail	X	-	U	O	-	-	-	U
Sorghum halepense (L.) Pers.	Johnson grass	X	-	U	-	-	-	-	U
Tricachne insularis (L.) Nees	sougrass	X	O	-	O	-	-	-	O
LEMNACEAE (Duckweed Family)									
Lemna minor L.	duckweed	X	-	-	-	-	-	R	-
LILIACEAE (Lily Family)									
Aloe vera L.	aloe	X	-	-	-	-	-	-	R
MUSACEAE (Banana Family)									
Musa X paradisiaca L.	banana, mai'a	P	-	-	-	R	-	-	R
PALMAE (Palm Family)									
Cocos nucifera L.	coconut, niu	P	R	-	-	-	-	-	R
Phoenix dactylifera L.	date palm	X	-	-	-	R	-	-	R
Roystonea elata (Barbr.) Harper	royal palm	X	-	-	-	-	-	-	R
RUPPIACEAE (Ruppia Family)									
Ruppia maritima var. pacifica St. John & Fosberg	ruppia, widgeon grass	I	-	-	-	-	-	R	-

SCIENTIFIC NAME	COMMON NAME	STATUS	VEGETATION TYPES 1	2	3	4	5	6	7
TYPHACEAE (Cattail Family)									
Typha latifolia L.	common cattail	X	-	-	-	0	-	A	-
DICOTYLEDONS									
ACANTHACEAE (Acanthus Family)									
Asystasia gangetica (L.) T. Anders.	Chinese violet, asystasia	X	L	L	-	-	-	-	L
AIZOACEAE (Carpetweed Family)									
Sesuvium portulacastrum (L.) L.	'akulikuli	I	-	-	-	-	-	-	R
Trianthema portulacastrum L.		X	R	-	-	-	-	-	R
AMARANTHACEAE (Amaranthus Family)									
Achyranthes aspera L.	weedy achyranthes	X	0	-	0	-	-	-	L
Alternanthera pungens HBK.	khaki weed	X	-	-	-	-	-	-	R
Amaranthus hybridus L.	amaranth	X	-	-	-	-	-	-	R
Amaranthus spinosus L.	spiny amaranth	X	0	0	-	-	-	-	0
Amaranthus viridus L.	slender amaranth	X	-	0	-	-	-	-	U
ANACARDIACEAE (Mango Family)									
Mangifera indica L.	mango	X	R	-	-	-	-	-	R
Schinus terebinthifolius Raddi	Christmas berry	X	U	-	U	L	-	-	0
APOCYNACEAE (Periwinkle Family)									
Catharanthus roseus (L.) G. Don	periwinkle	X	-	-	-	-	-	-	R
Nerium oleander L.	oleander	X	-	-	-	-	-	-	R
Plumeria rubra L.	plumeria hybrid	X	-	-	-	-	-	-	R
Thevetia peruviana (Pers.) K. Schum.	be-still tree	X	R	-	-	-	-	-	-
ARALIACEAE (Ginseng Family)									
Brassaia actinophylla Endl.	octopus tree	X	R	-	-	-	-	-	-
Polyscias guilfoylei (Bull) Bailey	panax	X	-	-	-	-	-	-	R
BASELLACEAE (Basella Family)									
Boussingaultia gracilis Miers.	Madeira vine	X	-	-	-	-	-	-	R

SCIENTIFIC NAME	COMMON NAME	STATUS	VEGETATION TYPES 1	2	3	4	5	6	7
BATIDACEAE (Batis Family)									
Batis maritima L.	pickle weed	X	-	-	-	-	L	L	R
BIGNONIACEAE (Bignonia Family)									
Spathodea campanulata Beauv.	African tulip tree	X	-	-	-	-	-	-	R
BORAGINACEAE (Heliotrope Family)									
Cordia sp.	nena, kipukai	X	-	-	R	-	-	-	R
Heliotropium curassavicum L.		I	-	-	L	-	-	-	U
Heliotropium ovalifolium var. depressum (Cham.) Merr.		X	-	-	-	-	-	-	R
CACTACEAE (Cactus Family)									
Hylocereus undatus (Haw.) Britt. & Rose	night-blooming cereus	X	-	R	-	-	-	-	U
Opuntia ficus-cairica (L.) P. Mill.	prickly pear, panini	X	-	-	-	-	-	-	R
Nopalea sp.	spineless opuntia	X	R	R	-	-	-	-	-
CAPPARACEAE (Caper Family)									
Gynandropsis gynandra (L.) Briq.	African spider flower	X	-	-	U	-	-	-	U
CASUARINACEAE (Casuarina Family)									
Casuarina equisetifolia Stickm.	ironwood	X	-	-	-	-	-	R	-
CHENOPODIACEAE (Goosefoot Family)									
Atriplex suberecta Verdoorn	Australian saltbush	X	-	-	L	-	-	-	0
Chenopodium aff. hircinum Schrad.		X	-	-	-	-	-	-	R
Chenopodium murale L.	nettle-leaved goosefoot	X	U	0	0	-	-	-	-
COMPOSITAE (Daisy Family)									
Bidens pilosa L.	Spanish needle, beggar's tick	X	U	U	-	-	-	-	-
	herba del cabello	X	-	-	-	-	-	-	U
Calyptocarpus vialis Less.									
Crassocephalum crepidioides (Benth.) S. Moore	crassocephalum	X	-	-	-	U	-	U	-

SCIENTIFIC NAME	COMMON NAME	STATUS	VEGETATION TYPES 1	2	3	4	5	6	7
Eclipta alba (L.) Hassk.	false daisy	X	-	-	-	O	-	-	R
Emilia fosbergii Nicolson	red pua-lele, flora's paintbrush	X	O	O	-	U	-	-	-
Erigeron bonariensis L.	hairy horseweed	X	-	-	O	-	-	-	O
Pluchea X fosbergii Cooperrider & Galang	hybrid pluchea	X	-	R	R	-	-	-	-
Pluchea indica (L.) Less.	Indian pluchea	X	R	O	L	L	L	L	L
Pluchea odorata (L.) Less.	pluchea	X	R	O	O	U	R	R	L
Sonchus oleraceus L.	sow thistle, pua-lele	X	U	O	U	O	-	-	O
Tridax procumbens L.	coat buttons	X	O	-	U	-	-	-	-
Verbesina encelioides (Cav.) B. & H. ex Gray	golden crown-beard	X	O	O	O	-	-	-	O
Xanthium saccharatum Wallr.	cocklebur	X	O	U	-	R	-	-	-
CONVOLVULACEAE (Morning-glory Family)									
Argyreia nervosa (Burm. f.) Bojer	woolly morning-glory	X	R	-	-	-	-	-	-
Ipomoea aquatica Forsk.	ung-choi	X	-	-	-	R	-	-	-
Ipomoea cairica (L.) Sweet	koali	I	-	U	U	O	-	-	-
Ipomoea indica (Burm.) Merr.	koali'awania	I	-	-	-	R	U	-	U
Ipomoea obscura (L.) Ker-Gawl		X	-	R	O	-	-	-	U
Ipomoea triloba L.	little bell	X	O	L	-	-	-	-	O
Jacquemontia sandwicensis Gray	pa'u-o-Hi'i-'aka	E	O	R	-	-	-	-	R
Merremia aegyptia (L.) Urban	hairy merremia, koali-kua-hulu	I	O	U	U	-	-	-	O
Merremia tuberosa (L.) Rendle	wood rose	X	-	-	-	-	-	-	R
CUCURBITACEAE (Squash Family)									
Cucumis dipsaceus Ehrenb. ex Spach	wild cucumber	X	-	-	-	-	-	-	R
Momordica charantia var. pavel Crantz	wild bittermelon	X	O	L	-	-	-	-	O
EUPHORBIACEAE (Spurge Family)									
Euphorbia geniculata Ortega	wild spurge	X	U	-	-	-	-	-	-
Euphorbia glomerifera (Millsp.) L. C. Wheeler	glomerate spurge	X	-	O	-	-	-	-	O
Euphorbia heterophylla L.	false poinsettia	X	-	U	-	-	-	-	-
Euphorbia hirta L.	hairy spurge	X	-	O	O	-	-	-	O
Euphorbia prostrata Ait.	prostrate spurge	X	-	-	-	-	-	-	U

SCIENTIFIC NAME	COMMON NAME	STATUS	VEGETATION TYPES 1	2	3	4	5	6	7
Jatropha curcas L.	physic nut	X	-	-	-	-	-	-	R
Manihot esculenta Crantz	cassava, manihot	X	R	-	-	-	-	-	-
Ricinus communis L.	castor bean	X	U	L	U	O	-	-	O
LABIATAE (Mint Family)									
Hyptis pectinata (L.) Poir.	comb hyptis	X	-	-	-	R	-	-	U
Leonotis nepetaefolia (L.) Ait. f.	lion's-ear	X	O	U	-	-	-	-	O
LEGUMINOSAE (Pea Family)									
Acacia farnesiana (L.) Willd.	klu	X	R	R	-	-	-	-	-
Canavalia cathartica Thouars	mauna-loa	X	-	R	-	-	-	-	-
Cassia bicapsularis L.		X	R	-	-	-	-	-	-
Cassia surattensis Burm.	kolomona	X	-	-	-	-	R	-	-
Cassia sp.		X	-	-	-	-	-	-	R
Crotalaria incana L.	fuzzy rattlepod	X	L	O	U	-	-	-	U
Desmanthus virgatus (L.) Willd.	virgate mimosa	X	O	O	-	-	-	-	U
Desmodium tortuosum (Sw.) DC.	Florida beggarweed	X	-	O	-	-	-	-	R
Indigofera endecaphylla Jacq.		X	-	-	-	-	-	-	R
Indigofera suffruticosa Mill.	indigo	X	L	-	-	-	-	-	-
Leucaena leucocephala (Lam.) de Wit	koa-haole	X	O	L	L	L	-	L	A
Macroptilium lathyroides (L.) Urban	cow-pea, wild bushbean	X	L	-	-	R	-	-	O
Mimosa pudica var. unijuga (Ducass. & Walp.) Griseb.	sensitive plant, pua-hilahila	X	-	-	-	U	-	-	U
Phaseolus sp.		X	-	R	-	-	-	-	-
Pithecellobium dulce (Roxb.) Benth.	'opiuma	x	R	-	L	-	-	-	O
Prosopis pallida (HUmb. & Bonpl. ex Willd.) HBK.	algaroba, kiawe	X	U	-	O	L	-	U	C
Samanea saman (Jacq.) Merr.	monkeypod	X	R	-	-	-	-	-	R
Tamarindus indica L.	tamarind	X	R	-	-	-	-	-	-

SCIENTIFIC NAME	COMMON NAME	STATUS	VEGETATION TYPES 1	2	3	4	5	6	7
LOGANIACEAE (Strychnine Family)									
Buddleja asiatica Lour.	dogtail, Asiatic butterfly bush	X	-	-	-	-	-	-	R
MALVACEAE (Mallow Family)									
Abutilon grandifolium (Willd.) Sweet	hairy abutilon	X	O	U	U	-	-	-	O
Abutilon incanum (Link) Sweet	hoary abutilon	I	C	-	-	-	-	-	U
Gossypium barbadense L.	cotton	X	-	-	-	-	-	-	R
Hibiscus rosa-sinensis L.	red hibiscus	X	-	-	-	-	-	-	R
Hibiscus tiliaceus L.	hau	I	-	-	-	-	-	-	R
Malachra alceaefolia Jacq.	malachra	X	-	-	-	U	-	R	R
Malva parviflora L.	little mallow	X	-	-	O	-	-	-	U
Malvastrum coromandelianum Garcke	false mallow	X	O	-	O	-	-	-	O
Sida acuta Burm.		X	-	-	-	-	-	-	U
Sida fallax Walp.	'ilima	I	O	-	-	-	-	-	U
Sida rhombifolia L.	Cuba jute	X	-	-	-	R	-	-	O
Sida spinosa L.	prickly sida	X	U	U	O	-	-	-	-
Thespesia populnea (L.) Soland. ex Correa	milo	P	-	-	-	-	U	U	U
MORACEAE (Mulberry Family)									
Allaeanthus sp.	alokon	X	-	-	-	-	-	-	R
Ficus microcarpa L.	Chinese banyan	X	-	-	R	-	-	-	U
MORINGACEAE (Moringa Family)									
Moringa oleifera Lam.	kalamungai, horse-radish tree	X	R	-	-	-	-	-	R
MYRTACEAE (Myrtle Family)									
Syzygium cumini (L.) Skeels	Java plum	X	R	-	-	U	-	-	U
NYCTAGINACEAE (Four o'clock Family)									
Boerhavia coccinea Mill.		X	U	U	U	-	-	-	R
Boerhavia diffusa L.	alena	I	U	R	U	-	-	-	-
Mirabilis jalapa L.	common four o'clock	X	-	-	-	-	-	-	U

SCIENTIFIC NAME	COMMON NAME	STATUS	VEGETATION TYPES 1	2	3	4	5	6	7
ONAGRACEAE (Evening Primrose Family)									
Ludwigia octivalvis (Jacq.) Raven	primrose willow, kamole	I	-	-	-	R	-	R	-
OXALIDACEAE (Wood Sorrel Family)									
Oxalis corniculata L.	yellow wood sorrel, 'ihi	I	-	-	-	-	-	-	R
PASSIFLORACEAE (Passionflower Family)									
Passiflora edulis f. flavicarpa Deg.	yellow liliko'i	X	-	-	-	-	-	-	R
Passiflora foetida L.	scarlet-fruited passionflower	X	O	U	-	-	R	-	U
PLANTIGINACEAE (Plantain Family)									
Plantago major L.	common plantain	X	-	-	-	R	-	-	-
PLUMBAGINACEAE (Leadwort Family)									
Plumbago auriculata Lam.	blue plumbago	X	-	-	-	-	-	-	R
PORTULACACEAE (Purslane Family)									
Portulaca oleracea L.	common purselane, pigweed	X	U	-	U	-	-	-	U
PUNICACEAE (Pomegranate Family)									
Punica granatum L.	pomegranate	X	-	-	-	-	-	-	R
RHIZOPHORACEAE (Rhizophora Family)									
Rhizophora mangle L.	American mangrove	X	-	-	-	-	A	U	R
SOLANACEAE (Tomato Family)									
Capsicum annuum L.	chili pepper	X	R	-	-	-	-	-	U
Datura stramonium L.	jimson weed	X	-	R	-	R	-	-	-
Lycopersicon pimpinellifolium Mill.	currant tomato	X	L	-	-	-	-	-	U
Nicandra physalodes (L.) Gaertn.	apple-of-Peru	X	U	-	-	-	-	-	U
Nicotiana glauca Grah.	wild tobacco, paka	X	-	-	U	-	-	-	U

SCIENTIFIC NAME	COMMON NAME	STATUS	VEGETATION TYPES 1	2	3	4	5	6	7
Nicotiana tobaccum L.	tobacco, paka	X	-	-	-	-	-	-	R
Solanum nigrum L.	popolo	I?	U	-	-	-	-	-	U
Solanum seaforthianum Andr.	blue potato vine	X	-	-	R	-	-	-	R
STERCULIACEAE (Cocoa Family)									
Waltheria indica var. americana (L.) R. Br. ex Hosaka	hi'aloa, 'uhaloa	I	C	O	-	-	-	-	O
TAMARICACEAE (Tamarix Family)									
Tamarix apylla (L.) Karst.	Athel tamarisk	X	-	-	-	-	-	-	R
VERBENACEAE (Verbena Family)									
Stachytarpheta jamaicensis (L.) Vahl.	Jamaica vervain	X	-	-	-	R	-	-	-
ZYGOPHYLLACEAE (Tribulus Family)									
Tribulus terrestris L.	puncture vine	X	-	O	-	-	-	-	R

APPENDIX B

Terrestrial Vertebrate Animals of the West Loch Estates

by

Andrew J. Berger

Terrestrial Vertebrate Animals of the West Loch Estates

By Andrew J. Berger

This study was made on instructions received from Mr. Chester Koga in the offices of R. M. Towill Corporation on August 3, 1987, and according to details in a contract signed August 12, 1987. I talked via telephone with Ms. Colette Sakoda on August 18, 1987, and I arrived at the R. M. Towill Corporation offices at 7:15 a.m. on August 19. Field studies were conducted on August 19 and August 21, 1987. I deemed two days of field work adequate, because I have done work in the project region in the past.

The Habitat

The entire region has been drastically disturbed for more than 100 years. There is no semblance of any endemic ecosystem in the vicinity of the project area. As stated in the Environmental Impact Statement Preparation Notice for the West Loch Estates Subdivision (page 4): "The proposed site of West Loch Estates Increment I is former sugar land that is now permanently fallow. The proposed sites of Increment II and portions of the district park are presently still cultivated by Oahu Sugar Company. Portions of the proposed West Loch Beach Park are in residential and quasi-commercial uses, and portions are unused and undeveloped." Ms. Winona Char, the botanist, found no rare or threatened Hawaiian plants in the area.

Amphibians and Reptiles

There are no endemic amphibians or land reptiles in the Hawaiian Islands. All, therefore, have been introduced (either intentionally or accidentally) by man. None are endangered of threatened species and none are of any significance for an environmental impact statement.

I. Amphibians

Four species of frogs have been introduced to the island: of Oahu: the green-and-black poison-arrow frog (Dendrobates auratus), the bullfrog (Rana catesbeiana), the wrinkled frog (Rana rugosa), and the giant neotropical toad (Bufo marinus). The four species typically occupy different habitats, and none is of any concern for an environmental impact assessment (Hunsaker and Breese 1967).

II. Reptiles

1. Blind Snake, Typhylina bramina

"This small, secretive snake was apparently introduced from the Philippines in the dirt surrounding plants that were brought in for landscaping the campus of Kamehameha Boys School in Honolulu. It was first found there in January 1930" (Oliver and Shaw, 1933). These blind, worm-like snakes are rarely seen until they are flooded from underground burrows by heavy rain or unless one looks for them under branches and other debris on the ground. These harmless snakes are of no significance for an environmental assessment. They now are found on all of

the main islands (McKeown, 1978).

2. Skinks and Geckos

Eleven species of skinks (family Scincidae) and geckos (family Gekkonidae) occur on Oahu. All are foreign to the islands, all are insect eaters, and all adapt well to both urban and rural areas. They are of no significance to an impact assessment.

Birds of the West Loch/Waipio Region

Three groups of birds are found in the Hawaiian Islands: 1. endemic, 2. indigenous, and 3. introduced or alien birds.

1. Endemic Birds

These are birds that are unique to the Hawaiian Islands; they occur naturally no place else in the world. Many of these endemic birds are classified as endangered or threatened with extinction by the U.S. Fish & Wildlife Service and by the State Division of Forestry and Wildlife. Most of these endangered species are forest birds, few of them still exist on Oahu, and there is no suitable habitat on or near the project site.

Four species of endangered Hawaiian waterbirds do occur on Oahu: Koloa or Hawaiian duck (Anas whyilliana), Hawaiian gallinule or 'Alae 'Ula (Gallinula chloropus sandvicensis), Hawaiian coot or 'Alae Ke'oke'O (Fulica americana alai), and the Hawaiian stilt or Ae'O (Himantopus mexicanus knudseni).

It is because of these endangered waterbirds that we can point out that the only concern for the proposed project deals with any possible detrimental affects on the bird sanctuaries in West Loch of Pearl Harbor, specially the Waiawa and Honouliuli National Wildlife Refuges in the area. For example, when a Chevron Oil Company jet fuel pipeline ruptured on May 13, 1987, some 1,000 gallons of fuel were pumped into Waiawa spring, from which water was pumped into the Waiawa NWR. This pollution caused the death of several waterbirds and caused the desertion of at least six Hawaiian stilt nests (Stephen Berendzen, in Stine, 1987; Honolulu Star-Bulletin, May 14, 1987, page 1, and May 15, 1987, page A-3).

We note, however, that "Plans for the beach park and golf course areas will be developed to address Corps of Engineers and U.S. Fish and Wildlife Service concerns regarding alteration of wetlands and impacts on Pearl Harbor National Wildlife Refuge Honouliuli Unit" (page 5, item C. of the Environmental Impact Statement Preparation Notice).

With that in mind, I now will discuss the Hawaiian waterbirds.

1. Koloa or Hawaiian duck

To the best of our knowledge, this duck became extinct on Oahu during the 1950s. A Koloa restoration project was initiated by the State Division of Fish and Game in 1972. As of April 1979, 347 Hawaiian ducks had been released on Oahu in an attempt to reestablish the species on this island: 199 birds

were released in Kawainui Swamp; 103 at Waimea Falls Park; and 45 at Nuupia Pond on the Kaneohe Marine Corps Air Station. "Although release of cage-reared Koloa began on the windward side of Oahu in 1969, we can find no reports of the species in the Pearl Harbor area until 7/18/76, when two birds were counted on the ponds on Waipio Peninsula. Since that time, they have also been observed at the Honouliuli refuge unit. Because of the distance involved, it is questionable whether or not birds from the windward side will successfully disperse in greater numbers to this area" (Shallenberger, 1977:299). However, much more is involved than a "greater dispersal." It seems doubtful that the Pearl Harbor habitat offers the necessary food and safe nesting sites required by this ground-nesting duck. I know of no documented records of this duck nesting in the vicinity of salt water.

2. Hawaiian Gallinule

The Pearl Harbor area does not provide good habitat for the Hawaiian gallinule, and Shallenberger (1977) wrote that: "Hawaiian Gallinule are even less common in Pearl Harbor areas than are coots. No more than two birds have been reported in the Honouliuli refuge in recent years." Walker et al. (1986) reported no birds there during the summer census in 1985. Shallenberger did find the gallinule nesting at the prawn farm at Honouliuli. However, gallinule prefer fresh or brackish water to salt water so that it is doubtful that the Pearl Harbor habitat can ever be changed to provide optimal habitat for any

large numbers of gallinule. Walker et al. (1985) point out that Hawaiian gallinule habitat "consists of thickly vegetated marsh interspersed with fresh water ponds, taro patches, lagoons, reedy margins of water courses (streams, irrigation ditches, etc.) reservoirs, and wet pastures. . . . The key features of these areas for gallinules are, 1) dense stands of robust emergent vegetation near open water, 2) floating or barely emergent mats of vegetation, 3) water less than 3 feet deep and 4) fresh water as opposed to saline or brackish." The ecology of nesting by the gallinule has been discussed by Byrd and Zeillemaker (in press).

3. Hawaiian Coot

According to Shallenberger (1977:298), "Coots find far less suitable habitat in the Pearl Harbor wetlands than do stilt. No more than 3 coots have been reported on individual counts at Honouliuli refuge unit. . . . Greatest numbers in the Pearl Harbor area have generally been found in small fish ponds in the Waikele area, although HDF&G/USF&WS counts for this area average less than 15 birds." Walker et al. (1985:11) state that the Hawaiian subspecies of the coot "is not known to nest adjacent to salt water." One can conclude, therefore, that the Pearl Harbor region does not provide good habitat for the feeding and nesting of the Hawaiian coot.

4. Hawaiian Stilt

This is a subspecies of the North American black-necked stilt. The largest populations now occur on Maui and Oahu. Personnel of the State Division of Forestry and Wildlife take censuses of the Hawaiian waterbirds during the winter and the summer. The number of stilts in the state has varied from 523 birds during the winter of 1979 to 1,492 during the summer of 1986 (after the breeding season; see Walker, et al., 1986). The endangered status of all of the Hawaiian waterbirds results from a number of factors. Eggs and newly hatched young are easy prey to mongooses, cats, and dogs. The downy young also enter the water shortly after hatching, where they are prey to bass, bullfrogs, and black-crowned night herons (Berger, 1981). Sudden changes in water level also causes the destruction of nests. Of equal importance to these predators is the historical destruction of so many lowland marsh areas. A potential problem that has been very little studied in Hawaii is that of the effects of various pesticides on birds and their reproduction, although the U.S.Fish and Wildlife Service has been studying this problem on the mainland for the past 40 years (see Hall, 1987).

II. Indigenous Birds

These are species that occur naturally in Hawaii and also in other parts of the world. These birds are native to the Hawaiian Islands but are not unique to them. In this category are 22 species of seabirds, the Hawaiian black-crowned night heron, and a number of migratory species that spend their winter

or non-breeding season in the islands.

1. Black-crowned night heron, Nycticorax n. hoactli.

The 'Auku'u is considered to be an indigenous rather than an endemic species because the Hawaiian birds have not been recognized as subspecifically distinct from the North American birds. Hence, it is not classified as threatened or endangered even though its fate depends upon the preservation of suitable wetlands. Although these herons feed predominantly on aquatic insects, fish, frogs, and mice, they also sometimes prey on the downy young of terns and undoubtedly on the other marsh birds. Fourteen herons were counted in Waipio Peninsula, the Honouliuli NWR, and the Waiawa NWR during the Christmas Bird Count of the Hawaii Audubon Society on December 22, 1986 (Bremer, 1987). It may be pointed out here that the State Land Board gave prawn producers "a 120-day permit to destroy black-crowned herons which have been causing economic havoc at Oahu's Kahuku prawn farm as well as other aquaculture farms statewide" (Honolulu Star-Bulletin, October 26, 1985, page A-8).

2. Winter Residents

The most conspicuous of these birds is the lesser golden plover (Pluvialis dominica fulva), which occurs from sea level to about 10,000 feet elevation on Hawaii and Maui. The birds frequent lawns in residential areas, golf courses, weedy pastures, open areas in the mountains, and mud flats along the shore. However, a number of other shorebirds and

ducks spend the winter season in the islands. Some 13 species were observed on one day during December 1986 (Bremer, 1987). None of these migratory species is endangered or threatened and their occurrence is of no concern in an environmental assessment.

3. Seabirds

There are no nesting seabirds in the vicinity of the project site.

III. Introduced or Alien Birds

More than 170 species of alien birds have been intentionally introduced to the Hawaiian Islands. The following have been reported in the Waipio/West Loch region.

A. Order Ciconiiformes

b. Family Ardeidae, Herons

1. Cattle egret, Bubulcus ibis.

This egret was imported to Hawaii to "aid in the battle to control house flies, horn flies, and other flies that damage hides and cause lower weight gains in cattle" (Breese, 1959). Most of the funds were provided by ranchers to have the birds released on their land. Cattle egrets were released on Oahu in 1959 and 1961. Thistle (1962) reported that the population of egrets on Oahu exceeded 150 birds by July 1962; 621 egrets were counted by personnel of the State Division of Forestry and Wildlife during January 1986 (Walker et al.,

1986); and 116 egrets were counted in the Waipio region December 22, 1986 (Bremer, 1987). Thus, the Cattle egret is an abundant species in the Pearl Harbor area and I saw several flocks of 25 and more birds,

B. Order Galliformes

b. Family Phasianidae, Pheasants, Quail, Partridges

2. Ring-necked pheasant, Phasianus colchicus

According to Caum (1933), this Asian pheasant was introduced to the islands in 1865 "probably by Dr. Hillebrand." It also has been imported a number of times since then "through dealers in the United States as well as from the territorial game farm on Oahu" (Schwartz and Schwartz, 1949). It now is not a very successful species on Oahu. Hunters killed 235 birds during the 1960-1961 hunting season, but only one bird was reported during the 1983-1984 season (Saito, 1984). I did not see any pheasants during my recent field work, but four birds were reported on the Christmas count on December 22, 1986 (Bremer, 1987).

C. Order Columbiformes

c. Family Columbidae, Pigeons and Doves

3. Rock Dove or feral Pigeon, Columba livia

The pigeon probably was the first exotic bird

introduced to the Hawaiian Islands; its importation has been traced back to 1796. Schwartz and Schwartz (1949) wrote that feral pigeons roost and nest the year around in sheltered portions of cliffs along the sea coast, in rocky gulches, and in collapsed lava tubes up to 10,000 feet on Mauna Kea. They noted that "in certain places where rookeries are accessible to humans, it was and still is the custom for local residents to periodically take the squabs for food." These authors also found heavy parasitism by tapeworms, and they stated that tapeworm infestation retards proper nutrition and "occludes the intestine, produces undesirable toxins, and hinders breeding." Kishimoto and Baker (1969) reported finding the fungus Cryptococcus neoformans in 13 out of 17 samples of pigeon droppings collected on Oahu. The full singificance of their findings has not yet been determined, but, in humans, this fungus causes a chronic cerebrospinal meningitis; Hull, 1963:468) remarked that "in all but the cutaneous form the prognosis [in humans] is very grave." The rock dove is found in the project area.

4. Lace-necked or Spotted Dove, Streptopelia chinensis.

This Asian dove was introduced to the islands at an early date; the exact date is unknown, but

the birds are said to have been very common on Oahu by 1879. The species is now common to abundant on all main islands, and, like the other doves in Hawaii, is classified as a game bird. Although this dove occurs where the rainfall exceeds 100 inches per year, the highest densities are found in drier areas where the introduced kiawe is one of the dominant plants. Schwartz and Schwartz (1949) estimated densities as great as 200 birds per square mile in dry areas on Molokai. It is a common bird in the fallow cane fields, along cane haul roads, and in residential areas.

5. Barred or Zebra Dove, Geopelia striata

This dove is said to have been introduced to Hawaii sometime after 1922 (Bryan, 1958). It has been a remarkable successful species and it is now abundant on all of the islands. The zebra dove also prefers drier areas where seeds are abundnat. Schwartz and Schwartz (1949) estimated densities as great as 400 to 800 birds per square mile in some areas on Oahu (e.g., from Barber's Point to Makaha) and on Molokai. One study of the food habits of this dove in Hawaii revealed that the diet consists of 97 percent seeds and other plant materials; the 3 percent animal matter included several species of beetles, weevils, and wireworm

larvae. The zebra dove is an abundant species throughout the project area.

D. Order Strigiformes

d. Family Tytonidae, Barn Owls

6. Barn owl, Tyto alba pratincola

Barn owls differ from other owls in that they have a heart-shaped facial disc of feathers, hence, the name "mokey-faced owl." Barn owls were first released on Oahu in 1959. Like the mongoose much earlier, the owls were introduced with the hope that they would prey upon rats in sugarcane fields. Few studies of the food habits of the barn owl have been conducted in Hawaii, but one study revealed that about 90 percent of the food consisted of house mice (Tomich, 1971). Byrd and Telfer (1980) reported that barn owls had killed more than 100 seabirds and their chicks on Kauai and Kaula island. These owls are nocturnal in habits and I did not see any during my daytime field work. However, Bremer (1987) reported four barn owls in the Waipio area during December 1986.

E. Order Passeriformes

e. Family Alaudidae, Skylarks

7. Eurasian skylark, Alauda arvensis

The first skylarks were brought to Hawaii from

England in 1865; others were imported from New Zealand (where they had previously been introduced from England in 1864) in 1870. Henshaw (1904) wrote that the introduction of the Skylark to Oahu had been "a great success," and that some birds had been released on the windward side of Hawaii. Skylarks were fairly common in suitable habitat on Oahu 20 years ago, but have become increasingly uncommon in many areas as the years have passed. The Waipio region continues to provide good habitat for the skylark and 17 birds were counted there during December 1986 (Bremer, 1987).

f. Family Pycnonotidae, Bulbuls

8. Red-vented bulbul, Pycnonotus cafer

Although all members of this Old-world family are listed as "prohibited entry" by the State Quarantine Division of the Department of Agriculture, two species are now well established on Oahu.

The history of the spread of this species since the mid-1960s has been discussed by Berger (1975, 1981). Bulbuls are a scourge to both fruit and flower growers. The birds eat buds, flowers, and ripe fruits of all kinds. They are found throughout the project area

g. Family Turdidae, Thrushes and Bluebirds

9. White-rumped Shama, Copsychus malabarica

Shama is the Indian name for this thrush, which is native to India, Nepal, Burma, Malaysia, and throughout Indochina. The Hui Manu imported Shamas in 1940 and released them in Nuuanu Valley "and at some homes in the 2400 block on Makiki Heights road" (Harpham, 1953). The Shama is now common on both the windward and leeward slopes of the Koolau mountain. The birds prefer lush vegetation, but seven birds were seen in the Waipio region during December 1986.

h. Family Mimidae, Mockingbirds and Thrashers

10. Mockingbird, Mimus polyglottos

Very little has been published on the mockingbird in Hawaii. The Hui Manu released birds on Oahu in 1931, 1932, and 1933. The mockingbird has a very spotty distribution on Oahu, being absent from many areas but common in others (e.g., Diamond Head, Fort Shafter, Radford Terrace, and Barber's Point). A few birds inhabit the Waipio area.

i. Family Zosteropidae, White-eyes and Silver-eyes

11. Japanese White-eye, Zosterops japonicus

Long a favorite cage bird in the Orient, this species was first imported for release by the Territorial Board of Agriculture and Forestry in 1929 (Caum, 1933). Later importation were made by the Hui Manu.

The Japanese name is Mejiro, and Mejiro clubs held singing competitions with these birds. The white-eye has been a remarkably successful introduction and this species undoubtedly is the most abundant song bird in the Hawaiian Islands. It occurs from sea level to 10,000 feet elevation on Hawaii, and it occupies near-desert areas (e.g., Kawaihae) and those with an annual rainfall of more than 300 inches. The white-eye is a very common species through the project region.

j. Family Sturnidae, Mynas and Starlings.

12. Common Indian Myna, Acridotheres tristis

This myna is native to Sri Lanka, India, Nepal, and adjacent regions. It "was introduced from India in 1865 by Dr. William Hillebrand to combat the plague of army worms that was ravaging the pasture lands of the islands. . . . reported to be abundant in Honolulu by 1879, it now is extremely common throughout the Territory" (Caum, 1933). The myna continues to be common on Oahu and it occurs in the vicinity of man and his buildings, on golf courses, and throughout the Waipio region.

k. Family Ploceidae, Weaverbirds and their allies

13. Red Avadavat or Red Munia, Amandava amandava

Known as the strawberry finch in the petstore trade, Caum (1933) wrote that "it is not known with certainty just when these birds came to Hawaii,

but it was probably sometime between 1900 and 1910. Many were imported as cage birds during this period and it is supposed that the present population is derived from individuals escaped from captivity." Ord (1967) wrote that the strawberry finch "can usually be found near grassy open areas around sugar cane fields . . . in the lowlands about Pearl Harbor." The birds still inhabit this area, and 57 birds were counted during the December 1986 Hawaii Audubon Society Christmas Count.

14. Nutmeg Mannikin or Ricebird, Lonchura punctulata

Also known as the spotted munia, this Asian species was released in Hawaii by Dr. William Hillebrand about 1865 (Caum,1933) Caum wrote that the ricebird "feeds on the seeds of weeds and grasses and does considerable damage to green rice." Rice is no longer grown in Hawaii, but the ricebird has recently become a serious pest by eating the seeds of sorghum (to be discussed under house finch). The ricebird is another abundant species on all islands. I saw large flocks during my August field trips.

15. Black-headed Munia, Lonchura malacca atricapilla

This bird also is called the chestnut mannikin and black-hooded nun. The species was first reported in the wild by Udvardy (1960), who observed 10 adults and 15 juvenile birds near West Loch,

Pearl Harbor, on April 26, 1959. Ord (1967) reported that the species was abundant "in open grassy areas around Middle Loch and West Lochs of Pearl Harbor." The species has spread since that time (e.g., to the West Beach area) and still is abdunant in the Waipio--West Loch region. More than 200 birds were counted during the Audubon Society Christmas Count during December 1986.

16. Red-eared or Common Waxbill, Estrilda troglodytes

Also called the black-rumped waxbill, this species was first reported at Diamond Head on January 2, 1966. Little has been published on this species in Hawaii but its range has expanded considerably and it now is found in the Waipio region and west at least to West Beach. More than 180 birds were counted during December 1986 in the Waipio region (Bremer, 1987).

17. House Sparrow, Passer domesticus

The house sparrow (erroneously called the English Sparrow) was first imported to Oahu in 1871 when nine birds were brought from New Zealand (where the species had previously been introduced from England). Caum (1933) wrote that "whether or not there were further importations is not known, but the species was reported to be numerous in

Honolulu in 1879." The House Sparrow in North America (first introduced to Brooklyn, New York, in 1852) became a serious pest, and tens of thousands of dollars were spent in attempting to control the population. The house sparrow apparently never became a pest in Hawaii. It is omnivorous in diet, eating weeds seeds as well as insects and their larvae. The house sparrow is common throughout the project area.

1. Family Fringillidae, Sparrows, Cardinals, and Buntings.

18. Red-crested Cardinal, Paroaria coronata

This species traditionally has been called the Brazilian cardinal in Hawaii, but the native range includes Uruguay, Paraguay, Brazil, and parts of Bolivia and Argentina. This species was released in Hawaii several times between 1928 and 1931 (Caum, 1933). This cardinal is a common species in urban and residential areas as well as in the introduced vegetation of leeward Oahu. It is widespread in the general Waipio region.

19. Cardinal, Cardinalis cardinalis

This species has been given a number of vernacular names: Virginia cardinal, Kentucky cardinal, Red cardinal. Its native range is the eastern part of North America east of the plains and northward into Ontario. The cardinal was released several times in

Hawaii between 1929 and 1931 (Caum, 1933). The species is fairly common in some lowland areas, and is a characterisitc bird of the leeward parts of Oahu. The birds visit the edges of cane fields but spend most of their time in kiawe and other thickets whether inland or along the shore. They are found throughout the Waipio area.

20. House Finch, Carpodacus mexicanus frontalis

Also known as the Papayabird in Hawaii, the house finch was introduced from California "prior to 1870, probably from San Francisco" (Caum, 1933). The house finch is now an abundant species in both urban and rural areas on all of the islands, and probably is the second most common land bird species in Hawaii now. Although house finches do eat overripe papaya and other soft fruits at times, the species is predominantly a seed eater. House finches and ricebirds caused substantial damage to the experimental sorghum crops planted on Kauai and Hawaii during 1971-1972. "A report by the Senate Committee on Ecology, Environment and Recreation says rice birds and linnets [house finch] caused a 30 to 50 percent loss in the sorghum fields at Kilauea on Kauai last year. . . . seed-eating birds at Kohala ate about 50 tons of sorghum grain in a 30-acre experimental field that was expected to

produce 60 tons" (Honolulu Advertiser, March 14, 1972, p.B-2).

The house finch is an abundant species in the Waipio region. The birds feed along the edges of cane fields, in the fallow fields, as well as in any habitat where there are weed seeds.

Mammals

I. Endemic Mammals

The only endemic land mammal in the Hawaiian Islands is the Hawaiian bat (Lasiurus cinereus semotus), a subspecies of the North American hoary bat. The Hawaiian bat occurs primarily on the Islands of Hawaii and Kauai (Tomich, 1969; Kramer, 1971; Ten Bruggencate, 1983). I know of no evidence that there is a resident population on the island of Oahu.

II. Introduced Mammals

All of these introduced species of mammals in Hawaii have proven highly detrimental to man, his buildings, products, agricultural crops and/or to the native forests and their animal life. None is an endangered species and none is of conern as far as detrimental effects resulting from the proposed project. It would, in fact, be a great boon to the islands if it were possible to exterminate all of them.

With the possible exception of the house mouse (Mus musculus), all of the smaller alien mammals prey on birds, their eggs, or young. These small mammals include the roof rat

(Rattus rattus), Polynesian rat (Rattus exulans), Norway rat (Rattus norvegicus), and the small Indian mongoose (Herpestes auropunctatus), as well as feral cats (Felis catus), and dogs (Canis familiaris). Because all of these mammals are serious pests, I did not set traplines in order to sample the nocturnal rodents. It is reasonable to assume that all of them occur in the project site (Tomich, 1969; Kramer, 1971).

Summary and Conclusions

1. A substantial portion of the project site and adjacent areas consists either of sugarcane land (some now fallow and some still under cultivation) or of a dense growth of exotic or alien trees, shrubs, vines, and grasses (especially along the shore of West Loch). In its present condition, therefore, the area properly can be called a "waste land" as far as endemic or native vegetation and its animal life is concerned.

2. There are no endemic forest birds in the project area or anywhere near it.

3. The Honoululi and Waiawa National Wildlife Refuges are of special value to the endangered Hawaiian stilt and, to a lesser degree, for the other Hawaiian waterbirds. As pointed out on page 4 (above), it is of utmost importance that no polluting substances reach these sanctuaries. This potential problem has been addressed on page 5 (item C) of the Environmental Impact Statement Preparation Notice where it states that plans for the beach park and the golf courses will be coordinated

with personnel of the U.S. Fish and Wildlife Service and the Corps of Engineers. If this is done, I see no problem in the development of the project.

A buffer zone may be necessary, but there is ample evidence that the birds become habituated to both buildings and people (see, for example, Berger, 1973, 1976; Berger and Walker, 1976).

To the best of my knowledge, the only extensive published results of research on the effects of noise on birds are those of the U.S. Environmental Protection Agency (1971, 1980). The two reports give the results of research on a number of bird species that show that birds are little affected by artificially produced noises, airplanes, and sonic booms. "It was reported that to scare birds a noise level of approximately 85 dB SPl at the bird's ear was required" (1971: 36). The two reports cite many other examples of research dealing with behavior and reproductive biology in relation to both airplane and construction noises. In Hawaii, Berger (1973), in writing about the Hawaiian stilt said that "all of the bird species that inhabit Kanaha Pond ignore automobile traffic on the highway as well as airplanes that fly over the Pond," and Kridler (in Doty, 1969), also writing about Kanaha Pond, reported that "we did not notice one instance when planes frightened ducks or any other waterbird into flight." Finally, speaking on behalf of the Board of Land and Natural Resources in testimony

before the State Senate Committee on Ecology, Environment, and Recreation on February 10, 1976, Mr. Ronald L. Walker of the then State Division of Fish and Game said, in part: "Contrary to commonly held opinion that resident and migratory waterbirds do not adapt well to habitat subjected to human disturbance, it has been our experience that the Hawaiian stilt and migratory shorebirds and waterfowl are highly tolerant of human activities in the vicinity of their feeding and resting areas. This has been demonstrated not only at Paiko Lagoon . . . , but at Keehi Lagoon off the International Airport, which is subjected to daily disturbance by aircraft, motorboats, vehicles and recreationists on foot."

4. None of the 20 species of introduced or alien birds found in the project area is an endangered species and a number have proven to be serious pests in Hawaii. The destruction to sorghum crops by the ricebird and the house finch already has been mentioned. The doves and the myna have been implicated in spreading the seeds of such noxious plants as Lantana camara. The red-vented bulbul and the Japanese white-eye cause considerable damage to ornamental flowers and to fruit crops (see Keffer, et al., 1976). The barn owl is known to eat birds on Kauai and perhaps on other islands (Byrd and Telfer, 1980). Some of the introduced birds apparently cause no damage to crops or to the endemic forest birds, and they do provide pleasure for many people. However,

development, including landscaping, actually would provide habitat for many of the introduced species.

5. All of the mammals, land reptiles, and amphibians that occur in the project area are introduced or alien mammals. Many of them are predators on birds and several are destructive to agriculture and forest lands and/or to man, his buildings, and products. None of these animals is of any significance for an environmental impact statement.

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APPENDIX C

Traffic Noise Impact Study
For the Proposed
West Loch Estates Subdivision

by

Y. EBISU & ASSOCIATES

September 1987

TRAFFIC NOISE IMPACT STUDY
FOR THE PROPOSED
WEST LOCH ESTATES SUBDIVISION

PREPARED FOR
R. M. TOWILL CORPORATION

BY
Y. EBISU & ASSOCIATES

SEPTEMBER, 1987

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1. SUMMARY

The existing and future traffic noise levels in the vicinity of the proposed West Loch Estates Subdivision were evaluated for their potential impact on present and future residences in the project environs. The traffic noise level increases along Fort Weaver Road were calculated for the CY 1991 and 1997 time periods, and traffic noise increases associated with project and non-project traffic were assessed. Increases in traffic noise of 3.8 to 4.2 Ldn are predicted to occur as a result of project and non-project traffic on Fort Weaver Road. Traffic noise increases of 0.4 to 1.3 Ldn are projected to occur as a result of project traffic on Fort Weaver Road.

Project traffic noise impacts on existing residences along Fort Weaver Road in the vicinity of Renton Road are predicted to be relatively small, with project related increases in the order of 0.5 Ldn. Although significant increases in non-project traffic noise levels are predicted to occur by 1991, existing residences should remain in the "Acceptable, Moderate Exposure" category due to the large setbacks of the residences from Fort Weaver Road.

The existing Hale O Ulu School on the west side of Fort Weaver Road is currently in the "Normally Unacceptable, Significant Exposure" category. Projected increases in non-project traffic by 1991 are expected to increase traffic noise levels at the school by 2.0 Ldn. Project related traffic is not expected to be a significant noise source at the school, with the contribution from project traffic predicted to be 0.5 Ldn.

Future traffic noise impacts on West Loch residents can be minimized by the use of buffer zones of adequate depth on the Diamond Head side of Fort Weaver Road, and along the internal roadways of the development. In order to not preclude federal assistance on the project, it is suggested that minimum setback distances to the future 65 Ldn contour be used when practical in siting future residential units. Because these setback distances are large along some sections of Fort Weaver Road, the use of other noise mitigation measures may be desirable. These other measures include the construction of sound attenuating berms or walls along Fort Weaver Road, or the use of sound attenuating windows for two story homes.

II. PURPOSE AND METHODOLOGY

The purposes of this noise study were to predict the traffic noise level increases associated with the proposed West Loch Estates Subdivision project, and to evaluate possible noise impacts on the surrounding area resulting from the project's traffic noise sources. Additionally, the possible traffic noise impacts on future residents of the proposed subdivision along Fort Weaver Road and internal roadways were evaluated.

Traffic noise predictions were performed using the Federal Highway Administration (FHWA) Noise Prediction Model (Reference 1), and traffic assignments from the traffic study for the project (Reference 2). Historical traffic counts obtained by the State Department of Transportation at stations on Fort Weaver Road (References 3 and 4) were used to develop the relationships between peak hour Leq(h) and daily Ldn traffic noise levels. (See Worksheet #1 of APPENDIX C). Natural shielding effects from the terrain features along Fort Weaver Road were included in the traffic noise prediction model. As-built plans of the roadway were used to obtain roadway and Right-of-Way elevations. Receptor elevations were assumed to be 5 FT above existing terrain.

Existing traffic noise measurements at three locations along Fort Weaver Road were obtained in August, 1987 to calibrate the noise prediction model, and to refine future traffic noise predictions. The relative noise contributions from project and non-project traffic were obtained from the traffic projections of Reference 2 for the 1991 time period. Additionally, the project plus non-project traffic volumes for the 1997 time period contained in Reference 2 were used to describe the future traffic noise environment along Fort Weaver Road. Potential traffic noise impacts resulting from non-project and project traffic in CY 1997 were identified, and possible noise mitigation measures were described.

III. NOISE DESCRIPTORS AND THEIR RELATIONSHIP TO LAND USE COMPATIBILITY

Two noise descriptors currently used to relate outdoor noise levels to land use compatibility, and to assess environmental noise in general, are the Equivalent Noise Level (Leq) and the Day-Night Average Sound Level (Ldn). Both of these descriptors are averages of instantaneous A-Weighted Sound Levels as read on a standard Sound Level Meter. In traffic noise evaluations, the averaging period for the Leq descriptor is usually an hour, and more specifically, the peak hour of traffic. In all evaluations, the minimum averaging period for the Ldn descriptor is 24 hours (by definition), with the recommended averaging period being one year for land use compatibility evaluations. Additionally, sound levels which occur during the nighttime hours of 10:00 PM to 7:00 AM are increased by 10 decibels (dB) prior to computing the 24-hour average by the Ldn descriptor. A glossary of acoustical descriptors is contained in APPENDIX B.

TABLE 1, which was derived from information contained in Reference 5, presents current federal standards and acceptability criteria for residential land uses exposed to various levels of environmental noise. As a general rule, noise levels of 55 Ldn or less occur in rural areas or urbanized areas which are shielded from high volume streets. In urbanized areas, Ldn levels generally range from 55 to 65 Ldn, and are usually controlled by motor vehicle traffic noise. Buildings which front major roadways are generally exposed to levels of 65 Ldn, and as high as 72 Ldn when the roadway is a high speed freeway. Due to noise shielding effects from intervening structures, buildings which are located within interior lots are exposed to lower exterior noise levels of 60 Ldn or less.

For the purposes of determining noise acceptability for funding assistance from federal agencies (FHA/HUD and VA), an exterior noise level of 65 Ldn or lower is considered acceptable for residential developments. This standard is applied nationally

TABLE 1

EXTERIOR NOISE EXPOSURE CLASSIFICATION
(RESIDENTIAL LAND USE)

Noise Exposure Class	Day-Night Sound Level	Equivalent Sound Level	Federal Standard (1)
Minimal Exposure	Not Exceeding 55 Ldn	Not Exceeding 55 Leq	Unconditionally Acceptable
Moderate Exposure	Above 55 Ldn But Not Above 65 Ldn	Above 55 Leq But Not Above 65 Leq	Acceptable (2)
Significant Exposure	Above 65 Ldn But Not Above 75 Ldn	Above 65 Leq But Not Above 75 Leq	Normally Unacceptable
Severe Exposure	Above 75 Ldn	Above 75 Leq	Unacceptable

Note: (1) Federal Housing Administration, Veterans Administration, Department of Defense, and Department of Transportation.

(2) FHWA uses the Leq instead of the Ldn descriptor. For planning purposes, both are equivalent if: (a) heavy trucks do not exceed 10 percent of total traffic flow in vehicles per 24 hours, and (b) traffic between 10:00 PM and 7:00 AM does not exceed 15 percent of average daily traffic flow in vehicles per 24 hours.

Source: Reference 5.

(see Reference 6), including Hawaii. Because of our open living conditions, the predominant use of naturally ventilated dwellings, and the relatively low exterior to interior sound attenuation afforded by these naturally ventilated structures, an exterior noise level of 65 Ldn in local residential neighborhoods does not eliminate all risks of noise impacts. For these reasons, and as recommended in Reference 7, a lower level of 55 Ldn is considered as the "Unconditionally Acceptable" (or "Near Zero Risk") level of exterior noise for residential uses. However, after considering the cost and feasibility of applying the lower level of 55 Ldn, government agencies such as FHA/HUD and VA have selected 65 Ldn as a more appropriate regulatory standard.

For commercial and light industrial developments, exterior noise levels in the order of 65 to 75 Ldn are considered acceptable. FIGURE 1, extracted from Reference 8, depicts suggested noise level compatibility guidelines for various land use categories. Note that for commercial land uses, "Compatible" (or "Unconditionally Acceptable") noise levels are approximately 10 Ldn higher than for residential uses. This is due to the generally higher tolerance for noise in nonresidential settings, and the higher probability of total closure and air conditioning of commercial structures. Federal agencies utilize similar land use compatibility guidelines (Table 2 of Reference 5) for commercial and light industrial developments.

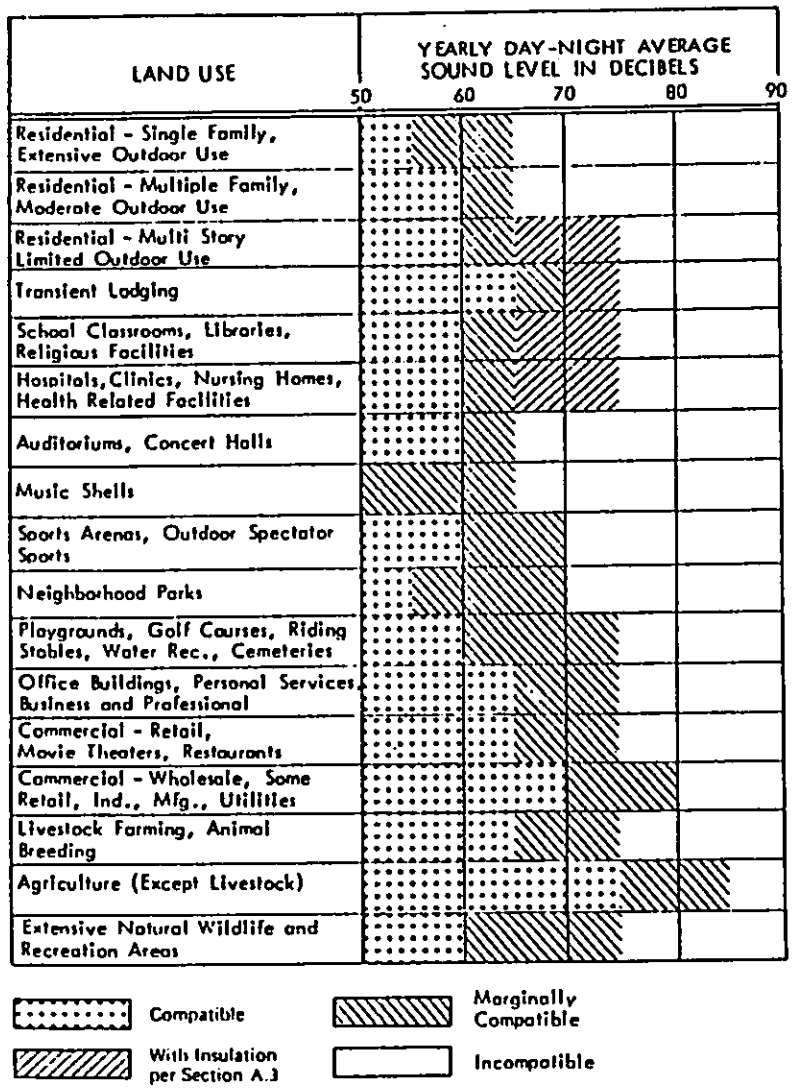


FIG. 1. Land use compatibility with yearly day-night average sound level at a site for buildings as commonly constructed [For information only; not a part of American National Standard for Sound Level Descriptors for Determination of Compatible Land Use S3.23-1980.]

IV. EXISTING NOISE ENVIRONMENT

Along the Fort Weaver Road Right-of-Way, existing traffic noise levels are in the "Significant Exposure, Normally Unacceptable" category. Existing setback distances to the 65 Ldn contour line are estimated at 235 FT and 128 FT from the centerline of the roadway at the north and south sections, respectively, of the roadway (see FIGURE 2). In the vicinity of the proposed residential subdivisions of West Loch Estates, which are located on the Diamond Head (east) side of the roadway, traffic noise levels are in the "Significant Exposure, Normally Unacceptable" category (approximately 67 to 73 Ldn) along the first row of proposed lots which will front the highway.

The results of the August, 1987 highway noise measurements are summarized in TABLE 2. The locations of the measurement sites and their relationships to the existing Ldn contours are shown in FIGURE 2. The agreement between the measured highway noise and the computed values was good at all three measurement Sites A thru C, as indicated in the last column of TABLE 2.

In the vicinity of the Renton Road intersection, existing residences of Fernandez Village are in the "Moderate Exposure, Acceptable" category due to the large setback distances (240+ FT) from the centerline of Fort Weaver Road, and due to the lower vehicle speeds near the signaled intersection. To the north, the existing Hale O Ulu School on the west side of Fort Weaver Road is exposed to traffic noise levels of 65 to 70 Ldn, which are considered "Unacceptable" for naturally ventilated schools. Existing quonset huts on the project site and south of the Honouliuli Stream Bridge are in the "Significant Exposure, Normally Unacceptable" category (approximately 65 to 70 Ldn). These existing structures will be removed under the proposed project.

Along the existing cane haul road which runs through the southern portion (Phase II) of the project, haul trucks are the dominant noise sources during the harvesting season, which occurs

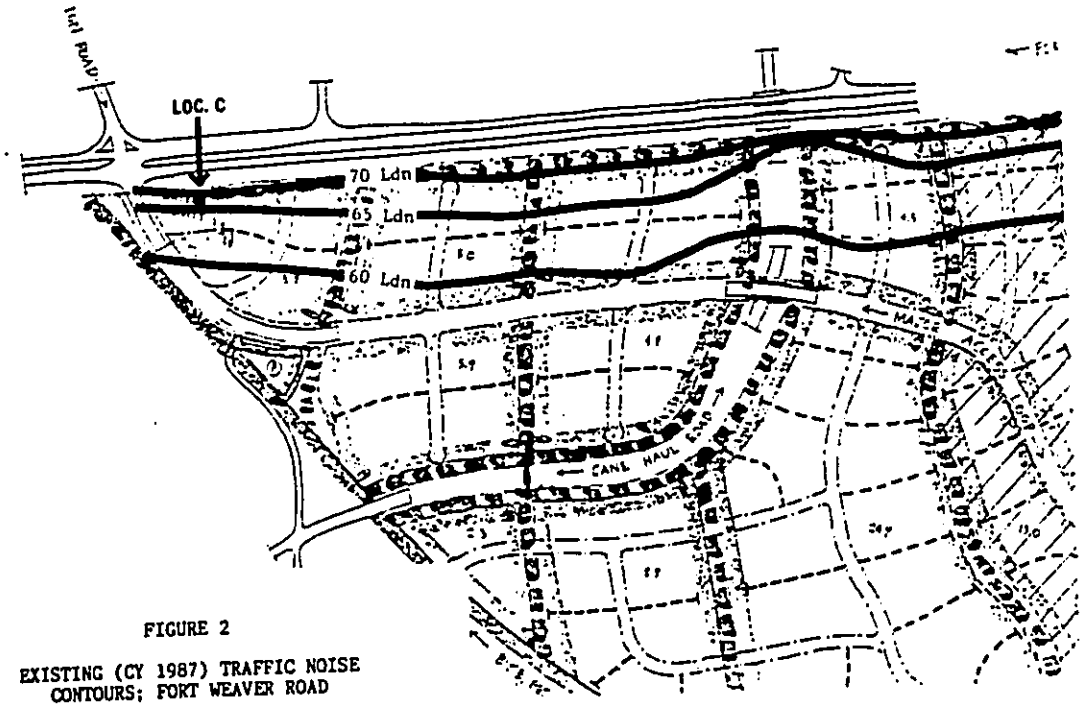


FIGURE 2

EXISTING (CY 1987) TRAFFIC NOISE CONTOURS; FORT WEAVER ROAD

(Approximate Scale: 1" = 400')

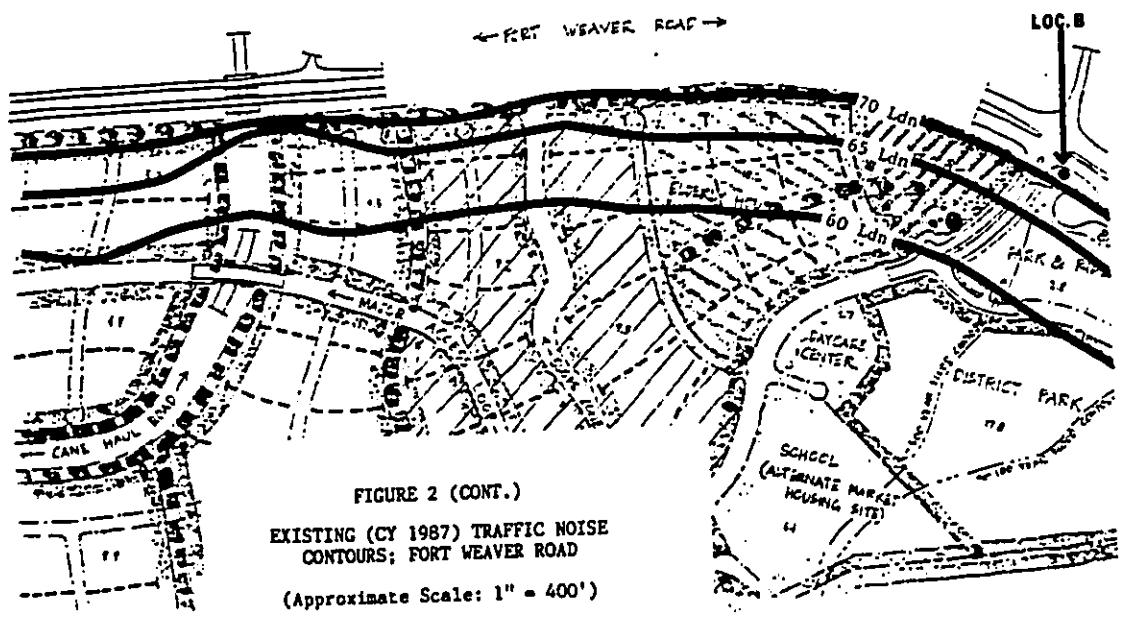


FIGURE 2 (CONT.)

EXISTING (CY 1987) TRAFFIC NOISE CONTOURS; FORT WEAVER ROAD

(Approximate Scale: 1" = 400')

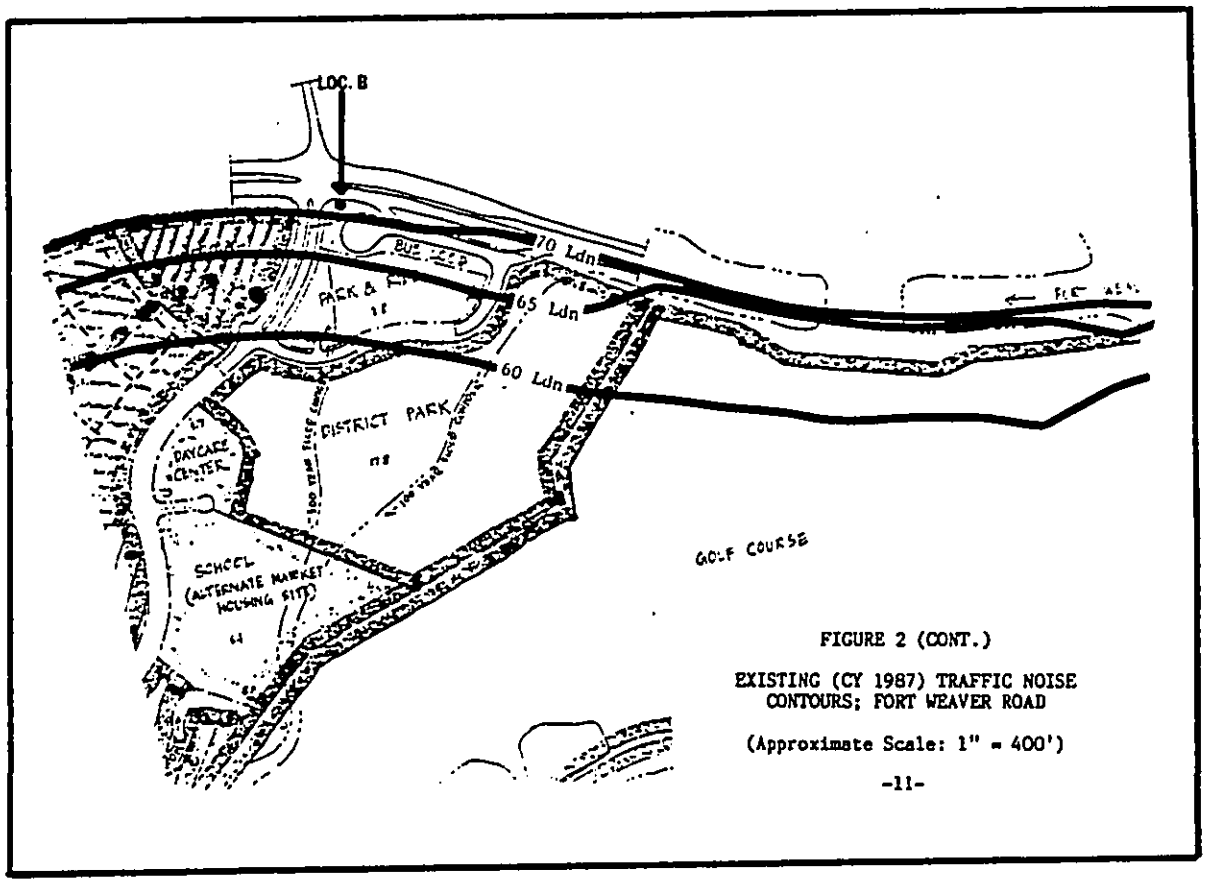


FIGURE 2 (CONT.)

EXISTING (CY 1987) TRAFFIC NOISE CONTOURS; FORT WEAVER ROAD

(Approximate Scale: 1" = 400')

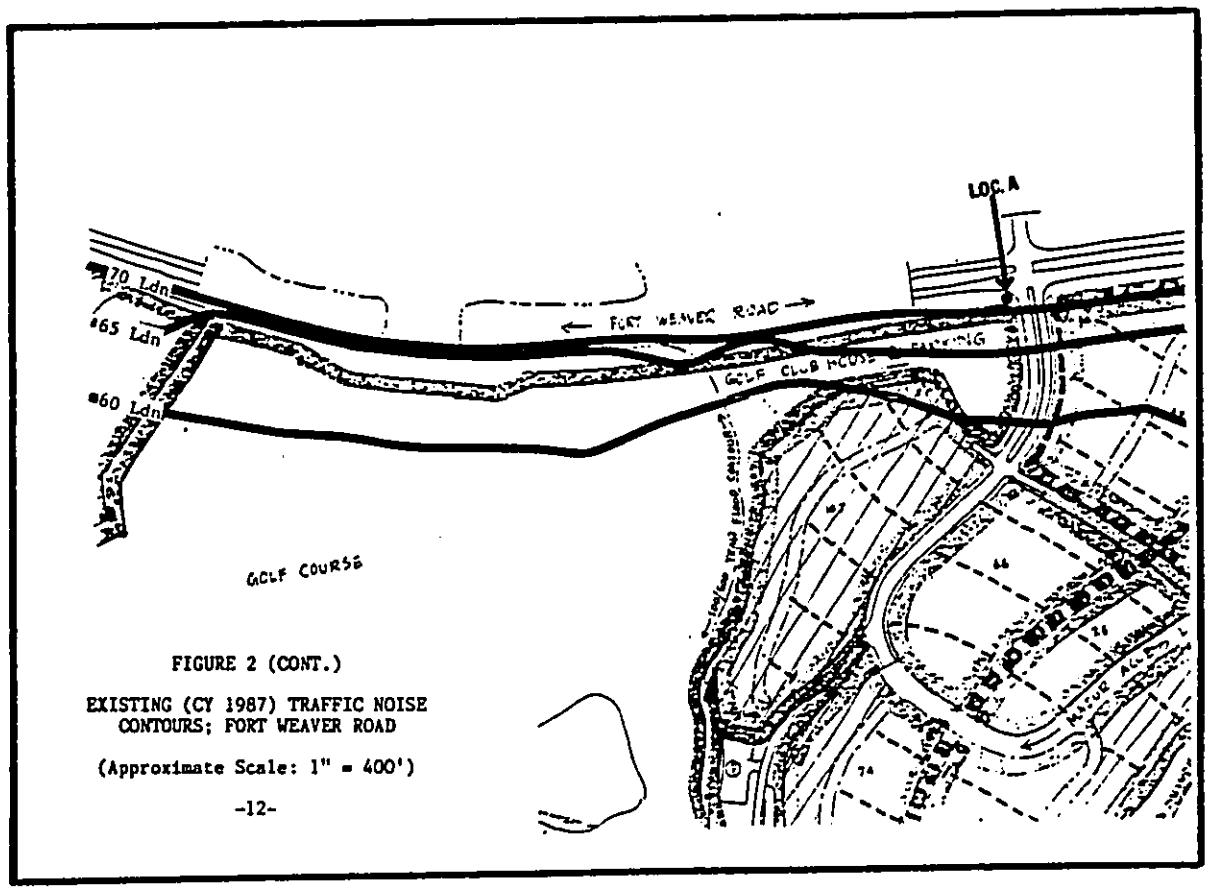


FIGURE 2 (CONT.)

EXISTING (CY 1987) TRAFFIC NOISE CONTOURS; FORT WEAVER ROAD

(Approximate Scale: 1" = 400')

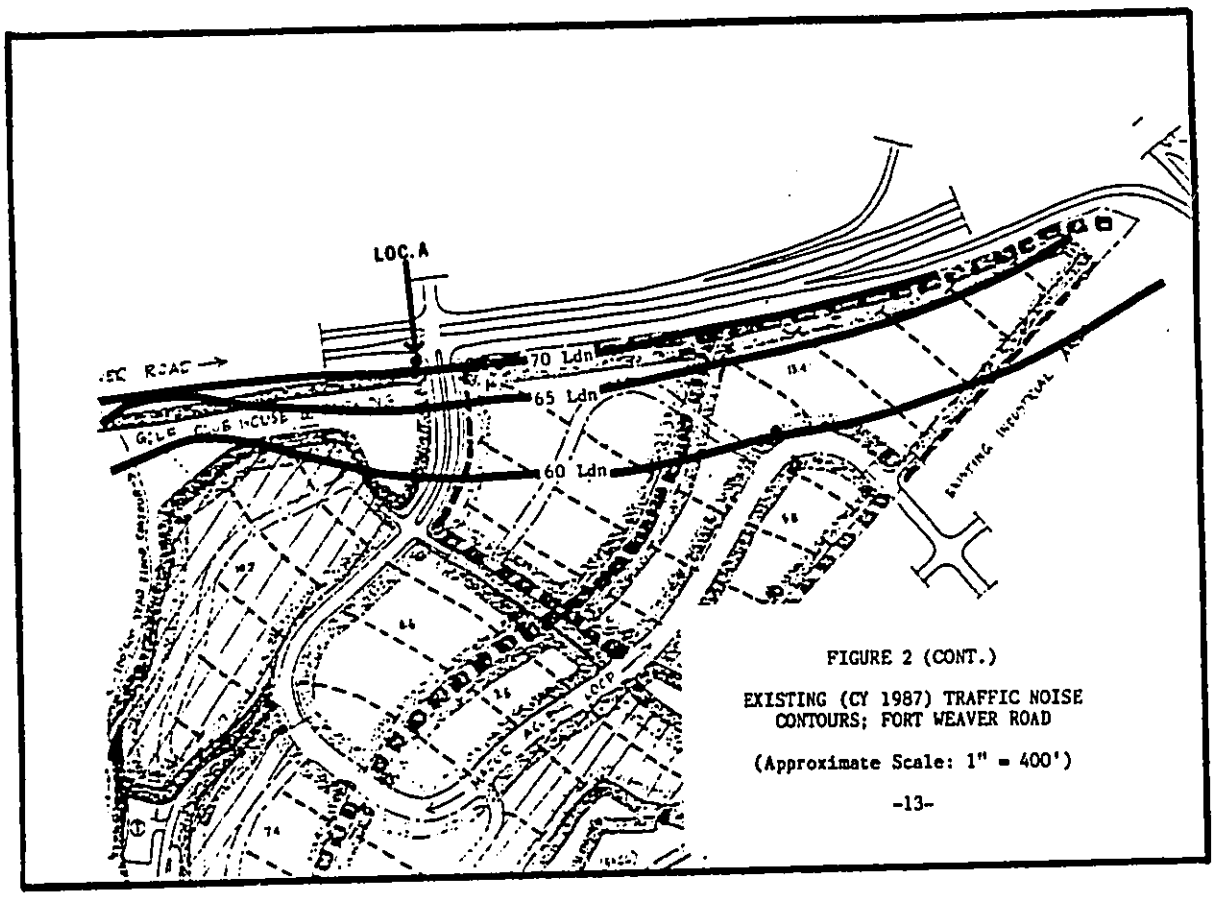


FIGURE 2 (CONT.)

EXISTING (CY 1987) TRAFFIC NOISE CONTOURS; FORT WEAVER ROAD

(Approximate Scale: 1" = 400')

TABLE 2

AUGUST, 1987 TRAFFIC NOISE MEASUREMENTS

Location	Time of Day (HRS)	Ave.Speed (MPH)	Hourly Traffic Volume — Auto	Med.Truck	Heavy Truck	Measured Leq (dB)	Predicted Leq (dB)	Measured Minus Predicted (dB)
1. SITE A On project site, 110' from Fort Weaver Rd. centerline.	0830 TO 0915	35	1,114	23	23	63.4	62.6	0.8
2. SITE A On project site, 110' from Fort Weaver Rd. centerline.	1400 TO 1500	35	1,175	24	24	62.0	62.9	-0.9
3. SITE B On project site, 80' from Fort Weaver Rd. centerline.	0700 TO 0815	50	1,335	28	28	71.1	69.9	1.2
4. SITE B On project site, 80' from Fort Weaver Rd. centerline.	1600 TO 1650	50	1,897	40	40	69.7	71.4	-1.7
5. SITE C On project site, 100' from Fort Weaver Rd. centerline.	0930 TO 1015	50	1,175	24	24	66.8	66.9	-0.1
6. SITE C On project site, 100' from Fort Weaver Rd. centerline.	1700 TO 1800	50	1,939	40	40	68.5	69.1	-0.6
7. SITE C On project site, 100' from Fort Weaver Rd. centerline.	1800 TO 1830	50	1,712	36	36	69.1	68.5	0.6

Notes:

1. Field-of-View at Sites A, B, and C assumed from 90 degrees (left) to 90 degrees (right).
2. Soft ground conditions assumed along Fort Weaver Road.

on a 2.5 year cycle. FIGURE 3 presents the worst case (hard ground or elevated sources) Ldn vs. centerline distance curves along the haul road for the peak and average hauling days of the harvesting season, and for the annually averaged day. The following assumptions were used in computing the existing Ldn values associated with haul truck noise:

a. Total cultivated area serviced: 1,828 acres.

b. Total cane haul truck loads per acre harvested: 4.49 loads (or inbound trips) per harvested acre.

c. Total hauling (work) days per harvesting season: 190 days per season.

d. Total 24-hour (3-shift) hauling days per harvesting season: 11 days per season.

e. Maximum number of loads during 24-hour hauling day: 72 daytime (7:00 AM to 10:00 PM) loads, and 44 nighttime (10:00 PM to 7:00 AM) loads.

f. Average daily number of loads during 190 day harvesting season: 41 daytime loads, and 2.6 nighttime loads.

g. Annually averaged (365 days/year), daily number of loads during year of harvest: 21.3 daytime loads, and 1.4 nighttime loads.

During a peak harvesting day of 24-hour operation, haul truck noise levels could exceed 65 Ldn within 190 FT setback distance from the haul road's centerline. However, average Ldn values for the 190 day harvest season or for the 365 day annual period do not exceed 65 Ldn at setback distances of 80 FT, and cane haul truck noise levels are in the "Moderate Exposure, Acceptable" category at the proposed residential lots along the haul road.

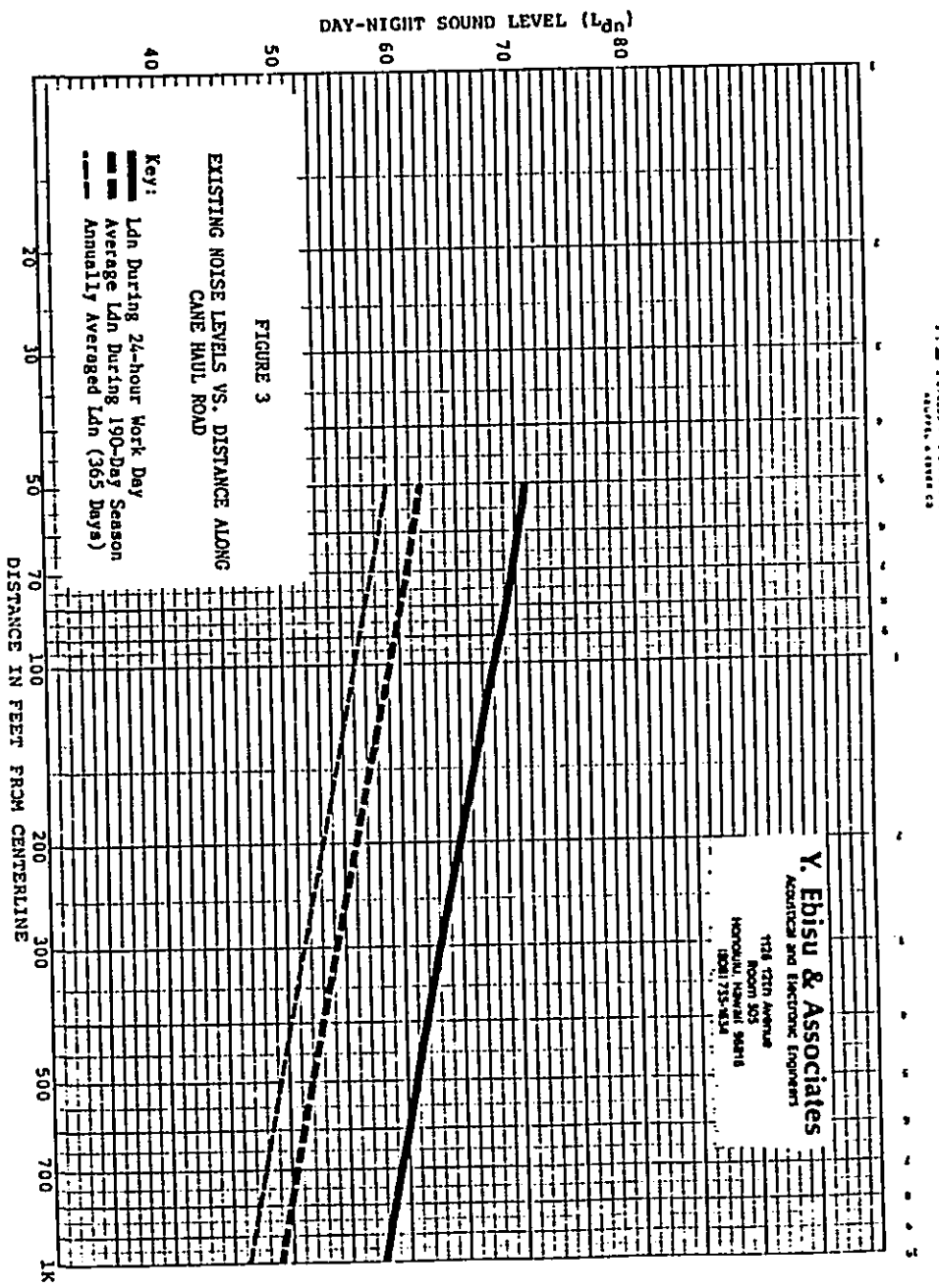


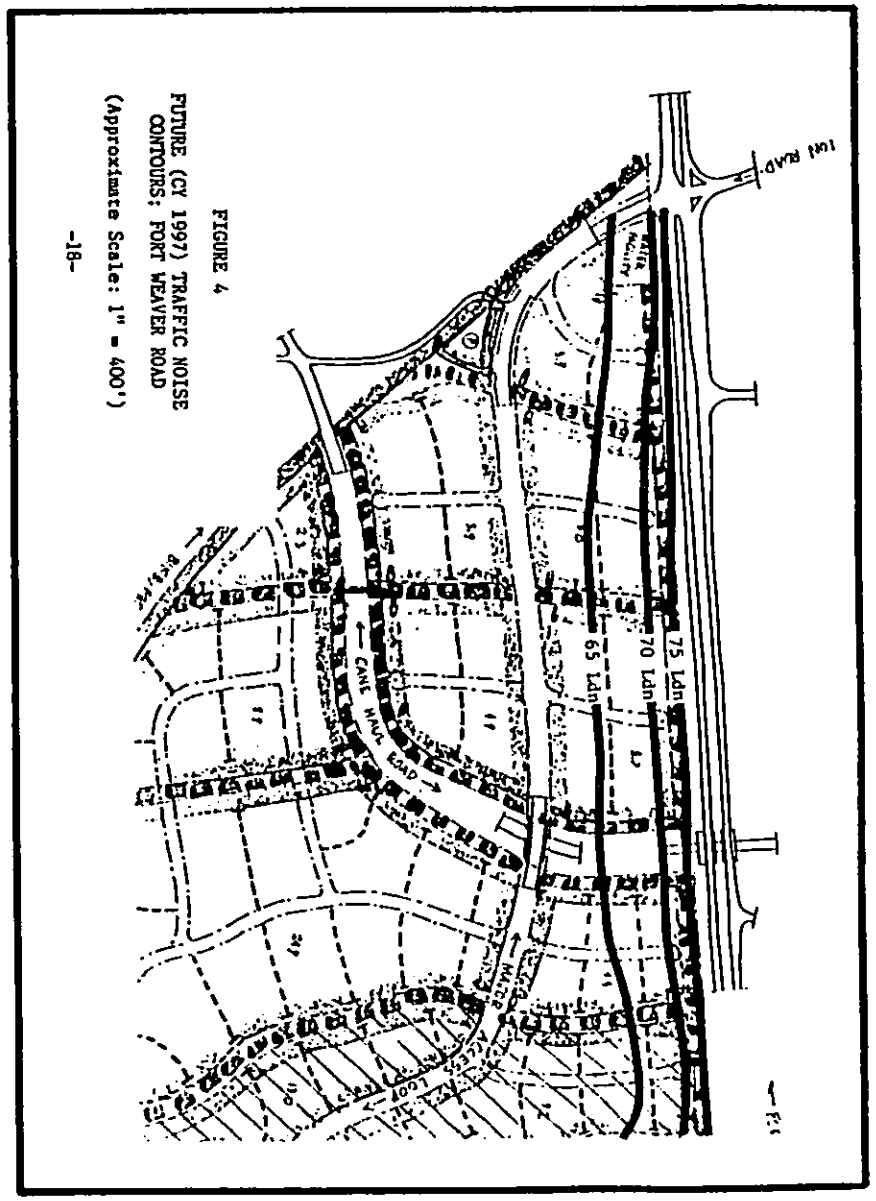
FIGURE 3

V. FUTURE TRAFFIC NOISE ENVIRONMENT

Predictions of future traffic noise levels were made using the traffic volume assignments for the 1991 and 1997 time periods as contained in Reference 2. FIGURE 4 depicts the future traffic noise contours on the Diamond Head side of Fort Weaver Road following project completion by the Year 1997. The contours of FIGURE 4 do not include the sound attenuation effects of sound barriers or berms which may be incorporated into the project, or the shielding effects of the structures planned within the project. The contours do include the shielding effects from natural terrain features as well as from the elevated roadway shoulders. Portions of the north and south residential parcels which are located within 400 FT of the Fort Weaver Road centerline are predicted to be within the 65 Ldn traffic noise contour, and are expected to be in the "Significant Exposure, Normally Unacceptable" category.

The predicted increases in PM peak hour traffic noise levels from the present to CY 1997 are shown in TABLE 3 for the various sections of Fort Weaver Road in the project environs. TABLE 4 presents the predicted increases in the setback distances to the 60, 65, and 70 Ldn traffic noise contours under unobstructed line-of-sight sound propagation conditions, and with the project traffic included. As noted in TABLE 4, the difference between Ldn and peak hour Leq(h) was computed to be equal to 1.3 dB. By CY 1997, increases in the setback distances to the 65 Ldn contour are predicted to be approximately 200 FT along Fort Weaver Road at the north and central portions of the project, and approximately 150 FT along Fort Weaver Road at the south portion of the project. It should be noted that the predicted increases in the noise contour setback distances are the result of both project and non-project traffic volume increases.

Future traffic noise levels were also calculated separately with and without the project traffic in CY 1991. The contributions of project and non-project traffic to the total noise



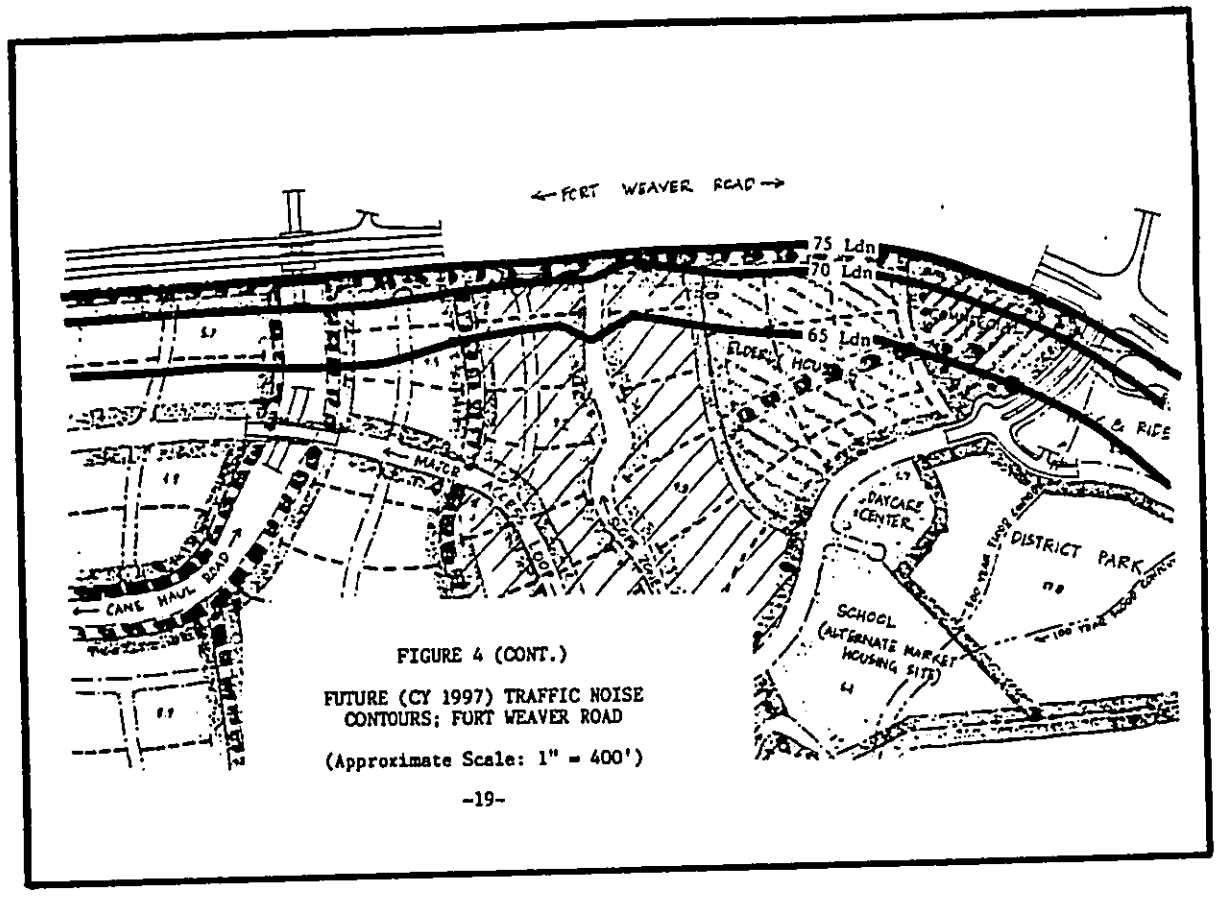


FIGURE 4 (CONT.)

FUTURE (CY 1997) TRAFFIC NOISE CONTOURS; FORT WEAVER ROAD

(Approximate Scale: 1" = 400')

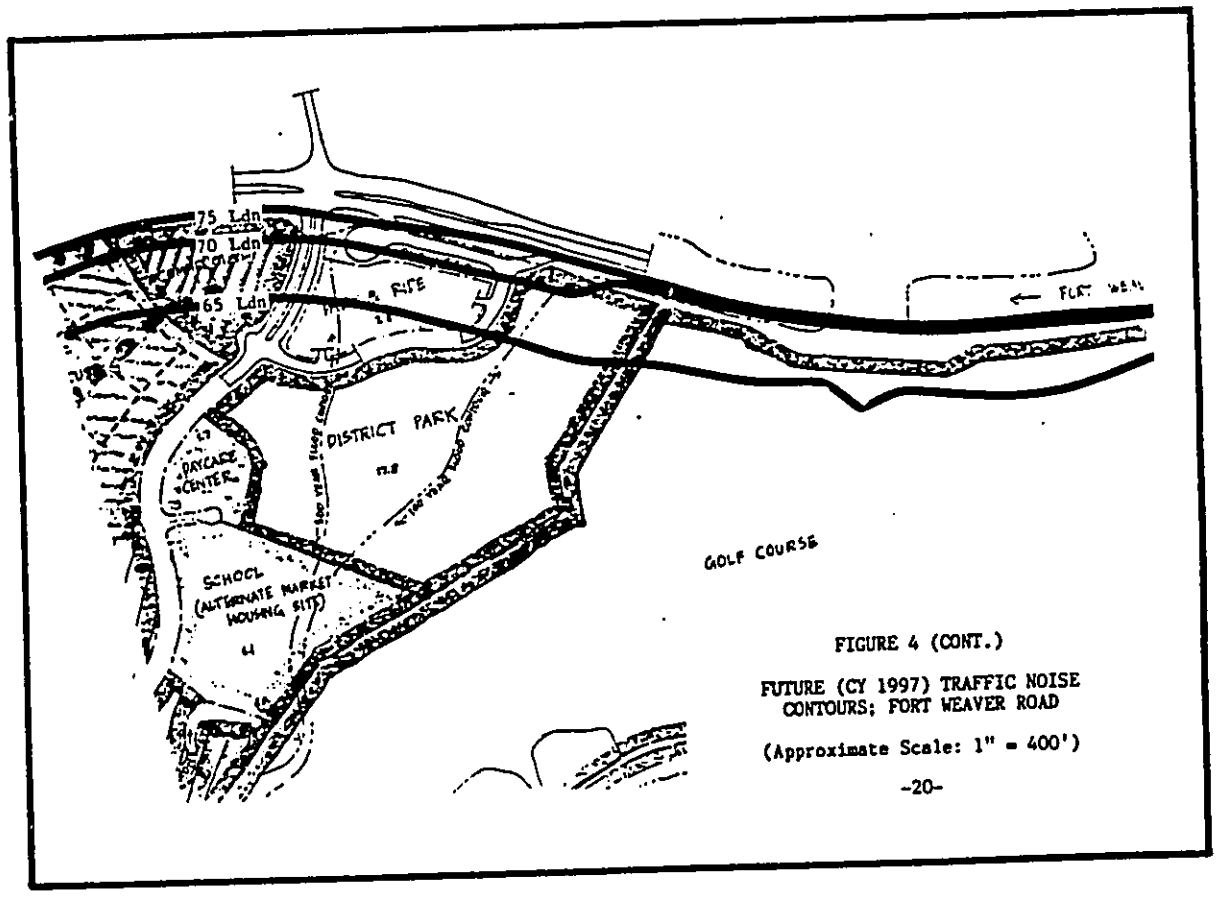


FIGURE 4 (CONT.)

FUTURE (CY 1997) TRAFFIC NOISE CONTOURS; FORT WEAVER ROAD

(Approximate Scale: 1" = 400')

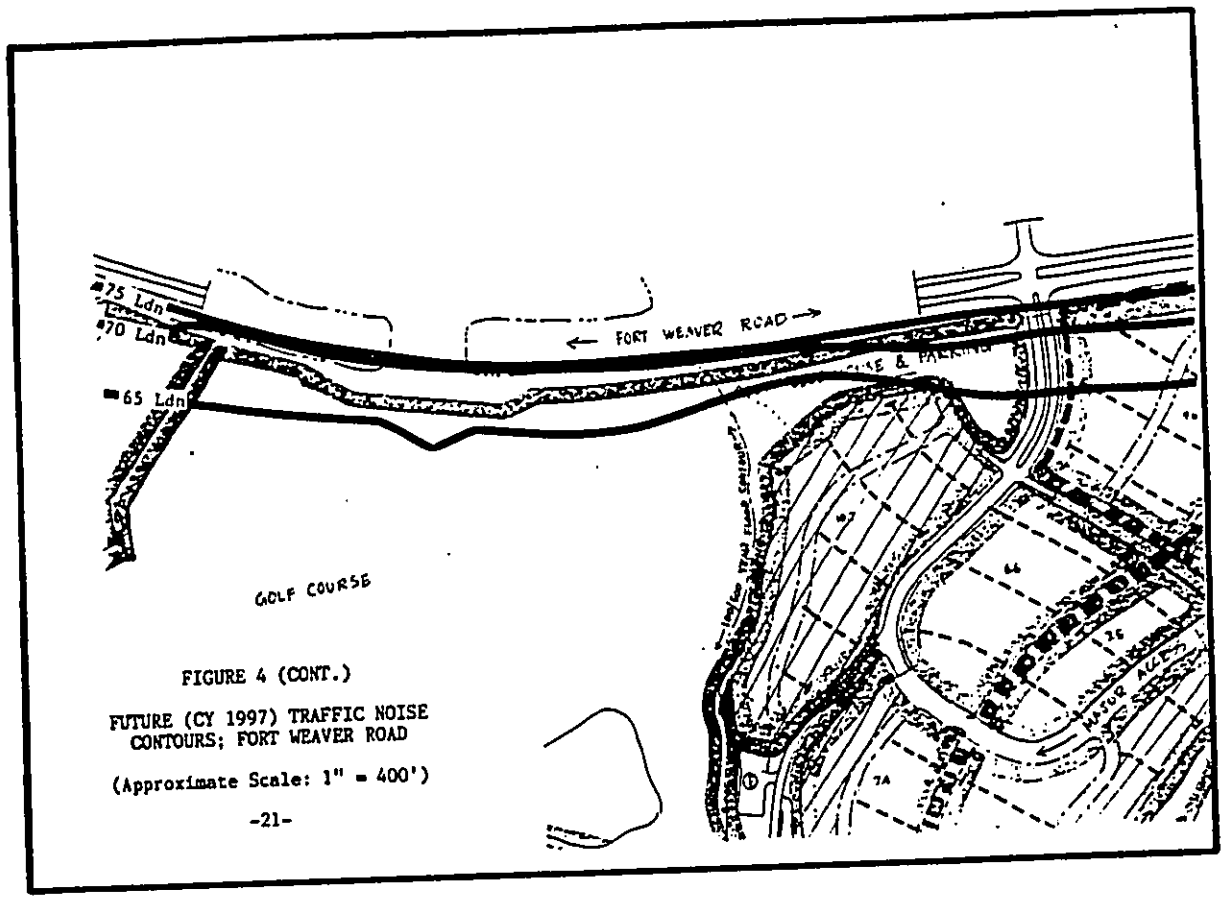


FIGURE 4 (CONT.)

FUTURE (CY 1997) TRAFFIC NOISE CONTOURS; FORT WEAVER ROAD

(Approximate Scale: 1" = 400')

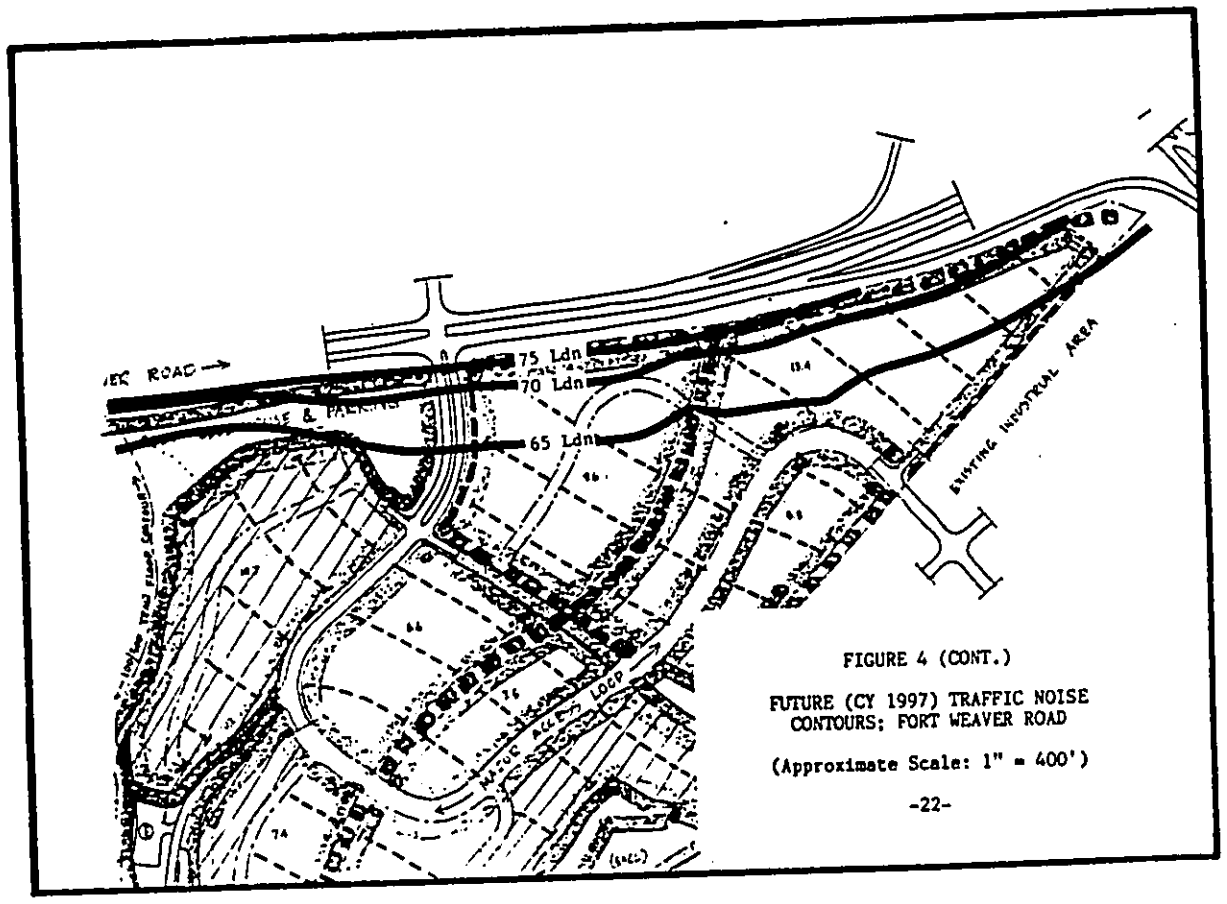


FIGURE 4 (CONT.)

FUTURE (CY 1997) TRAFFIC NOISE CONTOURS; FORT WEAVER ROAD

(Approximate Scale: 1" = 400')

TABLE 3

COMPARISONS OF EXISTING AND FUTURE TRAFFIC NOISE LEVELS IN PROJECT ENVIRONS

LOCATION	SPEED (MPH)	VPH	*** HOURLY LEQ IN dB @ 100 FT. AUTO	MT	HT	ALL VEH.	DB INCREASE
YEAR 1987 PM PEAK HOUR TRAFFIC:							
Ft. Weaver Rd. (North)	50	2,083	66.3	60.4	64.8	69.3	
Ft. Weaver Rd. (Center)	50	2,083	66.3	60.4	64.8	69.3	
Ft. Weaver Rd. (South)	43	2,083	64.5	58.9	63.9	67.8	
Ft. Weaver Rd. (To EB)	35	1,826	61.4	56.2	62.0	65.3	
PROJECTED 1997 PM PEAK HOUR TRAFFIC:							
Ft. Weaver Rd. (North)	50	5,320	70.4	64.5	68.9	73.3	4.1
Ft. Weaver Rd. (Center)	50	5,320	70.4	64.5	68.9	73.3	4.1
Ft. Weaver Rd. (South)	43	4,995	68.3	62.7	67.7	71.6	3.8
Ft. Weaver Rd. (To EB)	35	4,837	65.6	60.4	66.2	69.5	4.2

Notes:

1. Assumed traffic mix of 96% Autos, 2% Medium Trucks, and 2% Heavy Trucks.
2. Soft ground conditions and 180 degree field-of-view assumed.
3. North Section is from Farrington Hwy. to proposed Road "A"; Center Section is from proposed Roads "A" to "B"; South Section is from proposed Road "B" to Arizona Rd., and EB Section is from Arizona Rd. toward Ewa Beach.
4. Average speeds vary from 50 MPH to 35 MPH along South Section from Road "B" to Arizona Road.

TABLE 4

EXISTING AND FUTURE DISTANCES TO 60, 65, AND 70 Ldn CONTOURS

STREET SECTION	60 Ldn SETBACK (FT) EXISTING	60 Ldn SETBACK (FT) FUTURE	65 Ldn SETBACK (FT) EXISTING	65 Ldn SETBACK (FT) FUTURE	70 Ldn SETBACK(FT) EXISTING	70 Ldn SETBACK(FT) FUTURE
Ft. Weaver Rd. (North)	505	944	235	438	109	203
Ft. Weaver Rd. (Center)	505	944	235	438	109	203
Ft. Weaver Rd. (South)	403	723	187	335	87	156
Ft. Weaver Rd. (To EB)	275	526	128	244	59	113

Notes:

1. All setback distances are to the roadway centerline.
2. Setback distances are for unobstructed line-of-sight conditions.
3. Computed Ldn equal to PM Peak Hour Leq(h) plus 1.3 dB.

TABLE 5

SUMMARY OF TRAFFIC NOISE INCREASES ASSOCIATED WITH PROJECT AND NON-PROJECT TRAFFIC
CY 1991

ROADWAY SECTION	** PM PEAK HR VOLUME (VPH) ** WITHOUT PROJECT	WITH PROJECT	**** PM PEAK HR Leq (dB) **** WITHOUT PROJECT	WITH PROJECT	*** INCREASE IN dB ** NON-PROJECT	PROJECT
Ft. Weaver Rd. (North)	3,502	4,752	71.5	72.8	2.3	1.3
Ft. Weaver Rd. (Center)	3,261	4,354	71.2	72.5	2.0	1.3
Ft. Weaver Rd. (South)	3,261	3,719	69.8	70.3	2.0	0.5
Ft. Weaver Rd. (To EB)	3,042	3,329	67.5	67.9	2.2	0.4

Notes:

1. All noise levels computed at 100 FT setback distance from centerline of Ft. Weaver Road.
2. See TABLE 3 for assumptions used in traffic noise predictions.

(project plus non-project) levels were calculated. TABLE 5 presents the anticipated increases in traffic noise levels, and the contribution of project traffic to these increases. As indicated in TABLE 5, increases in traffic noise levels associated with project traffic are predicted to range from 0.4 to 1.3 Ldn by CY 1991. The greatest increases in project related traffic noise are predicted to occur along the north portions of Fort Weaver Road, and are expected to be in the order of 1.3 Ldn. Relatively insignificant increases of 0.5 Ldn are expected along the south portions of Fort Weaver Road as a result of project traffic. Non-project traffic noise increases along the north and south sections of the roadway are predicted to be greater at 2.3 Ldn and 2.2 Ldn, respectively.

Along the internal circulation roadways of the proposed subdivision, traffic noise levels should not exceed FHWA or FHA/HUD criteria at 87 FT setback distance (from the roadway centerline) for the projected maximum PM peak hour volume of 1,028 VPH and at an average speed of 35 MPH or less. Corresponding minimum setback distances for internal streets with PH peak hour volumes of 700, 500, and 250 VPH are 67, 54 and 34 FT, respectively.

VI. DISCUSSION OF FUTURE NOISE IMPACTS

Without noise mitigation measures, future traffic noise levels are expected to be in the "Significant Exposure, Normally Unacceptable" noise exposure category along the first row of West Loch Estates house lots which front Fort Weaver Road. If development of West Loch residences within the future 65 Ldn contour (see FIGURE 4) is necessary due to the difficulties in achieving adequate setback distances, adverse noise impacts on future residents are expected to occur.

Unavoidable traffic noise impacts are predicted to occur in the form of increased traffic noise along all sections of Fort Weaver Road as a result of project and non-project traffic. By CY 1997, traffic noise levels at existing homes and at the Hale O Ulu School are predicted to increase by approximately 3.8 Ldn to 4.2 Ldn above existing levels, which are significant. Project related traffic noise contributions to these increases are anticipated range from 0.4 to 1.3 Ldn. Growth in non-project traffic are predicted to contribute 2.8 to 3.8 Ldn to the total increases in noise along Fort Weaver Road. Traffic noise increases associated with the West Loch Estates Subdivision project are predicted to represent 10% and 32% of the total increases predicted along the south and north sections, respectively, of Fort Weaver Road by CY 1997. This degree of project contribution to future increases in traffic noise are considered to be moderate to insignificant. The major contributor to the expected increases in traffic noise at existing noise sensitive properties south of the proposed "Road B" intersection is non-project traffic.

VII. POSSIBLE NOISE MITIGATION MEASURES

The results of this noise study indicate that sufficient setback distances do not exist to meet FHA/HUD noise criteria at the proposed Phase I and Phase II residential lots which front Fort Weaver Road. Minimum barrier heights of 6 to 9 FT will probably be required along the east highway Right-of-Way to reduce future traffic noise levels below 65 Ldn. If two story homes are located within 65 Ldn contour of FIGURE 4, the upper level spaces will not be adequately shielded by a 6 to 9 FT high wall, and the use of other mitigation measures, such as air conditioning of affected rooms or the installation of window sound attenuators, may be employed.

TABLE 6 is a summary of probable top elevations and locations of the required sound attenuation barrier segments. The barrier segments are located on the Diamond Head side of Fort Weaver Road, with start and end points keyed to the highway station numbers (see As-Built plans for Fort Weaver Road). For example, the first barrier segment, which is approximately parallel to the roadway from Station 94+00 to Station 95+00, should be between 160 to 155 FT ("Y-START" and "Y-END") east of the roadway centerline, and should have an average top elevation of 74.5 FT. Sections of sound attenuation barrier are required from STA 94+00 to STA 112+00, and from STA 152+00 to STA 195+00. The top elevations shown for each barrier segment were computed so as to meet the 65 Ldn FHA/HUD standard for the first row of single story homes east of the barrier. The indicated top elevations should be confirmed following completion of the lot grading plans, and prior to actual construction. Earth berms, concrete block or rock walls, or combination berms plus walls are acceptable methods of implementing the sound barriers. In order to minimize traffic noise reflections toward the west and across the highway, the sound absorption or scattering characteristics of the walls should be maximized. The use of lava rock, the avoidance of painting or sealing the pores (on the side facing the highway) of a concrete

TABLE 6

LOCATION OF POSSIBLE SOUND ATTENUATION BARRIERS
(EAST SIDE OF FORT WEAVER ROAD)

START STA. NO.	END STA. NO.	Y-START (FT)	Y-END (FT)	AVE. TOP ELEV.(FT)
94+00	95+00	-170	-165	74.5
95+00	96+00	-165	-160	74.5
96+00	97+00	-160	-155	74.8
97+00	98+00	-155	-145	75.0
98+00	99+00	-145	-135	75.3
99+00	100+00	-135	-125	75.3
100+00	101+00	-125	-125	75.8
101+00	102+00	-125	-125	75.5
102+00	103+00	-125	-125	74.8
103+00	104+00	-125	-125	73.3
104+00	105+00	-125	-125	70.0
105+00	106+00	-125	-125	67.5
106+00	107+00	-125	-125	66.5
107+00	108+00	-125	-125	66.0
108+00	109+00	-125	-125	65.5
109+00	110+00	-125	-125	64.3
110+00	111+00	-125	-125	63.0
111+00	111+50	-125	-125	62.3
111+50	112+00	-125	-125	62.3
152+00	153+00	-100	-100	27.1
153+00	154+00	-100	-100	28.4
154+00	155+00	-100	-100	29.0
155+00	156+00	-100	-100	29.2
156+00	157+00	-100	-100	29.7
157+00	158+00	-100	-100	30.5
158+00	159+00	-100	-100	30.0
159+00	160+00	-100	-100	29.6
160+00	161+00	-100	-100	29.6
161+00	162+00	-100	-100	29.3
162+00	163+00	-100	-100	29.4
163+00	164+00	-100	-100	29.4
164+00	165+00	-100	-100	29.7
165+00	166+00	-100	-100	39.4
166+00	167+00	-100	-100	56.5
167+00	168+00	-100	-100	63.5
168+00	169+00	-100	-100	61.7
169+00	170+00	-100	-100	59.6
170+00	171+00	-100	-100	57.8
171+00	172+00	-100	-100	58.5
172+00	173+00	-100	-100	57.9
173+00	174+00	-100	-100	57.8
174+00	175+00	-100	-80	57.8
175+00	176+00	-80	-80	57.6
176+00	177+00	-80	-100	61.0

TABLE 6 (CONTINUED)

LOCATION OF POSSIBLE SOUND ATTENUATION BARRIERS
(EAST SIDE OF FORT WEAVER ROAD)

START STA. NO.	END STA. NO.	Y-START (FT)	Y-END (FT)	AVE. TOP ELEV.(FT)
177+00	178+00	-100	-100	61.8
178+00	179+00	-100	-100	61.3
179+00	180+00	-100	-100	60.0
180+00	181+00	-100	-100	59.0
181+00	182+00	-100	-100	57.8
182+00	183+00	-100	-100	56.5
183+00	184+00	-100	-100	54.5
184+00	185+00	-100	-100	51.8
185+00	186+00	-100	-100	49.0
186+00	187+00	-100	-100	45.8
187+00	188+00	-100	-100	45.0
188+00	189+00	-100	-100	47.5
189+00	190+00	-100	-100	50.5
190+00	191+00	-100	-100	50.4
191+00	192+00	-100	-100	50.4
192+00	193+00	-100	-100	50.3
193+00	194+00	-100	-100	49.5
194+00	195+00	-100	-100	49.3

block wall, the use of specially constructed, sound absorbent concrete blocks, and the use of foliage to visually screen the wall from the highway are possible methods of increasing the sound absorption or scattering characteristics of the wall.

If two-story homes are constructed within the 65 to 70 Ldn contours of FIGURE 4, the use of sound attenuating windows at the upper floor is the recommended mitigation measure. The first floor should be adequately shielded by the sound barrier described previously. Examples of sound attenuation windows are at Kalakaua Homes on Oahu, and at the Skill Village and Hale Noho Subdivisions on Maui.

A. REFERENCES

(1) Barry, T. and J. Reagan; "FHWA Highway Traffic Noise Prediction Model," FHWA-RD-77-108; Federal Highway Administration; Washington, D.C.; December 1978.

(2) Existing, CY 1991, and CY 1997 PM Peak Hour traffic volumes at the Fort Weaver Road intersections in the project area; draft transmittal from Pacific Planning & Engineering, Inc.; September 9, 1987

(3) Hawaii State Department of Transportation; 24-Hour Traffic Counts; Station C-10-H, New Fort Weaver Road at Honouliuli Bridge; January 20-21, 1986.

(4) Hawaii State Department of Transportation; 24-Hour Traffic Counts; Station C-10-J, New Fort Weaver Road at Farrington Highway; January 20-21, 1986.

(5) "Guidelines for Considering Noise in Land Use Planning and Control;" Federal Interagency Committee on Urban Noise; June, 1980.

(6) "Environmental Criteria and Standards, Noise Abatement and Control, 24 CFR, Part 51, Subpart B;" U.S. Department of Housing and Urban Development; July 12, 1979.

(7) "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety;" Environmental Protection Agency, EPA 550/9-74-004; March, 1974.

(8) American National Standard, "Sound Level Descriptors for Determination of Compatible Land Use;" ANSI S3.23-1980; Acoustical Society of America; May 30, 1980.

APPENDIX B — TEXT

EXCERPTS FROM EPA'S ACOUSTIC TERMINOLOGY GUIDE

Descriptor Symbol Usage

The recommended symbols for the commonly used acoustic descriptors based on A-weighting are contained in Table I. As most acoustic criteria and standards used by EPA are derived from the A-weighted sound level, almost all descriptor symbol usage guidance is contained in Table I.

Since acoustic nomenclature includes weighting networks other than "A" and measurements other than pressure, an expansion of Table I was developed (Table II). The group adopted the ANSI descriptor-symbol scheme which is structured into three stages. The first stage indicates that the descriptor is a level (i.e., based upon the logarithm of a ratio), the second stage indicates the type of quantity (power, pressure, or sound exposure), and the third stage indicates the weighting network (A, B, C, D, E.....). If no weighting network is specified, "A" weighting is understood. Exceptions are the A-weighted sound level and the A-weighted peak sound level which require that the "A" be specified. For convenience in those situations in which an A-weighted descriptor is being compared to that of another weighting, the alternative column in Table II permits the inclusion of the "A". For example, a report on blast noise might wish to contrast the L_{dn} with the L_{Adn}.

Although not included in the tables, it is also recommended that "L_{PN}" and "L_{EPN}" be used as symbols for perceived noise levels and effective perceived noise level, respectively.

It is recommended that in their initial use within a report, such terms be written in full, rather than abbreviated. An example of preferred usage is as follows:

> The A-weighted sound level (LA) was measured before and after the installation of acoustical treatment. The measured LA values were 85 and 75 dB respectively.

Descriptor Nomenclature

With regard to energy averaging over time, the term "average" should be discouraged in favor of the term "equivalent". Hence, L_{eq} is designated the "equivalent sound level". For L_d, L_n, and L_{dn}, "equivalent" need not be stated since the concept of day, night, or day-night averaging is by definition understood. Therefore, the designations are "day sound level", "night sound level", and "day-night sound level", respectively.

The peak sound level is the logarithmic ratio of peak sound pressure to a reference pressure and not the maximum root mean square pressure. While the latter is the maximum sound pressure level, it is often incorrectly labelled peak. In that sound level meters have "peak" settings, this distinction is most important.

"Background ambient" should be used in lieu of "background", "ambient", "residual", or "indigenous" to describe the level characteristic of the general background noise due to the contribution of many unidentifiable noise sources near and far.

With regard to units, it is recommended that the unit decibel (abbreviated dB) be used without modification. Hence, dBA, PNdB, and EPNdB are not to be used. Examples of this preferred usage are: the Perceived Noise Level (L_{PN} was found to be 75 dB. L_{PN} = 75 dB.) This decision was based upon the recommendation of the National Bureau of Standards, and the policies of ANSI and the Acoustical Society of America, all of which disallow any modification of bel except for prefixes indicating its multiples or submultiples (e.g., deci).

Noise Impact

In discussing noise impact, it is recommended that "Level Weighted Population" (LWP) replace "Equivalent Noise Impact" (ENI). The term "Relative Change of Impact" (RCI) shall be used for comparing the relative differences in LWP between two alternatives.

Further, when appropriate, "Noise Impact Index" (NII) and "Population Weighted Loss of Hearing" (PHL_x) shall be used consistent with CHABA Working Group 69 Report Guidelines for Preparing Environmental Impact Statements (1977).

TABLE I: A-Weighted Recommended Descriptor List

	Term	Symbol
1.	A-Weighted Sound Level	L_A
2.	A-Weighted Sound Power Level	L_{WA}
3.	Maximum A-Weighted Sound Level	L_{max}
4.	Peak A-Weighted Sound Level	L_{Apk}
5.	Level Exceeded x% of the time	L_x
6.	Equivalent Sound Level	L_{eq}
7.	Equivalent Sound Level over Time (T) (1)	$L_{eq(T)}$
8.	Day Sound Level	L_d
9.	Night Sound Level	L_n
10.	Day Night Sound Level	L_{dn}
11.	Yearly Day-Night Sound Level	$L_{dn(y)}$
12.	Sound Exposure Level	L_{SE}

(1) Unless otherwise specified, time is in hours (e.g. the hourly equivalent level is $L_{eq(1)}$). Time may be specified in non-quantitative terms (e.g., could be specified a $L_{eq(WASH)}$ to mean the washing cycle noise for a washing machine.)

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APPENDIX B (CONTINUED)

TABLE II: Recommended Descriptor List

	TERM	A-WEIGHTING	ALTERNATIVE(1) A-WEIGHTING	OTHER WEIGHTING (2)	UNWEIGHTED
1.	Sound (Pressure) (3) Level	L_A	L_{pA}	L_B, L_{pB}	L_p
2.	Sound Power Level	L_{WA}		L_{WB}	L_W
3.	Max. Sound Level	L_{max}	L_{Amax}	L_{Bmax}	L_{pmax}
4.	Peak Sound (Pressure) Level	L_{Apk}		L_{Bpk}	L_{pk}
5.	Level Exceeded x% of the time	L_x	L_{Ax}	L_{Bx}	L_{px}
6.	Equivalent Sound Level	L_{eq}	L_{Aeq}	L_{Beq}	L_{peq}
7.	Equivalent Sound Level Over Time(T) (4)	$L_{eq(T)}$	$L_{Aeq(T)}$	$L_{Beq(T)}$	$L_{peq(T)}$
8.	Day Sound Level	L_d	L_{Ad}	L_{Bd}	L_{pd}
9.	Night Sound Level	L_n	L_{An}	L_{Bn}	L_{pn}
10.	Day-Night Sound Level	L_{dn}	L_{Adn}	L_{Bdn}	L_{pdn}
11.	Yearly Day-Night Sound Level	$L_{dn(y)}$	$L_{Adn(Y)}$	$L_{Bdn(Y)}$	$L_{pdn(Y)}$
12.	Sound Exposure Level	L_S	L_{SA}	L_{SB}	L_{Sp}
13.	Energy Average value over (non-time domain) set of observations	$L_{eq(e)}$	$L_{Aeq(e)}$	$L_{Beq(e)}$	$L_{peq(e)}$
14.	Level exceeded x% of the total set of (non-time domain) observations	$L_{x(e)}$	$L_{Ax(e)}$	$L_{Bx(e)}$	$L_{px(e)}$
15.	Average L_x value	L_x	L_{Ax}	L_{Bx}	L_{px}

(1) "Alternative" symbols may be used to assure clarity or consistency.

(2) Only B-weighting shown.. Applies also to C,D,E,..... weighting.

(3) The term "pressure" is used only for the unweighted level.

(4) Unless otherwise specified, time is in hours (e.g., the hourly equivalent level is $L_{eq(1)}$). Time may be specified in non-quantitative terms (e.g., could be specified as $L_{eq(WASH)}$ to mean the washing cycle noise for a washing machine)).

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HOUR	SPEED (MPH)	VPH	% AUTOS	% MT	% HT	*** HOURLY LEQ IN AUTO			100 FT. ALL VEH
0000-0100	50	215	98.0	1.0	1.0	56.5	47.6	52.0	58.2
0100-0200	50	122	98.0	1.0	1.0	54.1	45.1	49.5	55.8
0200-0300	50	84	98.0	1.0	1.0	52.5	43.5	47.9	54.1
0300-0400	50	73	98.0	1.0	1.0	51.8	42.9	47.3	53.5
0400-0500	50	237	98.0	1.0	1.0	57.0	48.0	52.4	58.7
0500-0600	50	1,134	96.0	2.0	2.0	63.7	57.8	62.2	66.6
0600-0700	50	1,766	96.0	2.0	2.0	65.6	59.7	64.1	68.5
0700-0800	50	1,874	96.0	2.0	2.0	65.9	60.0	64.4	68.8
0800-0900	50	1,151	96.0	2.0	2.0	63.7	57.9	62.3	66.7
0900-1000	50	1,339	96.0	2.0	2.0	64.4	58.5	62.9	67.3
1000-1100	50	1,318	96.0	2.0	2.0	64.3	58.4	62.8	67.3
1100-1200	50	1,317	96.0	2.0	2.0	64.3	58.4	62.8	67.3
1200-1300	50	1,371	96.0	2.0	2.0	64.5	58.6	63.0	67.4
1300-1400	50	1,418	96.0	2.0	2.0	64.6	58.8	63.2	67.6
1400-1500	50	1,650	96.0	2.0	2.0	65.3	59.4	63.8	68.2
1500-1600	50	1,903	96.0	2.0	2.0	65.9	60.0	64.4	68.9
1600-1700	50	1,686	96.0	2.0	2.0	65.4	59.5	63.9	68.3
1700-1800	50	1,591	96.0	2.0	2.0	65.1	59.3	63.7	68.1
1800-1900	50	1,379	96.0	2.0	2.0	64.5	58.6	63.0	67.5
1900-2000	50	1,025	96.0	2.0	2.0	63.2	57.4	61.8	66.2
2000-2100	50	799	96.0	2.0	2.0	62.2	56.3	60.7	65.1
2100-2200	50	699	96.0	2.0	2.0	61.6	55.7	60.1	64.5
2200-2300	50	506	98.0	1.0	1.0	60.3	51.3	55.7	61.9
2300-2400	50	360	98.0	1.0	1.0	58.8	49.8	54.2	60.5

TOTAL VPD: 25,017 LDN @ 50 FT: LDN @ 100 FT: 70.2

STA:C-10-J, NEW FORT WEAVER ROAD AT FAR. HWY, TWO-WAY TRAFFIC (1/20-21/86)

APPENDIX C. WORKSHEET #1

APPENDIX D

Air Quality Impact Report
West Loch Estates

by

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Kailua, Hawaii

September 28, 1987

AIR QUALITY IMPACT REPORT

WEST LOCH ESTATES

September 28, 1987

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AIR QUALITY IMPACT REPORT
WEST LOCH ESTATES

1. INTRODUCTION

West Loch Estates is a two-phase residential development being proposed for construction on some 232 acres of sugarcane lands along Fort Weaver Road in the Ewa District of Oahu. Phase I calls for the completion of 586 homes by 1991 while Phase II includes an additional 914 dwellings by 1997.

The purpose of this report is to assess the impact of the proposed development on air quality both on a local and regional basis. The overall project is clearly an "indirect source" of air pollution as defined in the federal Clean Air Act [1] since its primary association with air pollution is due to its inherent generation of mobile source, i.e., motor vehicle activity. Much of the focus of this analysis therefore is on the project's ability to generate traffic and the resultant impact on air quality. Air quality impact was evaluated for existing (1987) and future (1991 & 1997) conditions.

Residential projects such as this also has off-site impacts due to increased demand for electrical energy which must be met through the combustion of some type of fuel. Disposal of the refuse generated by the residents will also result in offsite impact as it will most probably be burned in the City's proposed resource recovery facility. Both of these combustion processes result in pollutant emissions to the air which have been addressed.

Finally, during construction of the various buildings and facilities air pollutant emissions will be generated due to vehicular movement, grading and general dust-generating construction activities. These impacts have also been addressed.

2. AIR QUALITY STANDARDS

A summary of State of Hawaii and national ambient air quality standards is presented in Table 1 [2, 3]. Note that Hawaii's standards are not divided into primary and secondary standards as are the federal standards.

Primary standards are intended to protect public health with an adequate margin of safety while secondary standards are intended to protect public welfare through the prevention of damage to soils, water, vegetation, man-made materials, animals, wildlife, visibility, climate, and economic values [4].

Some of Hawaii's standards are clearly more stringent than their federal counterparts but, like their federal counterparts, may be

exceeded once per year. It should also be noted that in April, 1986, the Governor signed amendments to Chapter 59 (Ambient Air Quality Standards) making the state's standards for particulate matter and sulfur dioxide the same as national standards. In the case of particulate matter, however, this uniformity did not last long. On July 1, 1987, the EPA revised the federal particulate standard to apply only to particles 10 microns or less in diameter (PM-10) [5], leaving the state once again with standards different than the federal ones.

In the case of the automotive pollutants [carbon monoxide (CO), oxides of nitrogen (NOx), and photochemical oxidants (Ox)], there are only primary standards. Until 1983, there was also a hydrocarbons standard which was based on the precursor role hydrocarbons play in the formation of photochemical oxidants rather than any unique toxicological effect they had at ambient levels. The hydrocarbons standard was formally eliminated in January, 1983 [6].

The U.S. Environmental Protection Agency (EPA) is mandated by Congress to periodically review and re-evaluate the federal standards in light of new research findings [7]. The last review resulted in the relaxation of the oxidant standard from 160 to 240 micrograms/cubic meter (ug/m3) [8]. The carbon monoxide (CO), particulate matter, sulfur dioxide (SO2), and nitrogen dioxide (NO2) standards are currently under review, but final action has not been taken yet [9].

Finally, the State of Hawaii also has fugitive dust regulations for particulate matter (PM) emanating from construction activities [10]. There simply can be no visible emissions from fugitive dust sources.

3. EXISTING AIR QUALITY

The two nearest State Department of Health air monitoring stations to the project area are located at the Campbell Industrial Park about 6 miles to the southwest and at Pearl City, some 4 miles to the northeast. The State Department of Health has monitored air quality at the park since 1971, and a summary of the data is presented in Table 2. Total suspended particulates (TSP), sulfur dioxide (SO2), and nitrogen dioxide (NO2) were all monitored on a 24-hour basis. Initially, the site was at the Barbers Point Lighthouse, but the proximity to the ocean resulted in very high TSP levels due to salt spray. The station was therefore moved to the Chevron Refinery site about 1.7 kilometers north of the lighthouse on March 17, 1972. In 1976, NO2 monitoring was ceased. On August 7, 1979, the monitoring station was moved to a rooftop location at the same Chevron site.

It should also be noted that total suspended particulate monitoring with a high-volume sampler was ceased at the site in October, 1985. In November, 1985, a new PM-10 sampler was installed. This instrument measures respirable particulate matter under 10 microns in aerodynamic diameter. PM-10 and SO2 monitoring data for 1986 are summarized in Table 3. Table 4 lists PM-10 and TSP data at the Pearl City site for calendar year 1986.

It is evident from the data in Tables 2, 3 and 4 that both the National Ambient Air Quality Standards (NAAQS) and Hawaii Ambient Air Quality Standards (HAAQS) are being met at those monitoring sites.

Because the Campbell Industrial Park monitoring station is situated relatively close to the elevated sources, i.e., the stacks, located at the industrial park, the data collected may not be representative of the highest ambient pollutant levels resulting from the various industrial sources at the park. Computer modeling done in conjunction with the City's resource recovery facility permitting indicated maximum SO2 concentrations occurring some 1.0 to 1.5 kilometers north of the park in the flat terrain as well as on the hillsides also north of the park [11].

Unfortunately, there are no routine monitoring data for the primary automotive pollutant, i.e., carbon monoxide. The nearest CO monitoring site is at the Department of Health building in downtown Honolulu some 11 miles east-southeast of the project area. Because the area is presently at an early stage of development, it can be surmised that present CO levels are also relatively low.

A spot sampling of carbon monoxide concentrations along Fort Weaver Road was conducted during two recent a.m. peak hour traffic periods as part of this impact analysis. The results were as follows:

Location	Date/Time	NAS Barbers Point Wind Direction	Wind Speed	1-Hour CO Concentration
10 m east of Fort Weaver Road at eastbound H-1 on-ramp of Kunia Interchange	17 Sep 87 Thursday 6 - 7 am	NE	3-5 kts	3.4 mg/m3
10 m east of Fort Weaver Road near Project Access Road "A"	22 Sep 87 Tuesday 6 - 7 am	W	2-7 kts	2.8 mg/m3

It should be noted that during the September 17, 1987 sampling the monitoring instrument was located upwind of the Fort Weaver Road traffic due to the light northeasterly winds; thus, the low CO levels being measured were due to vehicles operating on the H-1 freeway upwind (northeast) of the sampling site.

During the September 22, 1987 sampling, onsite winds were very light and at times calm. During the calm periods, CO concentrations leveled off at about 1.0 - 1.5 mg/m3.

4. CLIMATE & METEOROLOGY

Weather conditions in the project area are typical of sites located on the leeward coast of Oahu. Long-term climatic data collected at Barbers Point Naval Air Station indicate mean daily maximum and minimum temperatures of 81 and 69 degrees Fahrenheit, respectively; mean annual rainfall of 20.3 inches; and prevailing winds from the northeast at 9 knots [12]. Annual rainfall is of interest because of its role in particulate matter removal from the atmosphere, while wind speed and direction are determinants of pollutant concentration and potential receptors, respectively. Atmospheric stability is another important factor in determining the potential for air pollution problems. It is largely a function of insolation and wind speed, and an objective methodology for determining it has been developed by Turner [13].

Historical data from Honolulu International Airport were reviewed and indicated a seasonal variation in wind direction. This winter-summer disparity is clearly shown in Figures 1 and 2 which depict January and August wind roses.

Historical meteorological data from Barbers Point NAS which had been processed using the Turner method were also reviewed [14,15,16]. They confirmed the annual predominance of northeasterly trade winds, but also indicated a significant occurrence of onshore winds primarily associated with a midday seabreeze regime. A screening of the 1967 - 71 Barbers Point surface observations indicated SE to SW winds occurred 643 - 1,032 hours per year. This is equivalent to 6.5 - 11.8% of the time.

Secondly, they indicate that almost 25% of the time slightly to moderately unstable conditions exist. Such conditions are conducive to bringing smoke plumes from elevated sources, e.g., smoke stacks, down to the ground within a relatively short distance downwind. Somewhat surprisingly, the data also show a

very significant percentage (45%) of stable air conditions which tend to carry plumes largely intact for great distances. Such conditions can result in high pollutant concentrations if the plume reaches hills which are at approximately the same height as the stack. Such stable conditions can also contribute to high pollutant concentrations if they coincide with peak traffic hours because automotive pollutants are emitted close to the ground.

5. MOBILE SOURCE IMPACT

5.1 Mobile Source Activity. A traffic impact report was prepared for the proposed development and served as the basis for this mobile source impact analysis [17]. Existing and projected p.m. peak-hour volumes for 1991 and 1997 at the following intersections with Fort Weaver Road were provided:

- Project Access Road "A"
- Project Access Road "B"
- Renton Road

Average daily hour-by-hour distributions for 1985 and 1997 were also provided. Morning peak-hour volumes were estimated based on the a.m. peak/ADT and p.m. peak/ADT ratios. A 6:00 - 7:00 a.m. traffic count made during the September 22, 1987 CO sampling indicated northbound traffic on Fort Weaver Road at 1327 vph and southbound at 591 vph which was consistent with the estimates.

5.2 Mobile Source Emission Factors. Carbon monoxide (CO) emission factors for vehicles were generated using the MOBILE-3 emissions model [18]. The emission factors were localized by use of the age distribution of registered vehicles in the City & County of Honolulu [19]. Fraction of vehicle miles travelled (VMT) was assumed to be directly proportional to the registration distribution. Emission factors were based on traffic speeds ranging from 10 - 40 mph depending on the volumes on each leg of the intersections. Intersections were assumed to be signalized with green/cycle ratios proportional to approach demands. Queue lengths and emission strengths at intersection approachs were determined by an EPA method [20].

5.3 Modeling Methodology. While emissions burden analysis is one means of evaluating a project's impact, it is generally more important to estimate the ambient impact since air quality standards are expressed as ambient concentrations, and it is the ambient concentrations to which living things are exposed. Computer modeling is normally employed to generate these ambient concentration estimates, most commonly with non-reactive pollutants. This is due to the complexity of modeling pollutants

which undergo chemical reactions in the atmosphere and are subject to the effects of numerous physical and chemical factors which affect reaction rates and products. For projects involving motor vehicles as the principal air air pollution source, carbon monoxide is normally selected for modeling because it has a relatively long half-life in the atmosphere (about 1 month) [21], and it comprises the largest fraction of automotive emissions.

The EPA guideline model CALINE-3 [22,23] was employed to estimate maximum 1-hour CO concentrations at receptor locations 10 - 40 meters from the intersection during the worst-case AM peak hour traffic. Worst-case meteorological conditions were selected accordingly.

Because of the time of day of the analysis (AM peak hour), the currently low level of urbanization in the area which would otherwise contribute to a "heat island" effect and increased turbulence, a stable atmosphere (Pasquill-Gifford Class "F") [24] and 1 meter per second (m/sec) wind speed were assumed as worst case meteorological conditions. A background CO level of 1.0 milligrams/cubic meter (mg/m3) was also assumed to account for the existing low level of traffic activity.

Preliminary modeling with 15, 45, 70, 80, and 90 degree wind-road angles with Fort Weaver Road indicated that the 15 degree angle would produce the maximum pollutant concentrations; thus, this angle was input to the CALINE-3 model. Specifically, due to the traffic volumes and predicted queuing, north-northwest winds direction were used for the "worst-case" analysis. In subsequent runs, north-northeast winds (yielding similar wind/road angles) were used because of their greater frequency.

5.4 Results: 1-Hour Concentrations. The results of the modeling for existing conditions are presented in Figures 3 - 5 for the three intersections under study. It is evident that both state and federal 1-hour CO standards appear to be met even under "worst-case" conditions of traffic, meteorology, and receptor location. The modeling results are also of the same magnitude as the CO sampling data collected on September 17 and 22, 1987 during a.m. peak-hour traffic.

Figures 6 through 8 depict the predicted CO concentrations at the intersections in 1991 if the proposed project were not built. The results suggest that the State's 1-hour CO standard of 10 mg/m3 may be exceeded, but the federal standard (40 mg/m3) would not. Note that the possible exceedance occurs within 10 meters of the roadway, and that concentrations drop off rather sharply with distance from the intersection.

The modeling results for the 1991 "with project" scenario are presented in Figures 9 through 11. The possibility of exceedances of the State standard out to 40 meters from the intersection is indicated. Again, however, the federal standard still appears to be met.

In 1997 with the project, predicted CO levels again show possible exceedances of the State standard, but only at the Road "A" and Road "B" intersections (Figures 12 and 13). Concentrations in the Renton Road area appear to have dropped back below the standard (Figure 14).

5.5 Results: 8-Hour Concentrations. Estimates of 8-hour concentrations can be derived by applying a "persistence" factor of 0.6 to the 1-hour concentrations. This "persistence" factor is recommended in an EPA publication on indirect source analysis [24] and has been further corroborated by analysis of carbon monoxide monitoring data in Honolulu which yielded the same 8-hour-to-1-hour ratio [25]. When using this approach any 1-hour CO concentration greater than 8.4 mg/m3 would indicate exceedance of the State's 8-hour standard. Similarly, any 1-hour concentration over 16.7 mg/m3 would indicate exceedance of the federal 8-hour standard.

Applying this factor to the 1-hour results indicates compliance with federal (10 mg/m3) and state (5 mg/m3) 8-hour standards under existing conditions. Violations of the State's standard, however, are indicated for 1991 and 1997 both with and without the project. For the "with project" scenarios in 1991 and 1997, exceedance of the federal standard also appears possible.

5.6 Correlation with Meteorological Data. In light of the high CO levels predicted for the intersections under study, a more detailed analysis of the Barbers Point meteorological data was undertaken in order to estimate the frequency of occurrence of those high concentrations. First, five years (1967-71) of meteorological data were screened for the occurrence of "worst-case" conditions, i.e., NNW (330 - 360 degrees) winds at 1 m/sec in a stable atmosphere (Pasquill-Gifford Category "F"), during the 6:00 - 8:00 a.m. period. None were found. A total of three hours out of the five years had similar conditions except 1.5 m/sec wind speed.

Next, the highest 1-hour CO scenario (Figure 10) was rerun with less stable conditions (Categories "E" and "D") in order to see if standards exceedances still showed up. The results of this modeling are depicted in Figures 15 and 16. The predicted concentrations are less than the "worst-case" levels but still indicate exceedance of the State 1- and 8-hour standards.

The meteorological data were again screened, this time for the frequency of 1 m/sec NNW winds and "E" and "D" stability. In two

of the five years, there were two hours for "E" stability and one hour for "D" during the specified morning hours. Again, the frequency of occurrence was very low.

Given knowledge of the greater frequency of NE winds in Hawaii, a modeling run was made with 1 m/sec NE (45 degrees) winds and "F" stability. The results in Figure 17 indicate exceedance of the State 1-hour standard and imply exceedance of the State and federal 8-hour standards. The high concentrations, however, do not appear to extend as far from the roadway as under the NNW wind conditions.

A screening of the 1971 and 1984 Barbers Point wind data indicated the following frequencies of 1 m/sec NE (30 - 60 degrees) winds and "F" stability:

	1971		1984	
Hour	Number of Occurrences	Annual Frequency	Number of Occurrences	Annual Frequency
6:00 am	10	2.74%	23	6.3%
7:00 am	10	2.74	14	3.8
8:00 am	3	0.82	0	0.0
Total:	23	6.3%	37	10.1%

Finally, wind data for the September - December, 1984 and January - February, 1985 period were manually screened in an effort to identify the "worst-case" 8-hour period. These months were selected because of the predominance of trade winds during the other months of the year and the greater likelihood of lower wind velocities during the Fall and Winter seasons. Because of the hourly traffic volume distribution along Fort Weaver Road, the screening focused on the 6:00 a.m. to 2:00 p.m. period. The screening criteria included:

- low wind speed
- consistent wind direction
- atmospheric stability

Three days (4 Sep 84, 26 Nov 84, and 4 Jan 85) were selected as offering the greatest promise of maximum 8-hour CO concentrations. All three days tended to have low velocity, predominantly NE winds with high stability (Class "F") in the early hours followed by neutral stability (Class "D") during the rest of the period. Most of the rejected days had either changes in wind direction in mid-morning due to onset of the seabreeze regime or simply higher wind speeds.

The hourly meteorological and traffic data for these three 8-hour periods was combined with the "worst-case" year (1991) and intersection (Road "B") and run in the CALINE-3 model. The results are presented in Table 5. The highest concentration, 7.3 mg/m3, indicates exceedance of the state but not the federal 8-hour standard.

5.7 In-Vehicle CO Levels. It should also be noted that operators and passengers can be exposed to levels of carbon monoxide inside vehicles significantly higher than that indicated by the microscale ambient air quality impact analysis. This exposure is, of course, exacerbated as congestion increases. When volume capacity ratios reach the 0.90 - 1.0 range and service levels drop to E and F, this occurs. With vehicles at idle or very low speed, CO emissions increase sharply and the occupants of vehicles are delayed in traffic; thus, for both reasons their CO exposure increases sharply. Unfortunately, there is currently no standardized modeling technique to estimate this exposure. In this particular instance, these conditions might occur during portions of a commute trip to Honolulu.

Carbon monoxide measurements were made during one such commute on September 22, 1987. The trip originated in the vicinity of Road "A" along Fort Weaver Road, proceeded to the H-1 eastbound on-ramp, then east on the H-1 to the Vineyard Street off-ramp, and terminated in the vicinity of the Cultural Plaza on North Kukui Street. The commute began at 7:30 a.m. and thus was near the end of the normal peak traffic period. The total trip time was 33 minutes and the average CO level in the vehicle was 12.8 mg/m3. This is comparable to levels found during a previous study of a.m. peak hour commutes along the Pali Highway [26].

6. STATIONARY SOURCE IMPACT

6.1 Electrical Generation. The estimated 10.8 million kilowatt hours of annual electrical demand by the ultimate development will necessitate the generation of electricity by power plants. Currently, most of Oahu's electrical energy is generated at Hawaiian Electric Company's Kahe Power Station located near Nanakuli on the leeward coast. This is currently a six-unit, approximately 650-megawatt facility firing low-sulfur fuel oil. A seventh 150-megawat unit has been recently proposed [27], and in the future some units may fire a coal-derived fuel, but for

the purposes of this analysis, oil-firing was assumed. Estimates of annual emissions were computed based on EPA emission factors and the fuel required to meet a 10.8 million KWhr demand. The results are presented in Table 6.

6.2 Solid Waste Disposal. The refuse generated by the residents of the 1,500 new homes in West Loch Estates will require disposal. Presently, about 80% of Oahu's refuse is being landfilled with the remaining 20% being burned at the Waipahu Incinerator [28]. In the future, most refuse will be burned at the City's proposed resource recovery facility. Estimates of annual emissions attributable to the combustion of West Loch Estates refuse at that facility are included in Table 6.

7. OTHER LONG-TERM IMPACTS

7.1 Agricultural Burning. Burning of sugar cane fields prior to harvest is a long-standing practice in Hawaii's sugar industry. Unfortunately for industry, however, as urbanization closes in around agricultural operations, it is inevitable that complaints about air pollution will arise. Cane fires result in the emission of particulates, carbon monoxide, and trace amounts of other organics. This was most recently demonstrated in an EPA study of cane burning on Maui [29]. Concentrations of particulates can reach high levels within about one mile of the fires [30]. A complete quantitative characterization of cane smoke, however, has yet to be performed. Fortunately, fires are generally infrequent and only last about 20 - 30 minutes.

7.2 Campbell Industrial Park. The industrial sources at Campbell Industrial Park obviously affect air quality in the Ewa area. The maximum concentrations of total suspended particulates (TSP) and sulfur dioxide, however, are in compliance with existing federal and state air quality standards. Neither monitoring nor computer modeling show violations of the current standards. Historically, there has been a problem meeting the State's TSP standard, and even with adoption of the less stringent federal standards, this may continue to be a problem as levels in the past have on occasion even exceeded those standards. As noted in Section 2, the state and federal particulate standards are once again different and while recent monitoring data indicate that the federal PM-10 standard is being met, the state TSP standard continues to be threatened.

SO2 standards are being gradually approached as new sources come in and existing sources expand. The impending construction of the City's resource recovery facility and the future construction of other as yet unidentified sources in the industrial park will all contribute additional increments of regulated and unregulated

pollutants to the Ewa air. The responsible government agencies will have to watch the situation closely to insure that standards continue to be complied with.

8. SHORT-TERM IMPACT

The principal source of short-term air quality impact will be construction activity. Construction vehicle activity will increase automotive pollutant concentrations along Fort Weaver road as well as in the vicinity of the project site itself. Because of the moderate existing off-peak traffic volumes, the additional construction vehicle traffic should not exceed road capacities although the presence of large trucks can reduce a roadway's capacity as well as lower average travel speeds.

The site preparation and earth moving will create particulate emissions as will building and on-site road construction. Construction vehicles movement on unpaved on-site roads will also generate particulate emissions. EPA studies on fugitive dust emissions from construction sites indicate that about 1.2 tons/acre per month of activity may be expected under conditions of medium activity, moderate soil silt content (30%), and a precipitation/evaporation (P/E) index of 50 [31,32].

The principal soil type in the project area is a Honouliuli clay with a silt content of about 30%. The precipitation/evaporation (P/E) Index for the area is 39. Compared to the EPA estimates and conditions, it would appear that there is a somewhat greater potential for fugitive dust due to the drier local climate, i.e., P/E Index of 39 versus 50.

9. DISCUSSION AND CONCLUSIONS

9.1 Mobile Source Impacts.

The presence of project-generated traffic will clearly increase the probability that state 1-hour and 8-hour CO standards will be exceeded within 40 meters of Fort Weaver Road by 1991 and later. Due to the federal motor vehicle control program [33], ambient levels could decline by 1997 and beyond unless offset by additional traffic generated by more residential development.

Exceedance of the federal 1-hour CO standard does not seem likely, but there appears to be a non-zero probability that the 8-hour standard could be exceeded in close proximity (within 20 meters) of Fort Weaver Road. Whether or not there will be a simultaneous occurrence of human exposure within that distance and timeframe will depend on the nature of development in the area.

9.2 Stationary Source Impacts.

The emissions estimates may be compared to the 1980 county emissions inventory in Table 7 in order to provide some perspective on their significance. The project's contribution to county emissions appears to be less than 1%.

9.3 Other Long-Term Impacts. As noted in Section 7, there will be at times exposure to the smoke from agricultural field burning. Until urbanization entirely replaces sugar cane cultivation in the Ewa District, this will result in some human exposure and complaints about cane fire smoke. The State Department of Health and federal EPA have indicated that they are continuing efforts to better characterize the exposure and potential health effects [34]. Depending on the results of those efforts, the smoke exposure may be reduced or eliminated before cane cultivation ceases in Ewa.

In the case of industrial air pollution sources at Campbell Industrial Park, the likelihood of those sources significantly affecting West Loch Estates seems rather low given the distance (about 7 miles) and low frequency of winds which would carry source emissions toward the development. A screening of the 1967-71 wind data from Barbers Point indicated about 0.5 - 1% of the time winds were heading from the industrial park towards West Loch Estates.

9.4 Short-Term Impacts. Since as noted in Section 8, there is a potential for fugitive dust due to the dry climate and fine soils, it will be important for adequate dust control measures to be employed during the construction period. Dust control could be accomplished through frequent watering of unpaved roads and areas of exposed soil. The EPA estimates that twice daily watering can reduce fugitive dust emissions by as much as 50%. The sooneat possible landscaping of completed areas will also help.

9.5 Conclusions. Based on the foregoing analysis, the following conclusions may be drawn:

- The proposed project will result in increased air pollutant emissions due to its inherent traffic generation ability, and its requirement for electrical power and solid waste disposal;

- The addition of project-related traffic will increase the probability of exceedances of state 1-hour and 8-hour carbon monoxide standards within 40 meters of Fort Weaver Road by 1991 and later;

- Project-related traffic will also contribute to the small probability that the federal 8-hour carbon monoxide standard will be exceeded within 20 meters of Fort Weaver Road;

- Annual emissions of criteria pollutants due to electrical generation and solid waste disposal attributable to West Loch Estates will increase county emissions by less than 0.1%; and

- Due to the relatively dry climate and fine soils in the area, dust control measures during construction will be important to prevent violations of state fugitive dust standards.

9.6 Mitigation Measures. The principal means available to reduce the predicted CO concentrations are:

- improve intersections to increase capacity

- increase bus service to area

- encourage car-pooling

- modify business/school starting hours

- develop mass transit system

- restrict residential development

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T A B L E S

TABLE 1

SUMMARY OF STATE OF HAWAII AND FEDERAL
AMBIENT AIR QUALITY STANDARDS

POLLUTANT	SAMPLING PERIOD	FEDERAL STANDARDS PRIMARY	FEDERAL STANDARDS SECONDARY	STATE STANDARDS
1. Total Suspended Particulate Matter (TSP)	Annual Geometric Mean	75	60	60
(micrograms per cubic meter)	Maximum Average in Any 24 Hours	260	150	150
2. PM-10	Annual	50	50	--
(micrograms per cubic meter	Maximum Average in Any 24 Hours	150	150	--
3. Sulfur Dioxide (SO2)	Annual Arithmetic Mean	80	--	80
(micrograms per cubic meter)	Maximum Average in Any 24 Hours	365	--	365
	Maximum Average in Any 3 Hours		1,300	1,300
4. Nitrogen Dioxide (NO2)	Annual Arithmetic Mean	100		70
(micrograms per cubic meter)				
5. Carbon Monoxide (CO)	Maximum Average in Any 8 Hours	10		5
(milligrams per cubic meter)	Maximum Average in Any 1 Hour	40		10
6. Photochemical Oxidants (as O3)	Maximum Average in Any 1 Hour	240		100
(micrograms per cubic meter)				
7. Lead (Pb)	Maximum Average in Any Calendar Quarter	1.5		1.5
(micrograms per cubic meter)				

TABLE 2

AIR MONITORING DATA
CAMPBELL INDUSTRIAL PARK
1971-85

	TSP.			SO_2			NO_2		
YEAR	RANGE	MEAN	>AQS	RANGE	MEAN	>AQS	RANGE	MEAN	>AQS
1971	18-471	125	5*	<5-16	<5	0	<20-49	29	0
1972	24-155	55	4	<5- 7	<5	0	<20-49	21	0
1973	14-129	50	1	<5-5	<5	0	<20-33	<20	0
1974	23-132	47	1	<5-10	<5	0	<20-40	25	0
1975	13-137	52	1	<5-11	<5	0	< 5-25	11	0
1976	12-101	40	1	<5-7	<5	0	< 5-29	14	0
1977	25-134	54	1	<5-18	<5	0	------	--	-
1978	22-127	48	1	<5-40	<5	0	------	--	-
1979	23-223	76	10	<5-27	<5	0	------	--	-
1980	29-158	53	2	<5-10	<5	0	------	--	-
1981	26-188	51	2	<5-40	<5	0	------	--	-
1982	15- 63	41	0	<5-12	<5	0	------	--	-
1983	28-193	--	2	<5-95	--	1	------	--	-
1984	17-112	50	1	<5-<5	<5	0	------	--	-
1985	24-138	57	3	<5-25	<5	0	------	--	-

NOTES:
1. TSP = total suspended particulates
2. SO_2 = sulfur dioxide
3. NO_2 = nitrogen dioxide
4. >AQS = number of violations of state air quality standard
5. All concentrations are in micrograms per cubic meter of air.
6. Sampling station was moved from Barbers Point Lighthouse to the Chevron Refinery site due to salt spray from the ocean on 17 March 1972.
7. The samplers were elevated to a rooftop on 7 August 1979.
8. Source: State Department of Health

TABLE 3

TSP & SO2 MONITORING DATA
BARBERS POINT, OAHU
1986

	Particulate Matter-10u (PM-10) 24-Hour Concentrations (ug/m3)				Sulfur Dioxide (SO2) 24-Hour Concentrations (ug/m3)			
MONTH	SAMPLES	MIN.	MAX.	MEAN	SAMPLES	MIN.	MAX.	MEAN
Jan 86	5	13	31	19	4	<5	<5	<5
Feb 86	4	21	40	27	4	<5	10	5
Mar 86	4	16	28	20	2	<5	<5	<5
Apr 86	4	27	31	28	5	<5	7	<5
May 86	5	19	20	24	5	<5	6	<5
Jun 86	3	18	42	31	5	<5	<5	<5
Jul 86	5	12	26	19	6	<5	<5	<5
Aug 86	3	24	35	29	5	<5	<5	<5
Sep 86	5	21	31	27	5	<5	<5	<5
Oct 86	5	17	43	28	5	<5	<5	<5
Nov 86	5	19	66	33	5	<5	<5	<5
Dec 86	4	7	40	24	5	<5	<5	<5
ANNUAL	52	7	66	26	56	<5	10	<5

SOURCE: Department of Health

TABLE 4

PM-10 & TSP MONITORING DATA
PEARL CITY, OAHU
1986

	Total Suspended Particulates (TSP) 24-Hour Concentrations (ug/m3)				Particulate Matter-10u (PM-10) 24-Hour Concentrations (ug/m3)			
MONTH	SAMPLES	MIN.	MAX.	MEAN	SAMPLES	MIN.	MAX.	MEAN
Jan 86	5	22	46	32	5	10	22	14
Feb 86	5	30	65	43	5	12	32	20
Mar 86	5	19	46	30	5	10	22	15
Apr 86	5	23	41	30	5	14	23	18
May 86	5	27	38	33	5	16	22	18
Jun 86	5	23	30	26	5	12	18	15
Jul 86	5	17	28	22	5	9	15	12
Aug 86	5	22	32	27	5	11	19	15
Sep 86	5	22	44	34	5	13	22	17
Oct 86	5	24	32	27	5	10	17	13
Nov 86	5	23	35	27	5	12	20	17
Dec 86	5	18	35	27	5	10	20	15
ANNUAL	60	17	65	30	60	9	32	16

SOURCE: Department of Health

TABLE 5

Estimates of Maximum 8-Hour Carbon Monoxide
Concentrations in the Vicinity of the Fort
Weaver Road - Road "B" Intersection
1991

Hours/ Receptor	Hourly CO Concentrations (mg/m3) 6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	8-hr Mean CO (mg/m3)
1	11.9	5.6	3.1	5.9	2.7	2.4	2.4	2.5	5.2*
2	8.5	3.2	2.2	4.5	2.1	1.8	2.4	2.4	3.9
3	5.6	2.6	1.7	3.8	1.7	1.6	2.3	2.4	3.1
4	3.8	2.5	1.6	3.1	1.5	1.4	2.0	2.3	2.6
5	13.9	8.1	4.1	6.1	3.7	2.9	1.9	2.1	6.1*
6	11.9	5.4	3.0	4.9	2.6	2.2	1.9	2.0	4.8
7	9.5	3.4	2.3	4.4	2.1	1.8	2.1	1.9	3.9
8	6.9	2.6	1.7	3.6	1.8	1.6	1.9	2.0	3.2
9	12.8	9.7	4.6	6.1	4.1	2.6	1.6	1.9	6.2*
10	12.5	7.6	3.6	5.1	3.2	2.5	1.7	1.7	5.4*
11	11.0	5.3	2.9	4.4	2.7	2.1	1.8	1.6	4.5
12	9.5	3.7	2.3	3.9	2.1	1.8	1.6	1.6	3.8

Meteorological data: 4 Jan 85

Hours/ Receptor	Hourly CO Concentrations (mg/m3) 6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	8-hr Mean CO (mg/m3)
1	7.2	4.5	4.7	5.0	3.8	3.4	1.0	3.4	4.7
2	4.2	3.4	3.4	3.6	2.8	2.3	1.0	2.6	3.3
3	3.1	3.3	2.7	2.8	2.3	1.9	1.0	2.1	2.7
4	3.0	3.2	2.1	2.5	1.9	1.7	1.0	1.8	2.5
5	10.9	6.3	5.5	5.7	3.9	3.8	1.0	3.5	5.8*
6	7.0	3.9	4.3	4.5	3.4	3.1	1.0	2.8	4.3
7	4.4	3.3	3.3	3.3	2.8	2.4	1.0	2.3	3.3
8	3.3	3.2	2.8	2.8	2.5	1.9	1.0	2.1	2.8
9	13.1	9.6	5.9	6.4	3.7	3.5	1.0	3.3	6.6*
10	10.1	5.3	4.7	5.0	3.5	3.2	1.0	2.8	5.1*
11	7.1	3.7	3.7	4.0	3.1	2.8	1.0	2.6	4.0
12	4.9	3.1	2.9	3.1	2.7	2.3	1.0	2.2	3.2

Meteorological data: 26 Nov 84

TABLE 5 (Con't)

Hours/ Receptor	Hourly CO Concentrations (mg/m3) 6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	8-hr Mean CO (mg/m3)
1	10.1	9.5	1.5	2.7	4.5	1.7	3.8	3.0	5.3*
2	5.6	5.3	1.4	2.1	3.8	1.4	3.7	2.4	3.7
3	4.2	4.1	1.3	1.9	3.2	1.4	3.7	2.1	3.1
4	3.9	3.9	1.2	1.5	3.1	1.4	3.7	1.7	2.9
5	15.5	14.5	1.5	2.8	4.0	2.1	3.1	2.7	6.6*
6	9.7	9.3	1.3	2.5	3.5	1.6	2.7	2.5	4.7
7	5.9	5.6	1.3	2.2	3.2	1.3	2.7	2.3	3.5
8	4.5	4.3	1.2	1.9	2.8	1.4	2.7	2.0	3.0
9	18.7	17.6	1.5	2.8	3.1	2.2	2.9	2.2	7.3*
10	14.2	13.4	1.3	2.4	2.9	1.8	2.5	2.3	5.8*
11	10.0	9.6	1.3	2.4	2.6	1.5	2.3	2.2	4.6
12	6.5	6.2	1.2	2.2	2.6	1.2	2.2	2.0	3.4

Meteorological data: 4 Sep 84

TABLE 6

Estimates of Annual Emissions Due to Electrical Generation and Solid Waste Disposal West Loch Estates, 1991-97

Pollutant	Emissions (T/Yr) Electrical Generation	Solid Waste Disposal
Sulfur dioxide	29.8	1.9
Nitrogen oxides	39.4	9.1
Particulate Matter	3.0	0.8
Carbon monoxide	1.9	8.0
Hydrocarbons	0.4	0.5

TABLE 7

1980 EMISSIONS INVENTORY

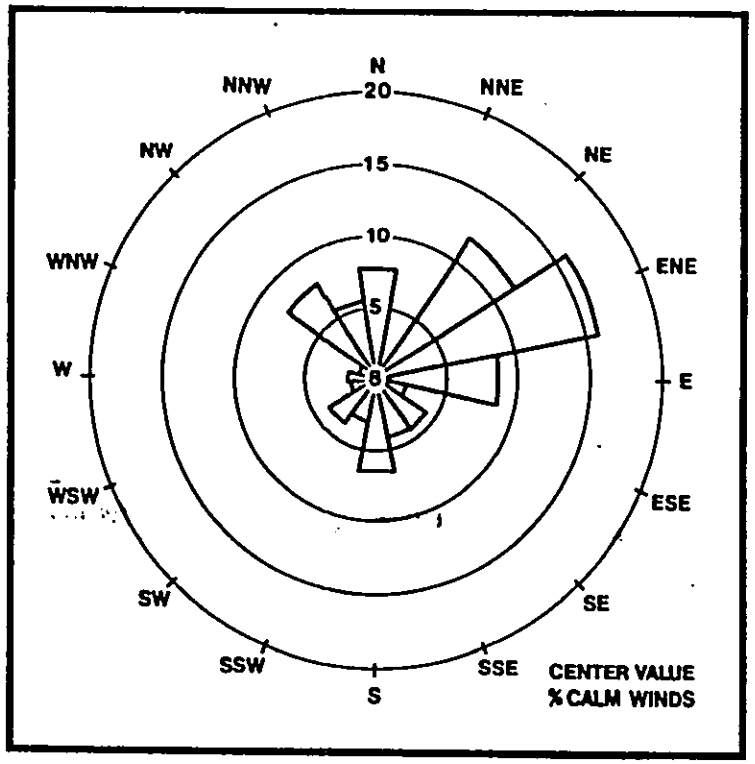
CITY & COUNTY OF HONOLULU

SOURCE CATEGORY	EMISSIONS (Tons/Year)				
	TSP	SOx	NOx	CO	HC
Steam Electric Power Plants	2092.0	36736.5	12454.9	1065.5	184.5
Gas Utilities	18.1	0.0	199.0	0.0	0.0
Fuel Combustion in Agricultural Industry	1088.4	579.3	358.1	0.0	30.8
Refinery Industry	621.9	7096.3	2148.8	266.4	2583.7
Petroleum Storage	0.0	0.0	0.0	0.0	1261.1
Metallurgical Industries	28.3	96.5	39.8	0.0	0.0
Mineral Products Industry	6883.7	1882.7	596.9	0.0	30.8
Municipal Incineration	42.4	144.8	2029.4	0.0	184.5
Motor Vehicles	1413.5	1013.8	17269.7	239197.6	22853.2
Construction, Farm and Industrial Vehicles	183.8	193.1	2506.9	3729.1	338.3
Aircraft	381.6	144.8	1750.8	5593.7	1476.4
Vessels	42.4	386.2	437.7	532.7	123.0
Agricultural Field Burning	1399.4	0.0	0.0	15982.0	1691.7
TOTAL IN TONS PER YEAR:	14,192	48,274	39,792	266,367	30,758

F I G U R E S

FIGURE 1

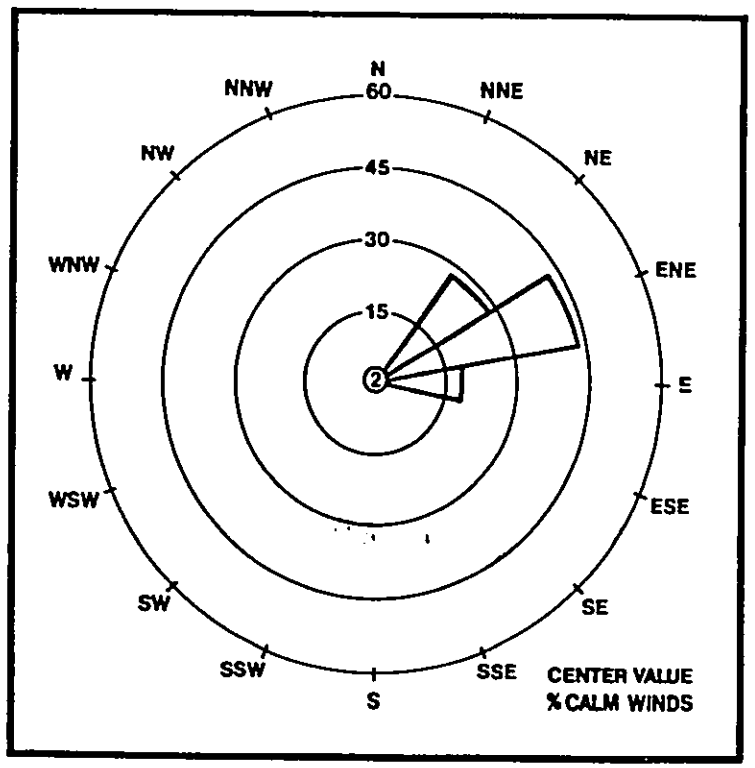
FREQUENCY DISTRIBUTION OF WIND DIRECTION IN PERCENTAGE
MONTH OF JANUARY
HONOLULU INTERNATIONAL AIRPORT



SOURCE: NATIONAL WEATHER SERVICE
RECORDS (1940-67)

FIGURE 2

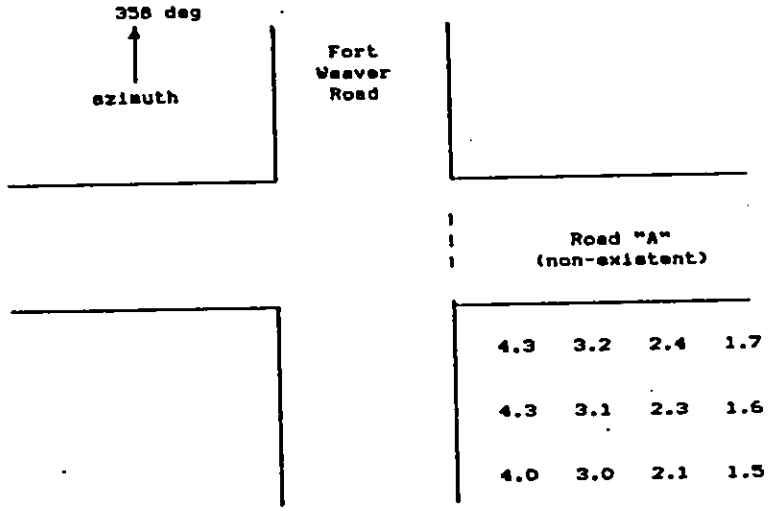
FREQUENCY DISTRIBUTION OF WIND DIRECTION IN PERCENTAGE
MONTH OF AUGUST
HONOLULU INTERNATIONAL AIRPORT



SOURCE: NATIONAL WEATHER SERVICE
RECORDS (1939-48, 1950-68)

FIGURE 3
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

FORT WEAVER ROAD AT WEST LOCH ESTATES
AM-PEAK HOUR - ROAD "A" (1987)

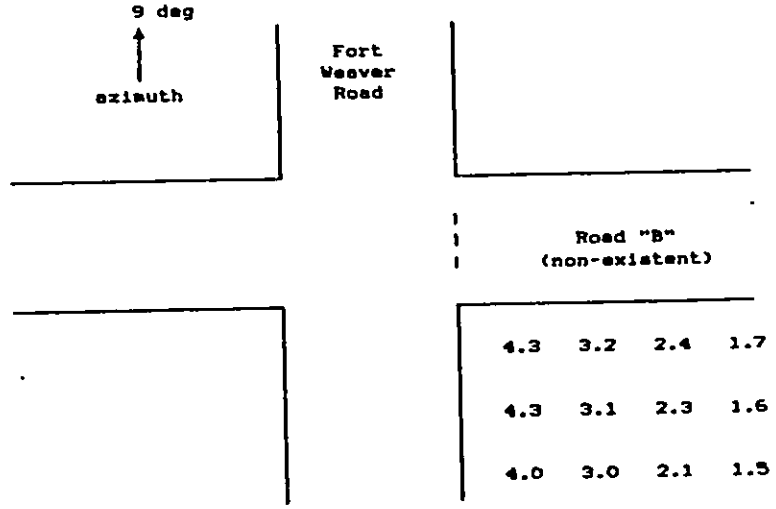


NOTES

CO concentrations = milligrams per cubic meter (mg/m3)
Receptor spacing = 10 meters
Wind direction = 343 deg
Wind speed = 1 meter per second (m/s)
Atmospheric stability = "F" (P-G Class 6)
Background CO concentration = 1.0 mg/m3
Diffusion model: CALINE-3
Emissions model: MOBILE-3

FIGURE 4
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

FORT WEAVER ROAD AT WEST LOCH ESTATES
AM-PEAK HOUR - ROAD "B" (1987)

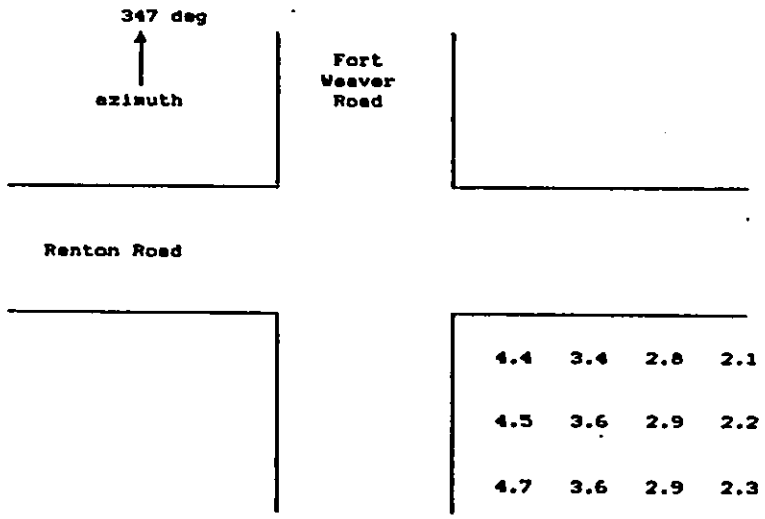


NOTES

CO concentrations = milligrams per cubic meter (mg/m3)
Receptor spacing = 10 meters
Wind direction = 354 deg
Wind speed = 1 meter per second (m/s)
Atmospheric stability = "F" (P-G Class 6)
Background CO concentration = 1.0 mg/m3
Diffusion model: CALINE-3
Emissions model: MOBILE-3

FIGURE 5
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

FORT WEAVER ROAD AT RENTON ROAD
AM-PEAK HOUR - RENTON ROAD (1987)

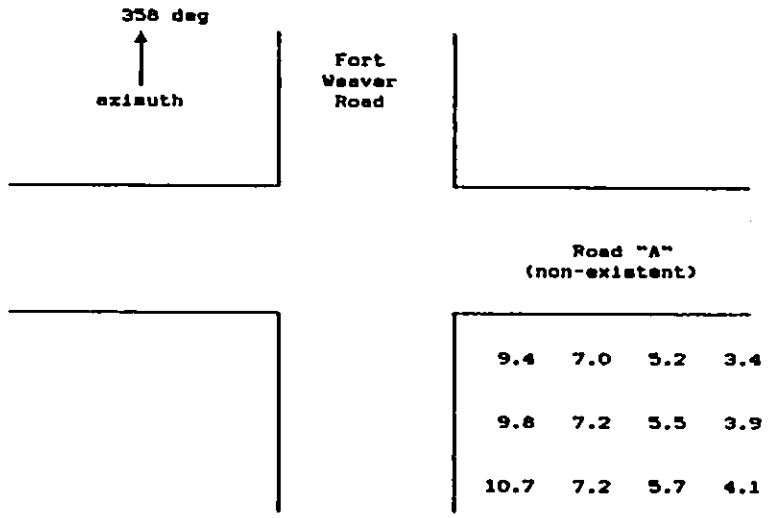


NOTES

CO concentrations = milligrams per cubic meter (mg/m3)
Receptor spacing = 10 meters
Wind direction = 332 deg
Wind speed = 1 meter per second (m/s)
Atmospheric stability = "F" (P-G Class 6)
Background CO concentration = 1.0 mg/m3
Diffusion model: CALINE-3
Emissions model: MOBILE-3

FIGURE 6
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

FORT WEAVER ROAD AT WEST LOCH ESTATES
AM-PEAK HOUR - ROAD "A" (1991 WITHOUT PROJECT)

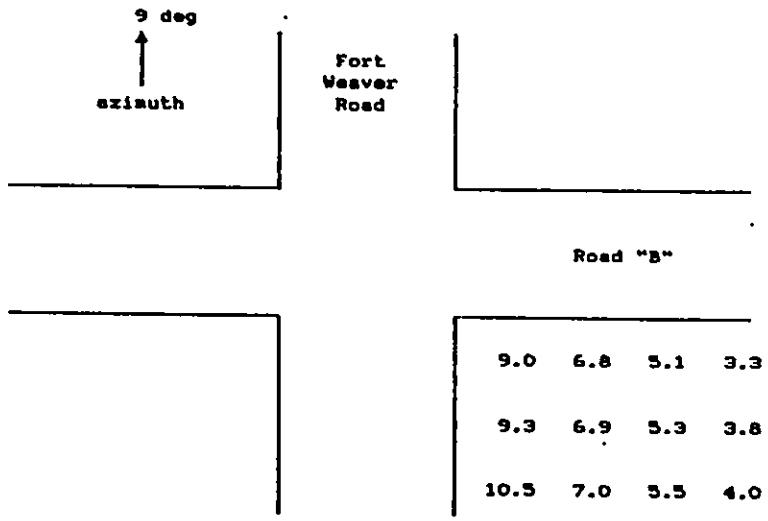


NOTES

CO concentrations = milligrams per cubic meter (mg/m3)
Receptor spacing = 10 meters
Wind direction = 343 deg
Wind speed = 1 meter per seconxd (m/s)
Atmospheric stability = "F" (P-G Class 6)
Background CO concentration = 1.0 mg/m3
Diffusion model: CALINE-3
Emissions model: MOBILE-3

FIGURE 7
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

FORT WEAVER ROAD AT WEST LOCH ESTATES
AM-PEAK HOUR - ROAD "B" (1991 WITHOUT PROJECT)

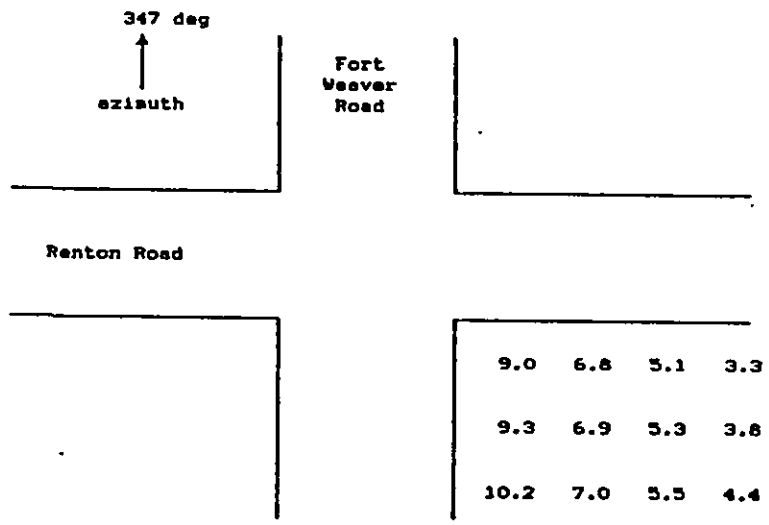


NOTES

CO concentrations = milligrams per cubic meter (mg/m3)
Receptor spacing = 10 meters
Wind direction = 354 deg
Wind speed = 1 meter per second (m/s)
Atmospheric stability = "F" (P-G Class 6)
Background CO concentration = 1.0 mg/m3
Diffusion model: CALINE-3
Emissions model: MOBILE-3

FIGURE 8
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

FORT WEAVER ROAD AT RENTON ROAD
AM-PEAK HOUR (1991 WITHOUT PROJECT)

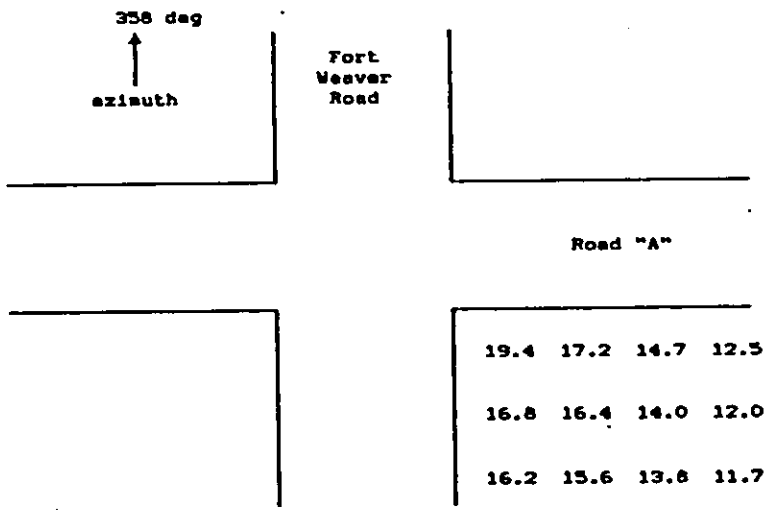


NOTES

CO concentrations = milligrams per cubic meter (mg/m3)
Receptor spacing = 10 meters
Wind direction = 332 deg
Wind speed = 1 meter per second (m/s)
Atmospheric stability = "F" (P-G Class 6)
Background CO concentration = 1.0 mg/m3
Diffusion model: CALINE-3
Emissions model: MOBILE-3

FIGURE 9
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

FORT WEAVER ROAD AT WEST LOCH ESTATES
AM-PEAK HOUR - ROAD "A" (1991 WITH PROJECT)

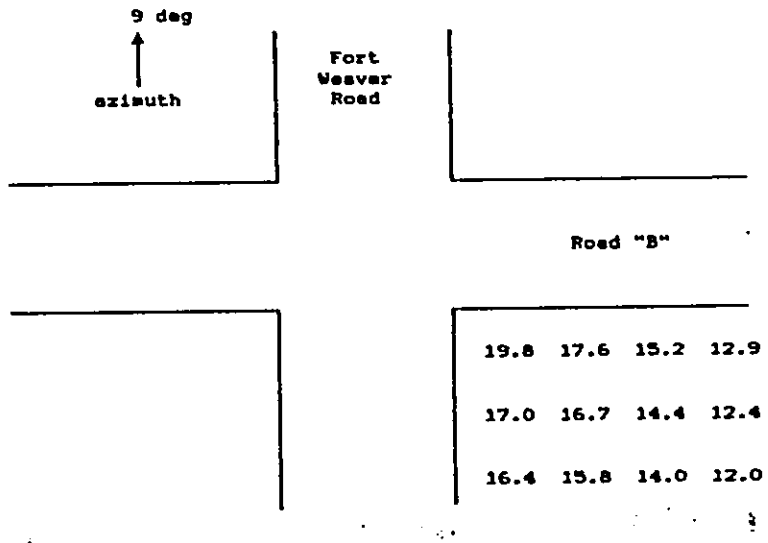


NOTES

CO concentrations = milligrams per cubic meter (mg/m3)
Receptor spacing = 10 meters
Wind direction = 343 deg
Wind speed = 1 meter per second (m/s)
Atmospheric stability = "F" (P-G Class 6)
Background CO concentration = 1.0 mg/m3
Diffusion model: CALINE-3
Emissions model: MOBILE-3

FIGURE 10
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

FORT WEAVER ROAD AT WEST LOCH ESTATES
AM-PEAK HOUR - ROAD "B" (1991 WITH PROJECT)

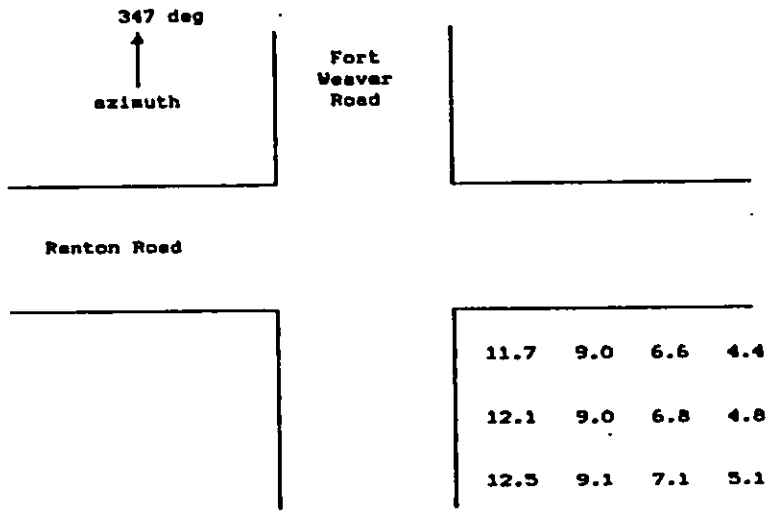


NOTES

CO concentrations = milligrams per cubic meter (mg/m3)
Receptor spacing = 10 meters
Wind direction = 354 deg
Wind speed = 1 meter per second (m/s)
Atmospheric stability = "F" (P-G Class 6)
Background CO concentration = 1.0 mg/m3
Diffusion model: CALINE-3
Emissions model: MOBILE-3

FIGURE 11
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

FORT WEAVER ROAD AT RENTON ROAD
AM-PEAK HOUR (1991 WITH PROJECT)

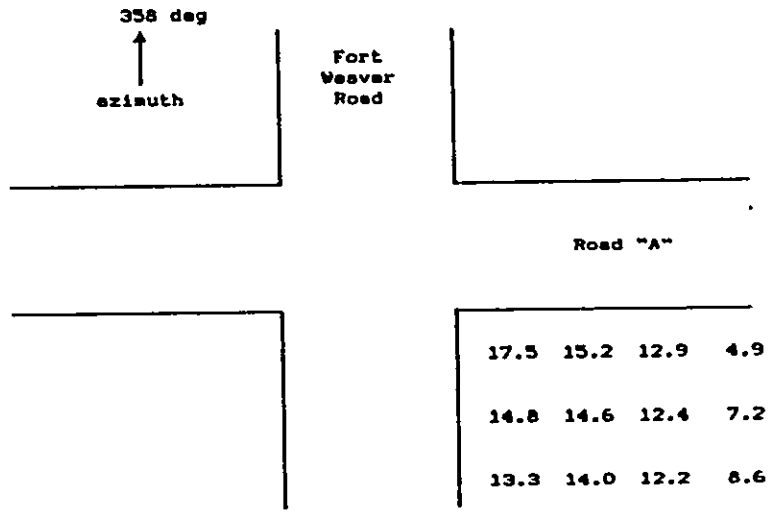


NOTES

CO concentrations = milligrams per cubic meter (mg/m3)
Receptor spacing = 10 meters
Wind direction = 332 deg
Wind speed = 1 meter per second (m/s)
Atmospheric stability = "F" (P-G Class 6)
Background CO concentration = 1.0 mg/m3
Diffusion model: CALINE-3
Emissions model: MOBILE-3

FIGURE 12
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

FORT WEAVER ROAD AT WEST LOCH ESTATES
AM-PEAK HOUR - ROAD "A" (1997 WITH PROJECT)

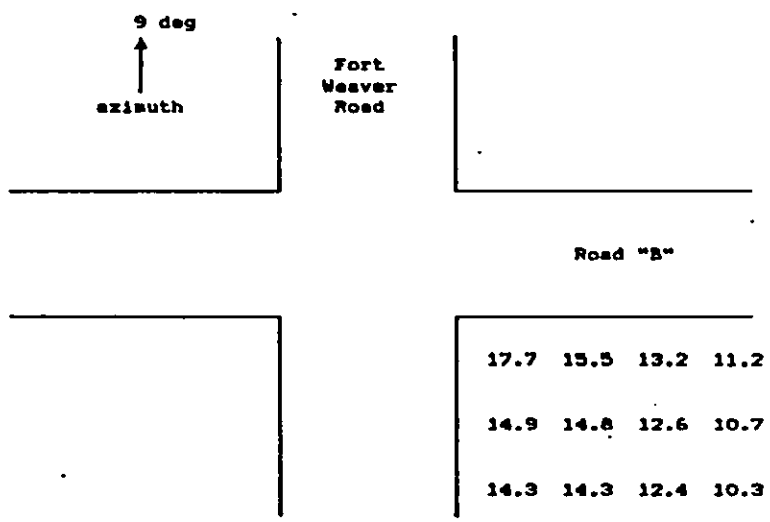


NOTES

CO concentrations = milligrams per cubic meter (mg/m3)
Receptor spacing = 10 meters
Wind direction = 343 deg
Wind speed = 1 meter per second (m/s)
Atmospheric stability = "F" (P-G Class 6)
Background CO concentration = 1.0 mg/m3
Diffusion model: CALINE-3
Emissions model: MOBILE-3

FIGURE 13
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

FORT WEAVER ROAD AT WEST LOCH ESTATES
AM-PEAK HOUR - ROAD "B" (1997 WITH PROJECT)

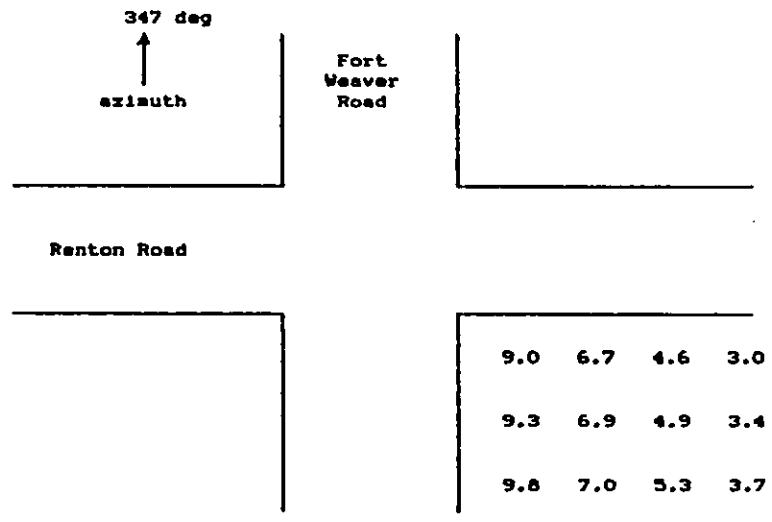


NOTES

CO concentrations = milligrams per cubic meter (mg/m3)
Receptor spacing = 10 meters
Wind direction = 354 deg
Wind speed = 1 meter per second (m/s)
Atmospheric stability = "F" (P-G Class 6)
Background CO concentration = 1.0 mg/m3
Diffusion model: CALINE-3
Emissions model: MOBILE-3

FIGURE 14
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

FORT WEAVER ROAD AT RENTON ROAD
AM-PEAK HOUR (1997 WITH PROJECT)

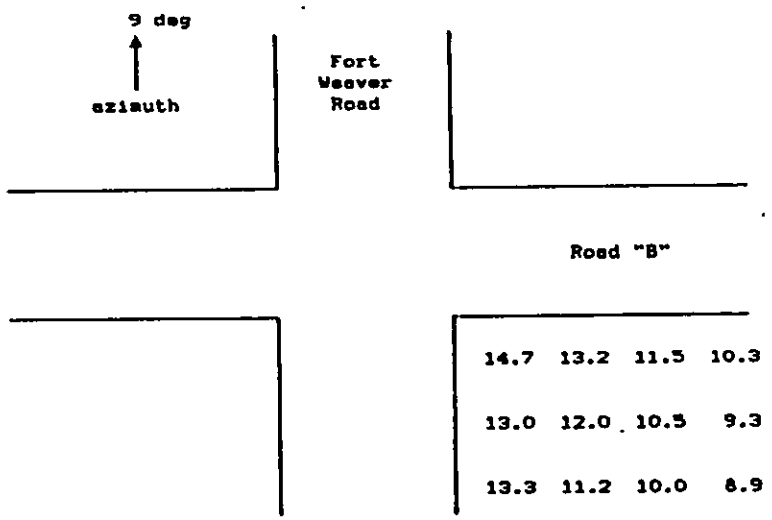


NOTES

CO concentrations = milligrams per cubic meter (mg/m3)
Receptor spacing = 10 meters
Wind direction = 332 deg
Wind speed = 1 meter per second (m/s)
Atmospheric stability = "F" (P-G Class 6)
Background CO concentration = 1.0 mg/m3
Diffusion model: CALINE-3
Emissions model: MOBILE-3

FIGURE 15
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

FORT WEAVER ROAD AT WEST LOCH ESTATES
AM-PEAK HOUR (1991 WITH PROJECT)
(STABILITY "E")

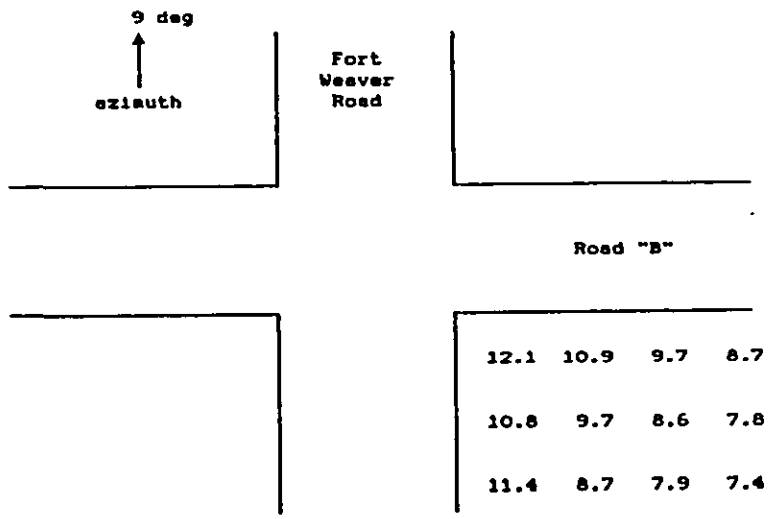


NOTES

CO concentrations = milligrams per cubic meter (mg/m3)
Receptor spacing = 10 meters
Wind direction = 354 deg
Wind speed = 1 meter per second (m/s)
Atmospheric stability = "E" (P-G Class 5)
Background CO concentration = 1.0 mg/m3
Diffusion model: CALINE-3
Emissions model: MOBILE-3

FIGURE 16
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

FORT WEAVER ROAD AT WEST LOCH ESTATES
AM-PEAK HOUR (1991 WITH PROJECT)
(STABILITY "D")

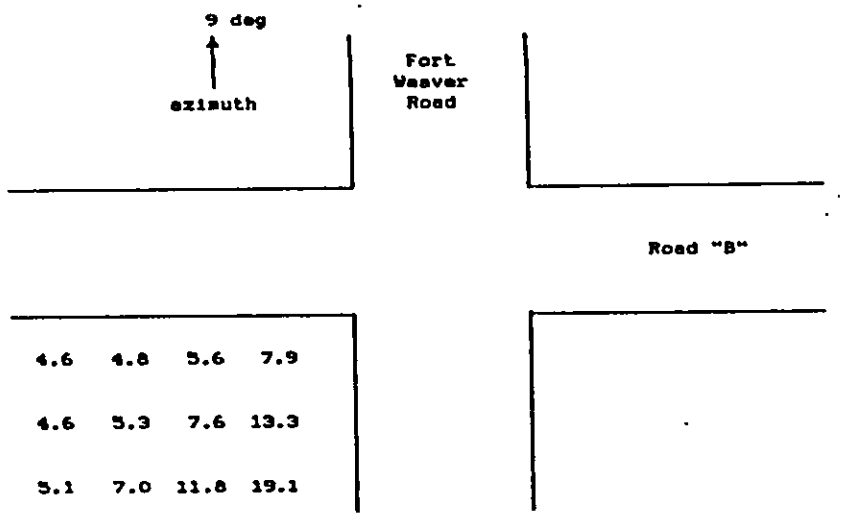


NOTES

CO concentrations = milligrams per cubic meter (mg/m3)
Receptor spacing = 10 meters
Wind direction = 354 deg
Wind speed = 1 meter per second (m/s)
Atmospheric stability = "D" (P-G Class 4)
Background CO concentration = 1.0 mg/m3
Diffusion model: CALINE-3
Emissions model: MOBILE-3

FIGURE 17
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

FORT WEAVER ROAD AT WEST LOCH ESTATES
AM-PEAK HOUR (1991 WITH PROJECT)
(NORTHEAST WIND)



NOTES

CO concentrations = milligrams per cubic meter (mg/m3)
Receptor spacing = 10 meters
Wind direction = 54 deg
Wind speed = 1 meter per second (m/s)
Atmospheric stability = "F" (P-G Class 6)
Background CO concentration = 1.0 mg/m3
Diffusion model: CALINE-3
Emissions model: MOBILE-3

APPENDIX E

Archaeological Reconnaissance Survey For Environmental Impact Statement West Loch Estates - Residential Increments I and II Land of Honouliuli Ewa District, Island of Oahu

by

PAUL H. ROSENDAHL, Ph.D., INC.
Consulting Archaeologist

September 1987

PAUL H. ROSENDAHL, Ph.D., Inc.
Consulting Archaeologist

Report 322-090787

ARCHAEOLOGICAL RECONNAISSANCE SURVEY FOR ENVIRONMENTAL IMPACT STATEMENT

WEST LOCH ESTATES - RESIDENTIAL INCREMENTS I AND II

Land of Honouliuli
Ewa District, Island of Oahu

September 1987

305 Mohouli Street • Hilo, Hawaii 96720 • (808) 969-1763 or 966-8038

PAUL H. ROSENDAHL, Ph.D., Inc.
Consulting Archaeologist

Report 322-090787

ARCHAEOLOGICAL RECONNAISSANCE SURVEY
FOR ENVIRONMENTAL IMPACT STATEMENT

WEST LOCH ESTATES - RESIDENTIAL INCREMENTS I AND II

Land of Honouliuli
Ewa District, Island of Oahu

by

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Prepared for

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INTRODUCTION

BACKGROUND

At the request of Mr. Chester Koga of R.M. Towill Corp., acting for their client, the City and County of Honolulu, Paul H. Rosendahl, Ph.D., Inc. (PHRI) conducted a combined surface and subsurface archaeological reconnaissance survey of the approximately 232 ac West Loch Estates - Residential Increments I and II project area in Honouliuli, Ewa, Island of Oahu. The primary objective of this survey was to provide information--concerning the presence or absence of any sites or features of possible archaeological significance within the project area limits--both appropriate to and sufficient for an Environmental Impact Statement (EIS) being prepared in accordance with Chapter 343-Haw. Rev. Stat. and in anticipation of a Land Use Boundary District Amendment petition to be submitted to the State Land Use Commission.

Reconnaissance survey field work was carried out during the period July 28-September 11, 1987, under the supervision of PHRI Principal Archaeologist Dr. Paul H. Rosendahl (Principal Investigator) and PHRI Supervisory Archaeologist Mr. A. Herrill Dicks (Project Field Director). Approximately 30 man-hours of labor were expended in carrying out the field work. An oral report on field work findings and preliminary conclusions was given to Mr. Chester Koga of R.M. Towill Corp. on September 14, 1987. Field work findings were also discussed with Dr. Joyce Bath, staff archaeologist for Oahu in DLNR-HSS. The present report constitutes the final report on the reconnaissance survey.

SCOPE OF WORK

The goal of the reconnaissance survey was to identify--to discover and locate on available maps--sites and features of potential archaeological significance. A reconnaissance survey comprises the initial level of archaeological investigation. It is extensive rather than intensive in scope, and is conducted basically to determine the presence or absence of archaeological resources within a specified project area. Reconnaissance survey indicates both the general nature and variety of archaeological remains present, and the general distribution and density of such remains. A reconnaissance survey permits a general significance assessment of the archaeological resources, and facilitates formulation of realistic recommendations and estimates for such further work as might be necessary or appropriate. Such work could include intensive survey--data collection involving detailed recording of sites and features, and selected test excavations; and possibly subsequent mitigation--data recovery research excavations, construction monitoring, interpretive planning and development, and/or preservation of sites and features with significant scientific research, interpretive, and/or cultural values.

The principal objectives of the combined reconnaissance survey of the West Loch Estates - Residential Increments I and II project area were four-fold: (a) to identify (find and locate) any sites or features present within the project area; (b) to evaluate the potential general significance of any identified archaeological remains; (c) to determine the possible impacts of proposed development upon any identified remains; and (d) to define the general scope of any subsequent data collection and/or mitigation work that might be necessary or appropriate. Based on a preliminary review of available background literature and records, and several discussions with Mr. Koga, Dr. Bath, and Dr. Ross Cordy, DLNR-HSS chief archaeologist, the following specific objectives were determined to constitute an adequate scope of work for the combined reconnaissance survey of the West Loch Estates - Residential Increments I and II project area:

1. To review and evaluate available archaeological and historical literature relevant to the immediate project area;

2. To conduct a combined surface and, if appropriate, subsurface sample field inspection survey of the approximately 232 acre project area to determine the presence or absence of any potentially significant archaeological sites;

3. To determine the nature of the physical conditions of the project area that would influence the conduct of any subsequent archaeological field work, should such be necessary; and

4. Prepare an appropriate scope of work (including specific field work and other non-field tasks) and accurate man-hour estimates for any subsequent archaeological work that might be necessary.

The potential general significance of any archaeological remains identified during the combined reconnaissance survey was to be evaluated in terms of the National Register criteria contained in 36 CFR Part 60, Section 6. The State Department of Land and Natural Resources-Historic Sites Section (DLNR-HSS) uses these criteria to evaluate eligibility for both the Hawaii State and National Register of Historic Places. It was anticipated that the potential significance of any identified remains would most likely relate to National Register criterion "(d)," which refers to remains "...that have yielded, or may be likely to yield, information important in prehistory or history". Once potential significance had been tentatively evaluated, DLNR-HSS would be consulted in order (a) to determine and fix formally the significance of the remains, and (b) to determine appropriate mitigation actions to be undertaken.

In order to facilitate future cultural resource management decisions regarding site treatments, any significant sites identified within the project area would also be evaluated in terms of three value modes—scientific research, interpretive, and cultural values—which are derived from the previously mentioned State and National Register eligibility

criteria. Research value refers to the potential of archaeological resources for producing information useful in the understanding of culture history, past lifeways, and cultural processes at the local, regional, and interregional levels of organization. Interpretive value refers to the potential of archaeological resources for public education and recreation. Cultural value, within the framework for significance evaluation used here, refers to the potential of archaeological resources for the preservation and promotion of cultural and ethnic identity and values.

PROJECT AREA DESCRIPTION

The West Loch Estates - Residential Increments I and II project area consists of approximately 232 acres located in the Land of Honouliuli, Ewa District, Island of Oahu. Comprised of two non-contiguous parcels separated by the Honouliuli Stream floodplain, the project area is located on the Ewa Plain in the southwest part of Oahu, immediately east of and adjacent to the West Loch of Pearl Harbor (Figure 1). Increment I (66 ac) is bounded by Fort Weaver Road on the west, the adjacent light industrial area of Waipahu on the north, the approximate limits of the fallow canefield (roughly the 20-ft contour) and a portion of the old Oahu Railroad and Land (OR&L) Company Right-of Way (ROW) (railroad cut) above the West Loch of Pearl Harbor on the east, and a portion of the Hoaeae Point access road and the approximate limits of the fallow canefield (roughly the 32-ft contour) overlooking the Honouliuli Stream floodplain on the south. Increment II (166 ac) is bounded by Fort Weaver Road on the west, the OR&L-ROW (railroad bed) on the southeast, and the approximate limits of the present canefield (roughly the 20-ft contour) overlooking the Honouliuli Stream floodplain and a small, immediately adjacent portion of the floodplain presently utilized for gardening and ranching on the northeast.

Comprised almost entirely of lands owned by the Estate of James Campbell and leased by Oahu Sugar Company, the entire project area has been extensively modified in recent times, primarily by sugarcane cultivation. The Increment I land has recently been fallowed, and has a low, variable density cover of weeds and shrubs. The Increment II land is currently largely under cultivation by Oahu Sugar Company, and most of the land therefore has a dense cover of sugarcane (Saccharum sp.). Other grasses and scattered stands of koa-haole (Leucaena glauca [L.] Benth.) are present primarily as a fringe along shallow gullies and drainages that cut through the project area and as a cover on very steep, uncultivated slopes.

PREVIOUS ARCHAEOLOGICAL WORK

Although no archaeological remains are known to exist within the project area, an extension/component of one previously identified site is situated immediately adjacent to it. While the portion of the Oahu Railroad and Land Company Right-of-Way (railroad bed) which bounds the

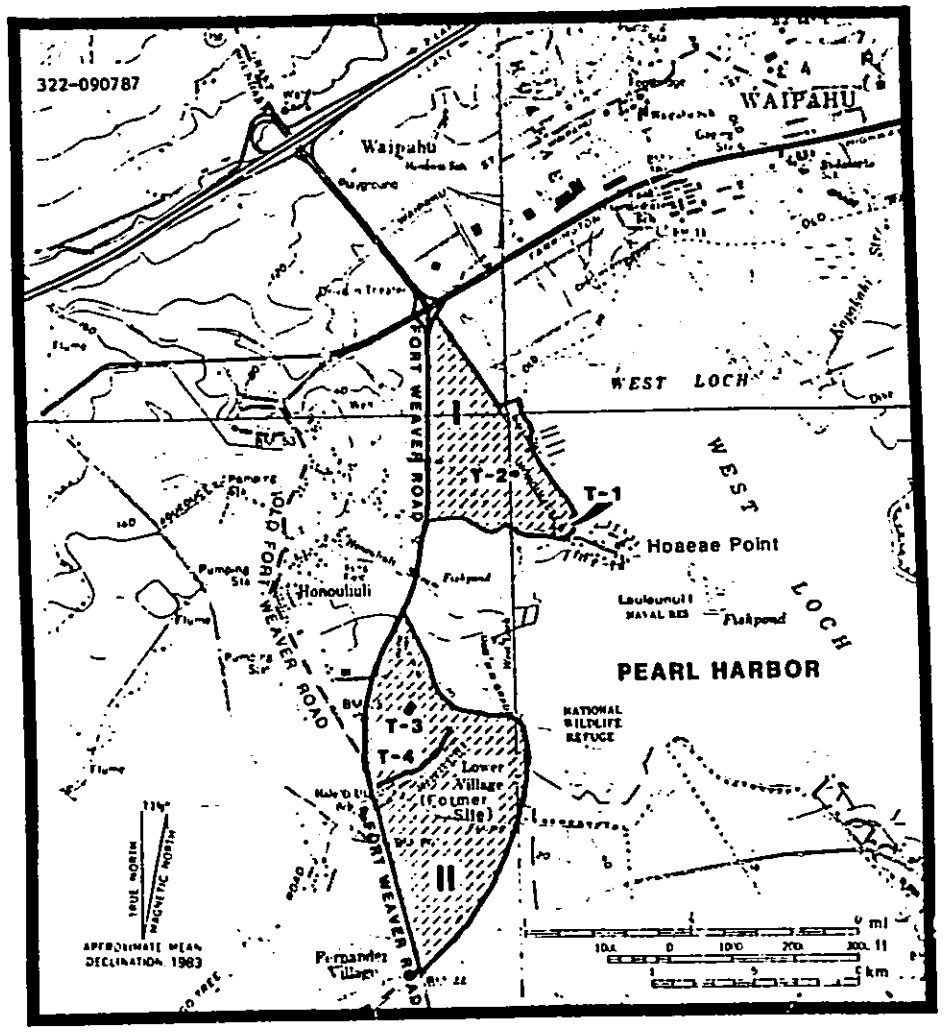

Figure 1.

PROJECT AREA AND SITE LOCATION MAP

Archaeological Reconnaissance Survey for Environmental Impact Statement
West Loch Estates - Residential Increments I and II
Land of Honouliuli, Ewa District, Island of Oahu

PHRI Project 87-322 July-September 1987

(Composite map based on current 7.5' series USGS quad maps.)

southeast side of Increment II and a part of the east side of Increment I is not itself a formally identified site, the existing section that extends approximately 13 miles—from the Fort Weaver Road intersection at the southern tip of the Increment II portion of the project area, across the Ewa Plain to the intersection of Farrington Highway and Lualualei Road in Nanakuli, is currently listed on the National Register of Historic Places (Site 50-80-12-9714). Based on a preliminary review of available documentary literature and records, and on initial surface reconnaissance field work observations, it is considered quite likely that potentially significant sites are present on both the immediately adjacent Honouliuli Stream floodplain, the shoreline areas along the West Loch of Pearl Harbor, and Hoaeae Point; however, these areas are outside the limits of the West Loch Estates - Residential Increments I and II project area.

FIELD METHODS AND PROCEDURES

Reconnaissance survey field work conducted during the period July 28-September 11, 1987 by PHRI consisted limited systematic pedestrian coverage and subsurface sampling, and a combination of vehicular coverage and pedestrian point inspections. Field work was greatly facilitated by black-and-white aerial photographs (approx. scale 1"=400'; R.M. Towill, Photo No.8311-3, 5/13/84, and Photo No.8500-4, 7/26/87), and a blueline topographic map (scale 1"=200', 4-ft contours; R.M. Towill, based on 7/26/87 aerial photograph). Systematic pedestrian coverage concentrated on those very limited portions adjacent to several shallow gullies and drainages and the very steep slopes which, on the basis of the aerial photographs and initial field inspection, appeared to have been least modified by sugarcane cultivation and other activities. The combination of vehicular coverage and pedestrian point inspections was used to check accessable locations throughout the project area primarily to verify the essentially total modification of the project area in recent times by sugarcane cultivation. Subsurface testing was limited in scope, and consisted of facing-off vertical exposures and digging shovel pits and short trenches into areas suspected of possibly having subsurface cultural deposits. Excavated fill was processed through 0.25 in mesh screens to facilitate recovery and recognition of potential cultural remains.

All identified sites were assigned sequential temporary field numbers prefixed with "T-", beginning with T-1. The location of sites identified during the reconnaissance was plotted onto a field copy of the 1"=200' scale topographic map. A standard PHRI site survey record form was completed for each site. Sketch maps of sites were drawn where appropriate. Sites and features were photographed using 35 mm black-and-white film (PHRI Field Roll No. 322-1). Each site, or the primary feature of each site complex, was marked with blue plastic flagging tape and was tagged with an aluminum tag denoting temporary site number, PHRI project number (87-322), the letters "PHRI", and the date.

FIELD WORK FINDINGS

Only four archaeological sites were identified within the West Loch Estates – Residential Increments I and II project area. These sites are summarized in Table 1 according to formal type, tentative functional interpretation, significance evaluation (in terms of value modes), recommended further field work tasks (where appropriate), and comments. Site locations are indicated in Figure 1. Based on the preliminary review of available documentary literature and records, and on surface reconnaissance field work observations, it is considered quite likely that potentially significant sites are present on both the immediately adjacent Honouliuli Stream floodplain and the shoreline areas along the West Loch of Pearl Harbor; however, these areas are outside the limits of the West Loch Estates – Residential Increments I and II project area, and are being investigated during the currently in progress combined surface and subsurface reconnaissance survey of the West Loch Estates – Golf Course and Shoreline Parks project area.

SITE DESCRIPTIONS

Site T-1 Midden Deposit (?)

This site is located at the southeast tip of the Increment I portion of the project area. It is comprised of a band of marine shell in a soil matrix that is exposed at four discontiguous points along an approximately 100 m long section in the face of a low cut along the inland side of the old cane haul road situated immediately above the old OR&L-ROW (railroad cut). A single short test trench was dug by shovel into each of the four exposures. Shovel Test 1 (ST-1), which was placed across a short alignment of basalt boulders that appeared to be a remnant of a low retaining wall along the cane haul road, revealed only fragmentary marine shell and coarse, well-sorted alluvial gravels beneath 75 cm of sterile overburden. ST-2, -3, and -4 all revealed a similar situation of fragmentary shell in a 10–20 cm thick brown silty clay loam matrix beneath 30 cm of sterile red silty clay overburden. A series of quick shovel probes a few meters inland of the exposed face demonstrated that the horizontal distribution of the deposits was restricted essentially to the exposed face.

The marine shell in the deposits consisted almost entirely of broken fragments of the brackish water bivalve Brachidontes cerebristratus. No portable artifacts of any kind were recovered, and the only other ecofactual remains noted were a very few pieces of other marine shell. The nature of the deposits suggested that if they were cultural in origin (i.e., a midden deposit), then they have been extensively disturbed.

Site T-2 Surface Artifact Collection Area

This site consists of an area about 50 m in diameter, situated approximately along the 40-ft contour, in the middle of the fallow cane-

field of Increment I. This locale was inspected because several early Hawaiian government maps (1873, 1897) found in the State Survey Office had indicated that a survey triangulation station had been situated there, and that some kind of structure—most likely a historic house site—had been present in the immediate vicinity. While the area was found to have been extensively disturbed by decades of cane cultivation, the recovery of several old bottle glass and ceramic vessel fragments seemed to confirm the earlier presence of pre-1900 historic habitation in the immediate area.

Table 1.

SUMMARY OF IDENTIFIED SITES AND FEATURES
WEST LOCH ESTATES – RESIDENTIAL INCREMENTS 1 AND II PROJECT AREA

Site & Feature Number	Formal Site/Feature Type	Tentative Functional Interpretation	*Significance Evaluation R	I	C	#Field Work Tasks DR	SC	EX	Comments
T-1	Midden deposit (?)	Habitation?	L	L	L	–	–	–	Minimal integrity (greatly disturbed); poss. non-cultural
T-2	Surface artifact collection area	Habitation	L	L	L	–	–	–	Historic site area; minimal integrity (greatly disturbed);
T-3 A-E	Complex (5)+ Graves	Modern cemetery	M	L	H	+	–	+	Minimum 5 graves found, poss. more present; 3 graves have names
T-4	Surface artifact collection area	Habitation	L	L	L	–	–	–	Historic/modern refuse area; minimal integrity (greatly disturbed)

*Significance Evaluation (Value Modes)—Nature: R = scientific research, I = interpretive, C = cultural; Degree: H = high, M = moderate, L = low.

#Field Work Tasks: DR = detailed recording (scaled drawings, photographs, and written descriptions), SC = surface collections, EX = test excavations.

+Number of component features within complex.

Site T-3 Complex (Modern Cemetery)

This site is located in Increment II, immediately adjacent to an abandoned section of the old Eva Beach Road. A cluster of five historic period graves found scattered in flat area on the inland of a knoll, this complex was initially identified during field survey. Subsequent study of an old USGS quad map (1927-28, Waipahu) revealed a designated cemetery in the same approximate location. Three of the graves (all undated) had legible names, one inscribed in the concrete headstone base and two incised into wooden crosses set inside small, white-fenced enclosures. A fourth, unnamed grave consisted of a small, fenced enclosure constructed of metal pipe and incorporating a cross formed of pipe, while a fifth, also unnamed, consisted of an upturned and partially buried concrete monument. The general appearance of this complex indicates a modern cemetery, and suggests the probable presence of additional, unmarked graves.

Site T-4 Surface Artifact Collection Area

Extending through the middle of Increment II, this site consists of an extensive concentration of historic period artifactual remains distributed for over 500 m along the base of a steep slope (along the 40-ft contour) in the presently cultivated cane field. The remains almost certainly derive from the plantation settlement known as Lower Village that formerly was situated on the flat above the slope. This settlement was razed in the early 1980s, just prior to the construction of the new Fort Weaver Road. A surface collection of diagnostic artifacts was made by collecting items in 50 m increments along the base of the slope. While most of the materials recovered (principally glass and ceramic items) evidence the post-1900 and recent age of the settlement, occasional pieces indicate the possibility of some pre-1900 occupation. It is obvious, however, that while the deposits at the base of the slope probably derive from intentional refuse disposal, the deposits have been so eroded and disturbed that no primary context stratigraphic situations are likely to be present.

CONCLUSIONS

COMMENTS

The combined surface and subsurface reconnaissance survey of the West Loch Estates - Residential Increments I and II project area confirmed an initial impression that the project area had been extensively and almost entirely modified by decades of historic period sugarcane cultivation. Only four sites were identified during the survey field work. Three of these (Sites T-2, -3, and -4) were found to be historic period in age, while the fourth (T-1) was ambiguous as to whether or not it even was a cultural feature. Two of the historic period sites, the cemetery (T-3) and the surface artifact collection area (T-4) appear to be related to relatively recent sugar plantation occupation, while the third—a small surface artifact collection area (T-2)—appears to date somewhat earlier.

GENERAL SIGNIFICANCE ASSESSMENTS AND RECOMMENDED GENERAL TREATMENTS

To facilitate State and County review, general significance assessments and recommended general treatments for all sites identified during the combined reconnaissance survey are summarized in Table 2. Significance categories used in the evaluation process are based on the National Register criteria contained in the Code of Federal Regulations (36 CFR Part 60, Section 4). The State Department of Land and Natural Resources-Historic Sites Section (DLNR-HSS) uses these criteria to evaluate eligibility for both the Hawaii State and National Register of Historic Places. Sites determined to be potentially significant for information content (Category A, Table 2) fall under Criterion D, which defines significant resources as ones which "...have yielded, or may be likely to yield, information important in prehistory or history". Sites potentially significant as representative examples of site types (Category B, Table 2) are evaluated under Criterion C, which defines significant resources as those which "...embody the distinctive characteristics of a type, period, or method of construction..., or that represent a significant and distinguishable entity whose components may lack individual distinction".

Sites with potential cultural significance (Category C, Table 2) are evaluated under guidelines prepared by the Advisory Council on Historic Preservation (ACHP) entitled "Guidelines for Consideration of Traditional Cultural Values in Historic Preservation Review" (ACHP 1985). The guidelines define cultural value as "...the contribution made by an historic property to an ongoing society or cultural system. A traditional cultural value is a cultural value that has historical depth" (1985:1). The guidelines further specify that "[a] property need not have been in consistent use since antiquity by a cultural system in order to have traditional cultural value" (1985:7).

Based on the findings of the combined reconnaissance survey field work, the cultural remains identified within the West Loch Estates – Residential Increments I and II project area appear to be, for the most part, of minimal significance in terms of potential information content. In view of the essentially negative results of the reconnaissance survey, it is concluded that, with the exception of appropriate treatment of Site T-3, no further archaeological work of any kind is necessary, and it is recommended that full archaeological clearance of the project area be granted. The information recovered during the present survey from Sites T-1, -2, and -4 is considered adequate and sufficient to warrant recommending that no further archaeological work is necessary for any of these sites. Only one site (T-3), an apparently modern cemetery complex, is

Table 2.

SUMMARY OF GENERAL SIGNIFICANCE ASSESSMENTS
AND RECOMMENDED GENERAL TREATMENTS
WEST LOCH ESTATES – RESIDENTIAL INCREMENTS I AND II

Site or Feature No.	Significance Category				Recommended Treatment			
	A	X	B	C	FDC	NFW	PID	PAI
T-1	–	+	–	–	–	+	–	–
T-2	–	+	–	–	–	+	–	–
T-3	+	–	–	+	+	–	–	+
T-4	–	+	–	–	–	+	–	–

General Significance Categories:

A=Important for information content, further data collection necessary (PHRI=research value);
X=Important for information content, no further data collection necessary (PHRI=research value, DLNR-HSS=not significant);
B=Excellent example of site type at local, region, island, State, or National level (PHRI=interpretive value); and
C=Culturally significant (PHRI=cultural value).

Recommended General Treatments:

FDC=Further data collection necessary (intensive survey and testing, and possibly subsequent data recovery/mitigation excavations);
NFW=No further work of any kind necessary, sufficient data collected, archaeological clearance recommended, no preservation potential;
PID=Preservation with some level of interpretive development recommended (including appropriate related data recovery work); and
PAI=Preservation "as is," with no further work (and possible inclusion into landscaping), or appropriate data recovery/disinterments.

believed to be culturally significant; preservation "as is," if at all possible, is recommended as the more desirable treatment for this site. If this course of action is not practical, then proper disinterment and reburial in accordance with State Health Department regulations and procedures should be carried out. The latter alternative should include an attempt to locate any living relatives of individuals buried at Site T-3, as it is considered likely that such relatives may still reside in the Ewa District.

Finally, it is recommended that a qualified archaeologist selectively monitor initial grubbing activity and/or vegetation clearing within the project area. The general significance evaluations and recommended general treatments presented in this report are based on the findings of the combined reconnaissance survey field work, which involved only minimal subsurface testing. Therefore, these evaluations and recommendations are given with the general qualification that during any development activity involving the extensive modification of the land surface, there is always the possibility—however remote, that previously unknown or unexpected subsurface cultural features, deposits, or burials might be encountered. In such a situation, immediate archaeological consultation should be sought.

REFERENCES CITED

ACHP (Advisory Council on Historic Preservation)

1985 Guidelines for Consideration of Traditional Cultural Values in Historic Preservation Review. Washington, D.C.: Advisory Council on Historic Preservation. (Draft report) (August)

CFR (Code of Federal Regulations)

36 CFR Part 60 National Register of Historic Places. Washington, D.C.: Dept. Interior, National Park Service.

McAllister, J. Gilbert

1933 Archaeology of Oahu. B.P. Bishop Museum Bulletin 104. Honolulu: Bishop Museum Press.

APPENDIX F

Traffic Impact Assessment Report For the Proposed West Loch Estates Subdivision Ewa, Oahu, Hawaii

by

PACIFIC PLANNING & ENGINEERING, INC.

September 1987

TRAFFIC IMPACT ASSESSMENT REPORT

FOR THE PROPOSED WEST LOCH ESTATES SUBDIVISION

Ewa, Oahu, Hawaii

September 1987

Pacific Planning & Engineering, Inc.

Prepared for:

City and County of Honolulu
Department of Housing and Community Development

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INTRODUCTION

The Department of Housing and Community Development (DHCD) of the City and County of Honolulu is proposing to construct a residential development composed of 1,500 residential single-family housing units and 150 elderly housing units in the West Waipahu area.

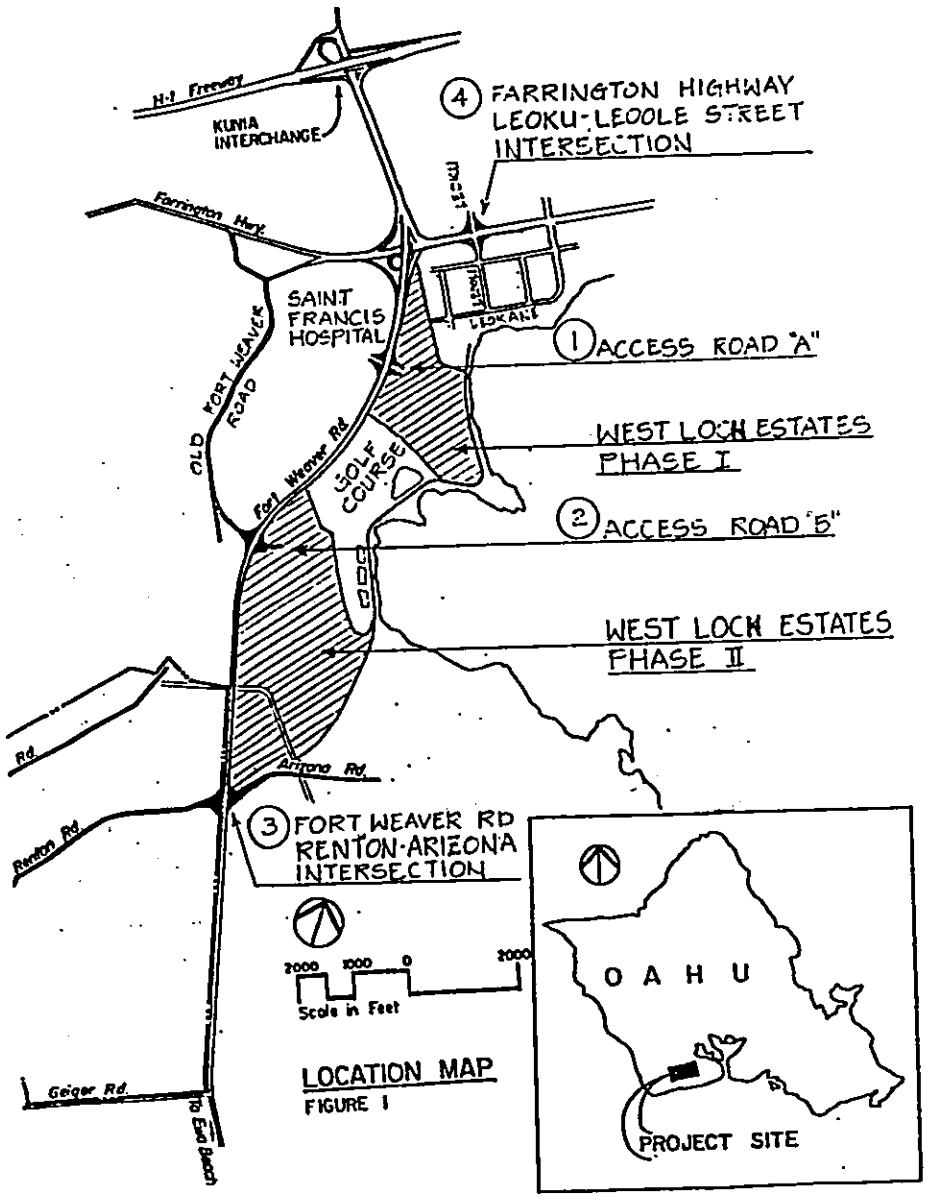
The development is divided into two phases. Phase I consists of 586 single-family units, an 18-hole golf course, and a Nature Conservation park along the shoreline of Pearl Harbor. Phase II consists of 764 single-family units, 150 elderly units, a commercial business area, a district park, a park and ride facility, an elementary school site and child care facility.

The project site is located along Fort Weaver Road in the area commonly referred to as West Loch, near Waipahu. Figure 1 shows the general project location. The project is bordered by Waipahu to the North, Fort Weaver Road to the West, Arizona Road to the South and Pearl Harbor to the East. Phase I of the development will be located across Fort Weaver Road from the new Saint Francis Hospital West, which is presently under construction.

The proposed project will have two access permitted locations, access Roads "A" and "B", which will provide the major access to Phases I and II, respectively. Secondary accesses to the proposed development will be through Leokane Street in the Waipahu industrial lots and another with Arizona Road. The 18-hole golf course will be located on both sides of Fort Weaver Road with a golf cart underpass providing access across the highway. The park and ride facility will provide a bus pick-up and drop-off area, a bus turn-around area, and a 350-space parking lot for bus riders.

This traffic study report identifies and evaluates the expected impact of forecast traffic generated by the proposed development in the year 1991. The analysis will also consider present and future developments along Fort Weaver Road and the overall impact on traffic on nearby roadways. The report includes a description of existing conditions and projected future conditions when the proposed developments are completed.

This report addresses impacts in the afternoon (pm) peak hour (3:30 - 4:30 PM), when recent traffic counts indicate the pm peak hour traffic volume averaged about ten percent greater than the morning (am) peak hour traffic volumes. The proposed project is expected to generate more traffic during the pm peak hour due to the residential nature of the development.



EXISTING CONDITIONS

Area Conditions and Roadway System

The general area is undeveloped or under cane cultivation, with some twenty or so homes on the project site. The nearest residential area, Honouliuli, is located west and across of Fort Weaver Road. There are no major developments planned for the immediate area. Major new residential areas are planned for the area south of Renton Road. The traffic impacts of these are addressed in a later chapter.

Fort Weaver Road provides the primary access to the proposed development and serves as a major arterial roadway between H-1 Freeway and the existing Ewa Beach Community. The roadway is a four-lane divided highway with a wide grassed medial that provides roadway width for left-turn storage lanes into the proposed subdivision.

There are no sight distance or other physical roadway constraints which would result in unusual traffic safety concerns or conditions at the proposed intersections with Fort Weaver Road. The speed limits are 35 and 45 miles per hour. There is a designated bikeway on the east side of the roadway. There are no driveway access points. All access is controlled by the State Department of Transportation, Highways Division.

Intersection improvements for the St. Francis Hospital West, presently under construction, will provide deceleration and left turn storage lane for northbound Fort Weaver Road traffic turning left into the hospital site. In addition, a traffic signal system was recommended at the intersection to improve egress during the afternoon peak hour.

Arizona Road is located along the Southern portion of the project and will serve as the secondary access for Phase II. It is an extension of Renton Road and is signalized at the intersection with Fort Weaver Road. It is presently an unpaved road servicing the West Loch U.S. Naval Magazine installation.

Leokane Street is located along the Northern portion of the project and serves as the secondary access for Phase I. Leokane Street is intersected by Leoole Street which accesses Farrington Highway in Waipahu. These streets serve the industrial area located northeast of the proposed project.

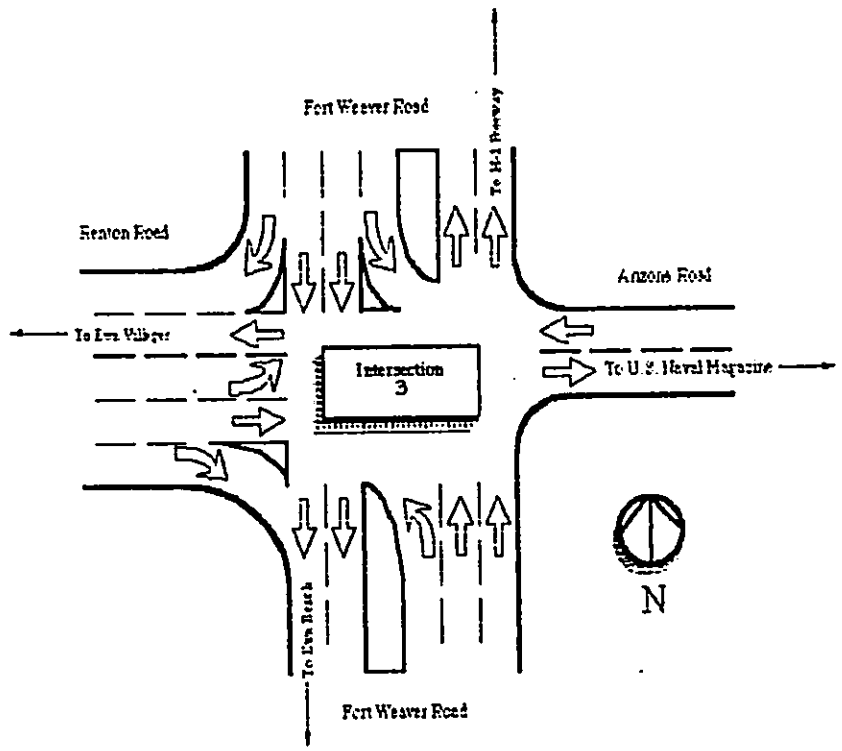


Figure 2 Intersection of Fort Weaver Road & Renton/Arizona Road

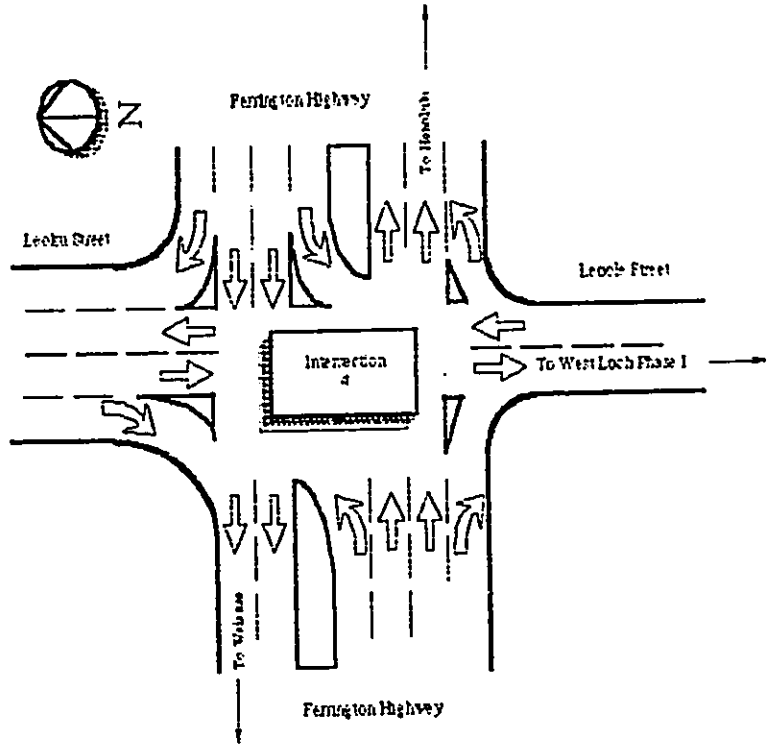


Figure 3. Intersection of Farrington Highway & Leoku/Leoku Street

Table 1. Intersection Traffic Counts

Traffic Count	Fort Weaver Road Northbound	Fort Weaver Road Southbound	Farrington Highway Eastbound	Farrington Highway Westbound
State DOT (Mechanical Count)				
Dec 18-19, 1985 (24-Hour)	12,414	12,651	-	-
AM Peak Hour (12/19/85)	1,141	746	-	-
Pm Peak Hour (12/18/85)	832	1,286	-	-
Aug 14-15, 1985 (24-Hour)	-	-	13,741	12,809
AM Peak Hour (8/15/85)	-	-	907	854
PM Peak Hour (8/14/85)	-	-	1,218	1,038
PPE (Manual Count)				
PM Peak Hour (8/19/87)	769	1,142	1,867	1,691

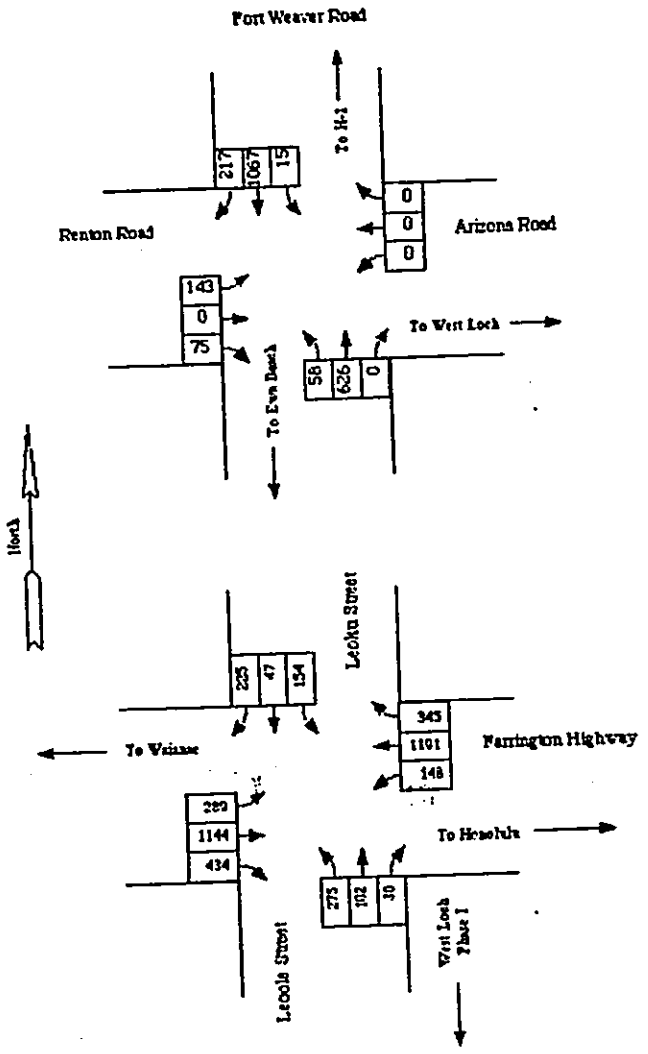


Figure 4. 1987 PM Peak Hour Traffic Volumes.

TRAFFIC FORECASTS

Future traffic were estimated for the year 1991 for two conditions--with and without West Loch Estates. All other variables such as the number of lanes on Fort Weaver were assumed to be the same until that time. Intersection changes are addressed in the chapter entitled Traffic Impacts. Future traffic generated by developments south of Renton Road were estimated. The year 1991 was selected for analysis as it was deemed to be the year when the project would be completed and occupied.

Trip Generation

The methodology used to determine number of trips generated by proposed or new projects is based upon trip rates established in the Institute of Transportation Engineers Trip Generation Report (Third Edition) 1982. These vehicle trip rates are based on average conditions and were reviewed for possible adjustment for local conditions.

The rates are used to calculate vehicles entering and exiting the project during the pm peak hour. The analysis accounts for the two-phases being physically separated. Two zones were created to account for the separation and necessary assignment to the Fort Weaver intersections.

Phase I development include 586 single family residential units, a Nature Conservation Park and an 18-hole golf course with clubhouse and parking area. Phase II consists of 764 single family dwelling units, 150 elderly housing units, a district park, a commercial development with 40,000-50,000 gross square feet of space, a civic center consisting of a day care center for 250 pre-schoolers, a park and ride area with 350 parking stalls and an area reserved for future Elementary School.

These land use activities are expected to generate trips in and out of the project. Certain uses will contribute negligible trips during the afternoon peak hour. For example, school traffic will be negligible after 3:30 pm. The analysis also accounts for internal trips within the project during the pm peak hour, as well as a potential reduction in the number of trips as a result of the park and ride facility.

The analysis estimates vehicle trips during the pm peak hour for the residential areas and the commercial center in Phase I and II. Table 2 lists the land use (parameter) and the

trip generation rates, while Table 3 list the number of trips generated by the land use activities.

Trip Distribution

Trip distribution determines the predicted origins and destinations of traffic generated by new projects. The trips distribution used in this study is based on completion of Phase I and II of West Loch Estates. The trips were distributed in three directions representing the major areas of Oahu that would have vehicles travelling between them and this area of Ewa. The directions are north to H-1 Freeway or Waipahu, south to Ewa Beach, and west to Ewa Village from West Loch Estates and new developments in the area, serviced by Fort Weaver Road.

Distribution tables based on population, employment, and dwelling units from various references were analyzed. In addition, as recommended by travel forecasting publications from the Institute of Traffic Engineers, trip distribution tables from the local urban transportation planning process were reviewed. Trip tables from the most recent forecasting effort, HALI 2000, by the Oahu Metropolitan Planning Organization were obtained and assessed for application in forecasting trip interchanges. The distribution results from these tables were modified based on dwelling unit and job distributions to account for the differences between the specific study zone boundaries and the data summarized for areas within the Ewa Development Area.

Traffic Assignment

Trip interchanges between zone pairs were estimated, and assigned to the roadways serving the future development. Turning movements at each intersection were estimated for the estimated traffic for each of the land use activities identified in Tables 2 and 3.

Analyses included the estimation of vehicle trips in the pm peak hour for the park and ride lot. Trips exiting and entering the lot include buses as well as vehicles. Bus frequencies were investigated and a frequency of 10 buses during the peak hour was utilized. Passengers loading and off-loading were estimated based on service to other areas. An average car occupancy of 1.5 was used for exiting vehicles. For simplicity, it was assumed that vehicles would be from West Loch and areas south of the project. (Usage levels beyond 1991 were not investigated, and no conclusions should be drawn

Table 2. Trip Generation Rates

Land Use (Parameters)	Daily (vpd)[1] Enter & Exit	AM Peak Hour (vph)[2] Enter	AM Peak Hour (vph)[2] Exit	PM Peak Hour (vph) Enter	PM Peak Hour (vph) Exit
Phase I					
Residential					
Single Family	10.00/unit	0.21	0.55	0.63	0.37
Recreation					
Golf Course	6.90/acre	0.20	0.05	0.05	0.20
Nature Conser. Park	3.60/acre	-	-	-	-
Phase II					
Residential					
Single Family	10.00/unit	0.21	0.55	0.63	0.37
Elderly Housing	3.30/unit	-	-	-	-
Recreation					
District Park	3.60/acre	-	-	-	-
Civic					
Elementary School	1.02/student	-	-	-	-
Day Care Facility	1.02/child	-	-	-	-
Park and Ride	2.00/acre	-	-	-	-
Commercial					
Neighborhood Center	0.1179/s.f.	2.07	2.03	6.84	7.03

[1]Vehicles per day
[2]Vehicles per hour

Table 3. Trip Generation

Land Use (Parameters)	Daily (vpd)[1] Enter & Exit	AM Peak Hour (vph)[2] Enter	AM Peak Hour (vph)[2] Exit	PM Peak Hour (vph) Enter	PM Peak Hour (vph) Exit
Phase I					
Residential					
586 Single Family	5,860	123	322	369	217
Recreation					
155 Ac. Golf Course	1,070	31	8	8	31
20 Ac. Nature Park	72	-	-	N[3]	N
Total Trip Ends Phase I	7,002	154	330	377	248
Phase II					
Residential					
764 Single Family	7640	160	420	481	283
150 Elderly Housing	495	-	-	15	15
Recreation					
17.8 Ac. District Park	64	-	-	N	N
Civic					
600 Student Elem	612	-	-	N	N
250 Child Day Care	255	-	-	N	N
350 Space Park & Ride	700	-	-	40	150
Commercial					
40-50,000 Sq Ft Neighborhood Center	5,305	43	91	308	316
Total Trip Ends Phase II	15,071	253	511	789	599

[1]Vehicles per day
[2]Vehicles per hour
[3]Negligible

based on these near-term estimates of transit service. Future changes and higher frequencies are subject to fleet size, operational considerations, and other factors .)

The general method used consists of adding the traffic volumes during the pm peak hour for the present conditions or 1987, the traffic volumes on the roadways generated by new residential units south of Renton Road, and the expected traffic volumes generated by West Loch Estates. Present year volumes are shown in Figure 2. Volumes for other intersections not shown are based on DOT tube counts. The 1991 traffic forecast results for the conditions "with West Loch" and "without West Loch" are presented in Appendix B. These worksheets are provided for more detailed information on specific turning movements at the intersections with Fort Weaver Road.

TRAFFIC IMPACTS

Impacts are usually measured by the change in level-of-service (LOS) for a given intersection or series of traffic movements. These terms are defined in Appendix A and provide the reader with a basis for interpreting the results of the following capacity analysis.

Impacts may be measured in terms of capacity level at signalized intersections. "Planning Analysis" of an intersection is an evaluation of the capacity of an intersection without considering the details of signalization contained in the Highway Capacity Manual. It is a basic assessment of whether capacity is likely to be exceeded for a given set of traffic volumes and intersection geometrics.

As part of the analysis requirements, the study assumes the major intersections are either signalized or will be signalized, and the traffic lights synchronized to obtain maximum green time along Fort Weaver Road, between the proposed access connection to Phase I West Loch Estates development project and Renton Road intersection.

Intersection analysis was conducted for the following intersections:

1. Fort Weaver Road and Road "A" (Primary Access to Phase I),
2. Fort Weaver Road and Road "B" (Primary Access to Phase II),
3. Fort Weaver Road and Renton-Arizona Road (Secondary Access to Phase II), and
4. Farrington Highway and Leoku-Leoole Street (Secondary Access to Phase I).

The Critical Movement Analysis Planning Application (Planning Analysis) from the revised (1985) Highway Capacity Manual (HCM) was used to estimate the capacity for the above intersections. It was assumed that those intersections not now signalized would be in 1991 for the purpose of analysis.

The 1991 volume forecasts for Phase I and II were assigned to the intersections to estimate pm peak hour turning movements at each of the four intersections. These were added to existing volumes and future traffic forecasts generated by other residential development to be occupied prior to 1991.

The method to analyze the level of intersectional capacity attainment consists of comparing the higher sum of conflicting straight and left turn movements for one roadway and adding the greater to its complement for the other roadway. An example of the Worksheet is provided in Appendix C. The analysis was made for the four intersections for 1987, 1991 without West Loch, and 1991 with West Loch.

The results of the intersection analysis are presented in Table 4. It presents the critical volumes for the named intersections. The following ranges are given by the HCM as general indicators of intersection capacity:

-Less than 1,200 vehicles per hour indicates "under-capacity" conditions at the intersection.
-Between 1,200 and 1,400 indicates "near-capacity" conditions.
- Exceeding 1,400 indicate "over-capacity" and may require additional lanes, or other intersection improvements.

Table 4 shows that only the Farrington/Leoole Street intersection is now operating near capacity. It indicates that during the pm peak hour level in 1991 none of the intersections would be operating at or over capacity. With the West Loch project, the intersections of Ft. Weaver Road with Phase I and Phase II would operate near capacity in 1991.

Table 4. Critical Volumes for 1991 Forecasts

Intersection	1987	C.L.[a]	w/o West Loch	C.L.	w/ West Loch	C.L.
1	650	Under	1145	Under	1321	Near
2	650	Under	987	Under	1280	Near
3	735	Under	1074	Under	1142	Under
4	1206	Under	1327	Near	1387	Near

[a]Without West Loch
1 Ft Weaver Road & Access Road "A"
2 Ft Weaver Road & Access Road "B"
3 Ft Weaver Road & Renton-Arizona Road
4 Farrington Highway & Leoole-Leoku Street

CONCLUSIONS AND RECOMMENDATIONS

The result of the 1991 forecasts show that the proposed West Loch Estates project will increase traffic volumes along Fort Weaver Road during the pm peak period. The critical traffic flows are expected to occur during the afternoon peak hour, when both the ambient traffic and projected traffic are at a peak. Based on the capacity analysis results, it is concluded that West Loch traffic will not bring an intersection to over-capacity levels.

With the anticipated growth in future years, it is recommended that turning lanes on Fort Weaver Road be considered for the Phase I and II intersections. Such improvements will contribute to better flow and less delay at the intersections, as well smoother merges onto Fort Weaver Road.

During Phase I development, it is recommended that the contemplated traffic signal operation of Fort Weaver Road and the access Road "A" intersection be upgraded to provide for a protected left turn for southbound traffic turning left into Phase I of West Loch Estates. Provision should be made for a left turn storage lane on Fort Weaver Road for that movement.

Access from the Phase I development through the Waipahu Industrial Lots will increase traffic volumes slightly along Leokane and Leoole Streets. To provide increased traffic capacity at the signalized intersection of Leoole Street and Farrington Highway, a possible action would be to modify the existing pavement markings on the south leg to two northbound lanes and one southbound lane. Given the proportion of turning movements on the northbound approach, the right lane should be made to allow left, straight and right turns. The left lane should be an exclusive left turn lane.

Traffic signal warrants for interruption of traffic flow are likely to be met for the Access Road "B" intersection with Fort Weaver Road which serves the Phase II development plans for West Loch. Signals should be considered and plans developed based on future traffic patterns. It is recommended that new developments south of Renton Road be included in the traffic signal timing plans.

Access for the Phase II development on Arizona and Ft. Weaver Roads will not require any significant remedial action since the signalized intersection is expected to operate under capacity with completion of Phase II. Improvements on Arizona Road are being contemplated for serving internal access needs.

APPENDIX A

APPENDIX A
DEFINITION OF LEVEL-OF-SERVICE

The concept of levels of service is defined as a qualitative measure describing operational conditions within a traffic stream, and their perception by motorists and/or passengers. A level of service definition generally describes these conditions in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety.

Six levels of service are defined for each type of facility for which analysis procedures are available. They are given letter designations, from A to F, with level-of-service A representing the best operating conditions and level-of-service F the worst.

Level-of-Service definitions--In general, the various levels of service are defined as follows for uninterrupted flow facilities:

Level-of-service A represents free flow. Individual users are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to maneuver within the traffic stream is extremely high. The general level of comfort and convenience provided to the motorist, passenger, or pedestrian is excellent.

Level-of-service B is in the range of stable flow, but the presence of other users in the traffic stream begins to be noticeable. Freedom to select desired speeds is relatively unaffected, but there is slight decline in the freedom to maneuver within the traffic stream from LOS A. The level of comfort and convenience provided is somewhat less than at LOS A, because the presence of others in the traffic stream begins to affect individual behavior.

Level-of-service C is in the range of stable flow, but marks the beginning of the range of flow in which the operation of individual users becomes significantly affected by interactions with others in the traffic stream. The selection of speed is now affected by the presence of others, and maneuvering within the traffic stream requires substantial vigilance on the part of the user. The general level of comfort and convenience declines noticeably at this level.

Level-of-service D represents high-density, but stable, flow. Speed and freedom to maneuver are severely restricted, and the driver or pedestrian experiences a generally poor level of comfort and convenience. Small increases in traffic flow will generally cause operational problems at this level.

Level-of-service E represents operating conditions at or near the capacity level. All speeds are reduced to a low, but relatively uniform value. Freedom to maneuver within the traffic stream is extremely difficult, and it is generally accomplished by forcing a vehicle or pedestrian to "give way" to accommodate such maneuver. Comfort and convenience levels are extremely poor, and driver or pedestrian frustration is generally high. Operations at this level are usually unstable, because small increases in flow or minor perturbations within the traffic stream will cause breakdowns.

Level-of-service F is used to define forced or breakdown flow. This condition exists wherever the amount of traffic approaching a point exceeds the amount which can traverse the point. Queues form behind such locations. Operations within the queue are characterized by stop-and-go wave, and they are extremely unstable. Vehicles may progress at reasonable speeds for several hundred feet or more, then be required to stop in a cyclic fashion. Level-of-service F is used to describe the operating conditions within the queue, as well as the point of the breakdown. It should be noted, however, that in many cases operating conditions of the vehicles or pedestrians discharged from the queue may be quite good. Nevertheless, it is the point at which arrival flow exceeds discharge flow which causes the queue to form, and level-of-service F is an appropriate designation for such points.

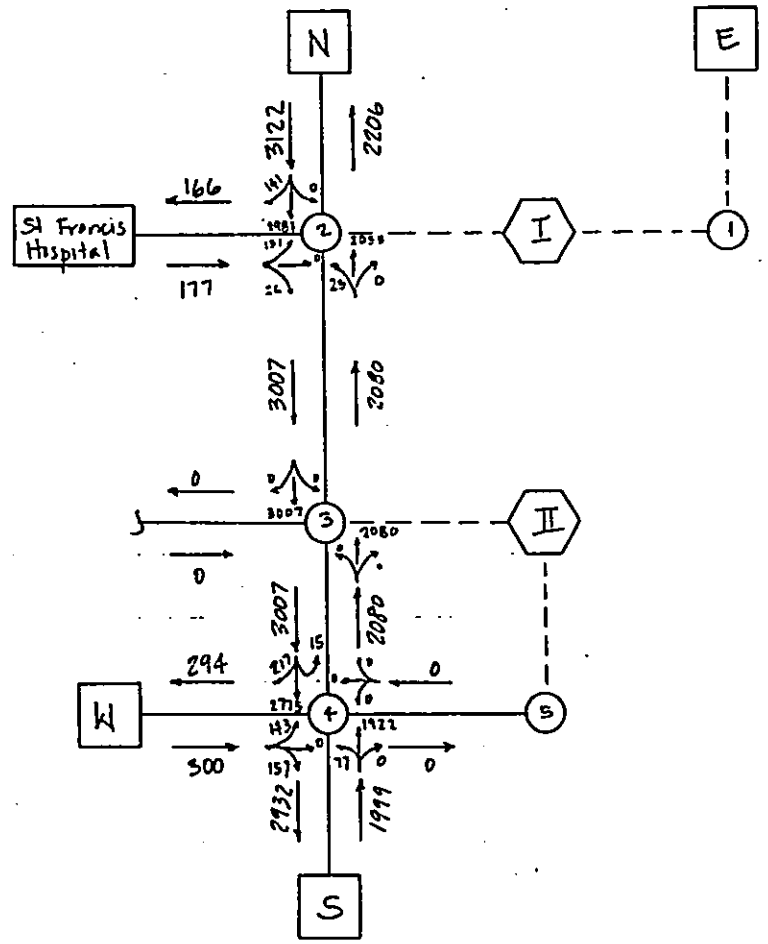
These definitions are general and conceptual in nature, and they apply primarily to uninterrupted flow. Levels of service for interrupted flow facilities vary widely in terms of both the user's perception of service quality and the operational variables used to describe them.

REFERENCE: Highway Capacity Manual (Special Report 209, 1985)

APPENDIX B

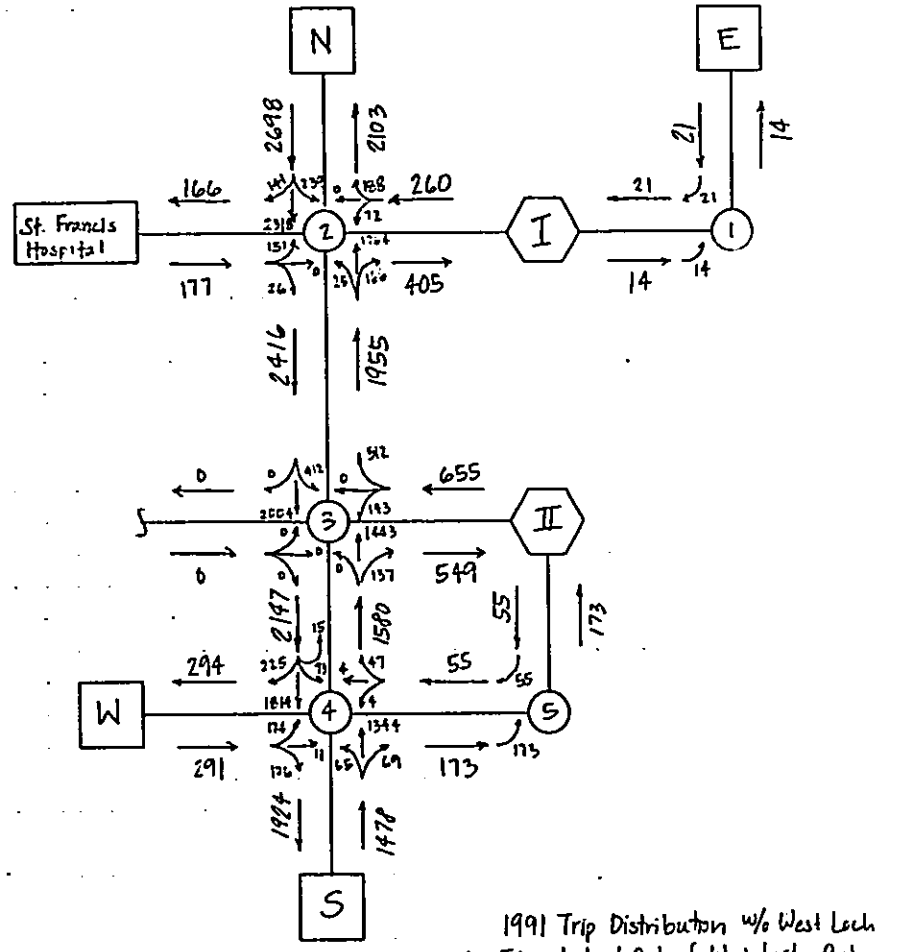
1991 TRAFFIC FORECASTS

1997 TRIP DISTRIBUTION FOR THE PM PEAK HOUR W/O WEST LOCH



1987 PM Peak Hr Traffic
+ Trips Into St Francis Hospital
+ Trips Out of St Francis Hospital
+ Trips Into EWA Area 1987-1997
+ Trips Out of EWA Area 1987-1997
= 1997 Trip Distribution w/o West Loch

1991 TRIP DISTRIBUTION FOR THE PM PEAK HOUR W/ WEST LOCH



1991 Trip Distribution w/o West Loch
± Trips Into & Out of West Loch Only
= 1991 Trip Distribution w/ West Loch

APPENDIX C

PLANNING APPLICATION WORKSHEETS

INTERSECTION CAPACITY ASSESSMENT

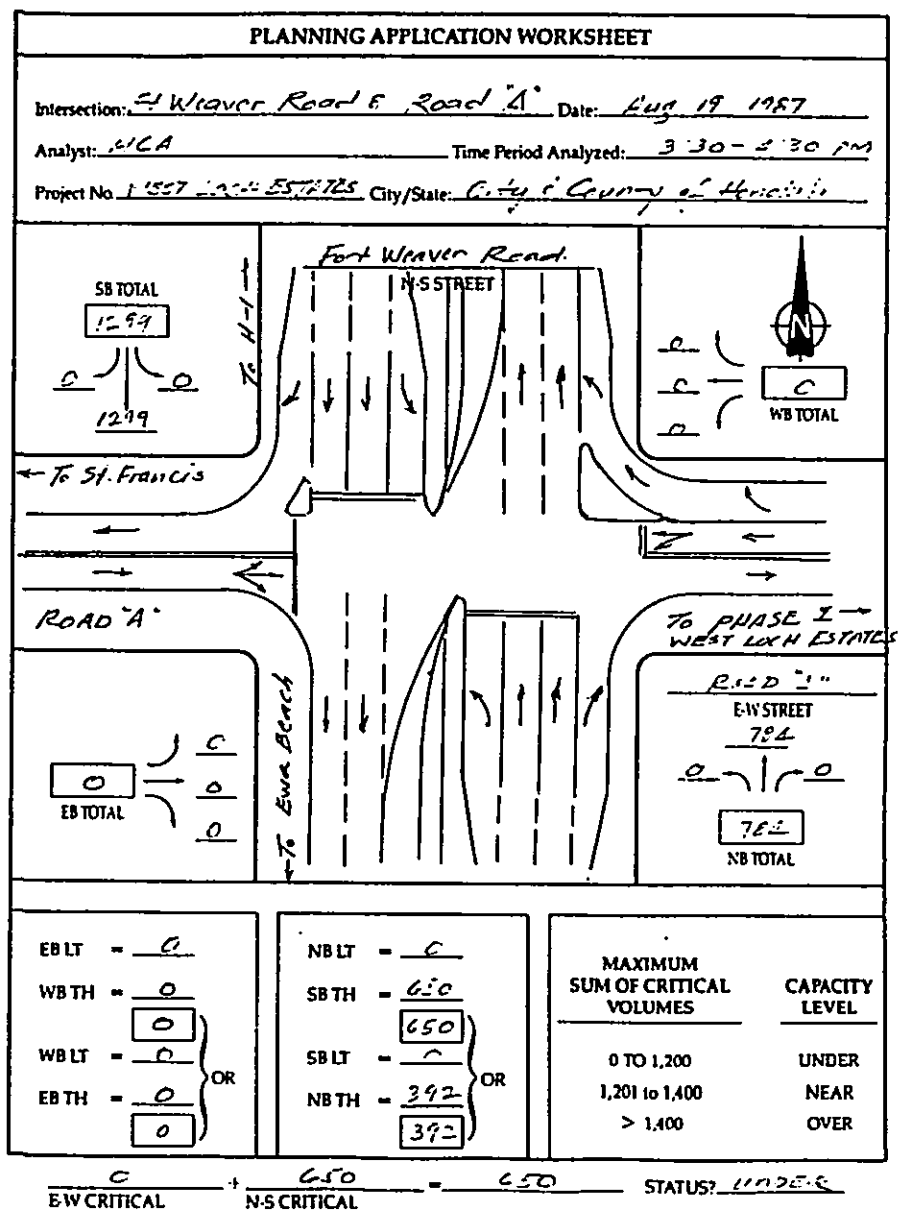
1987 CAPACITY LEVEL

PLANNING APPLICATION WORKSHEET

Intersection: Ft Weaver Road & Road "A" Date: Aug 19 1987

Analyst: WCA Time Period Analyzed: 3:30 - 2:30 PM

Project No. 1557 WEST LOCH ESTATES City/State: City & County of Honolulu



1991 CAPACITY LEVEL W/O WEST-ERN

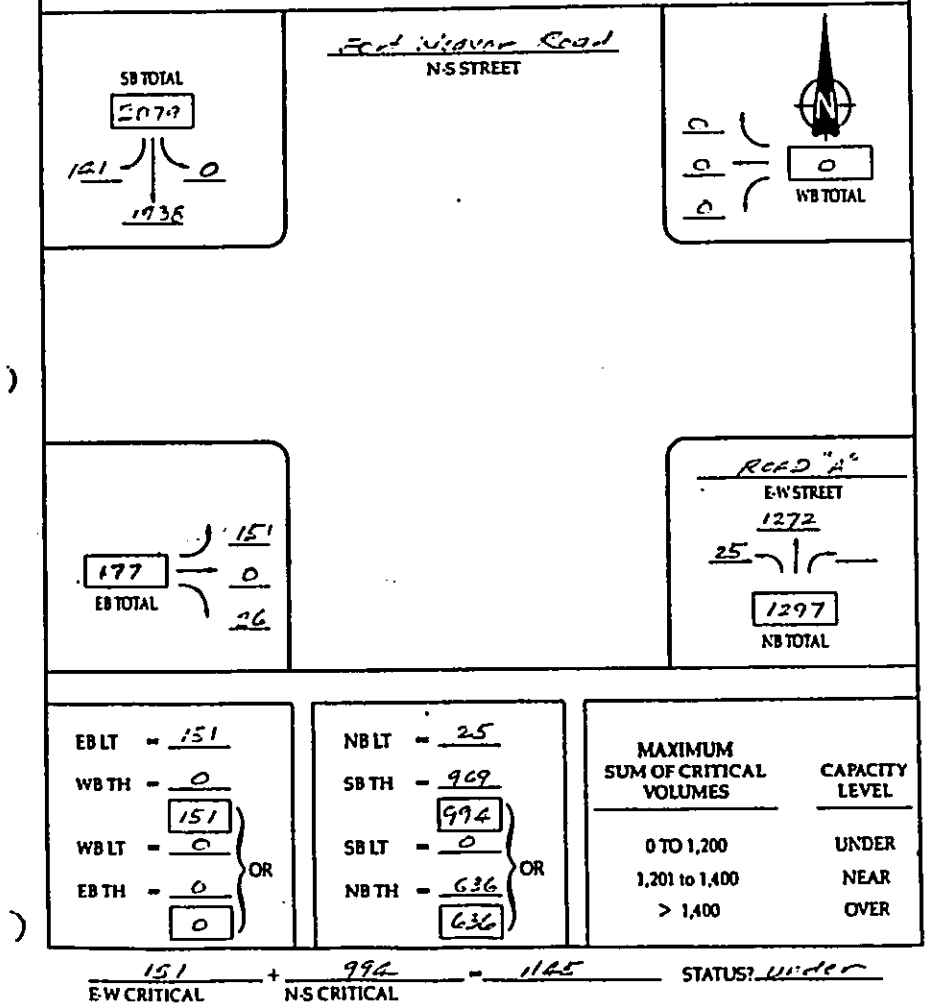
SIGNALIZED INTERSECTIONS 9-81

PLANNING APPLICATION WORKSHEET

Intersection: Ft Weaver Road & Road "A" Date: Sept 1991

Analyst: HCA Time Period Analyzed: 3:30 - 6:30 PM

Project No. WEST LOCH ESTATE City/State: City & County of Honolulu



EB LT = 151	NB LT = 25	MAXIMUM SUM OF CRITICAL VOLUMES	CAPACITY LEVEL
WB TH = 0	SB TH = 969		
151	994		
WB LT = 0	SB LT = 0		
EB TH = 0	NB TH = 636	0 TO 1,200	UNDER
0	636	1,201 to 1,400	NEAR
OR	OR	> 1,400	OVER

151 (E-W CRITICAL) + 994 (N-S CRITICAL) = 1145 STATUS? Under

1991 CAPACITY LEVEL W/ WEST-ERN

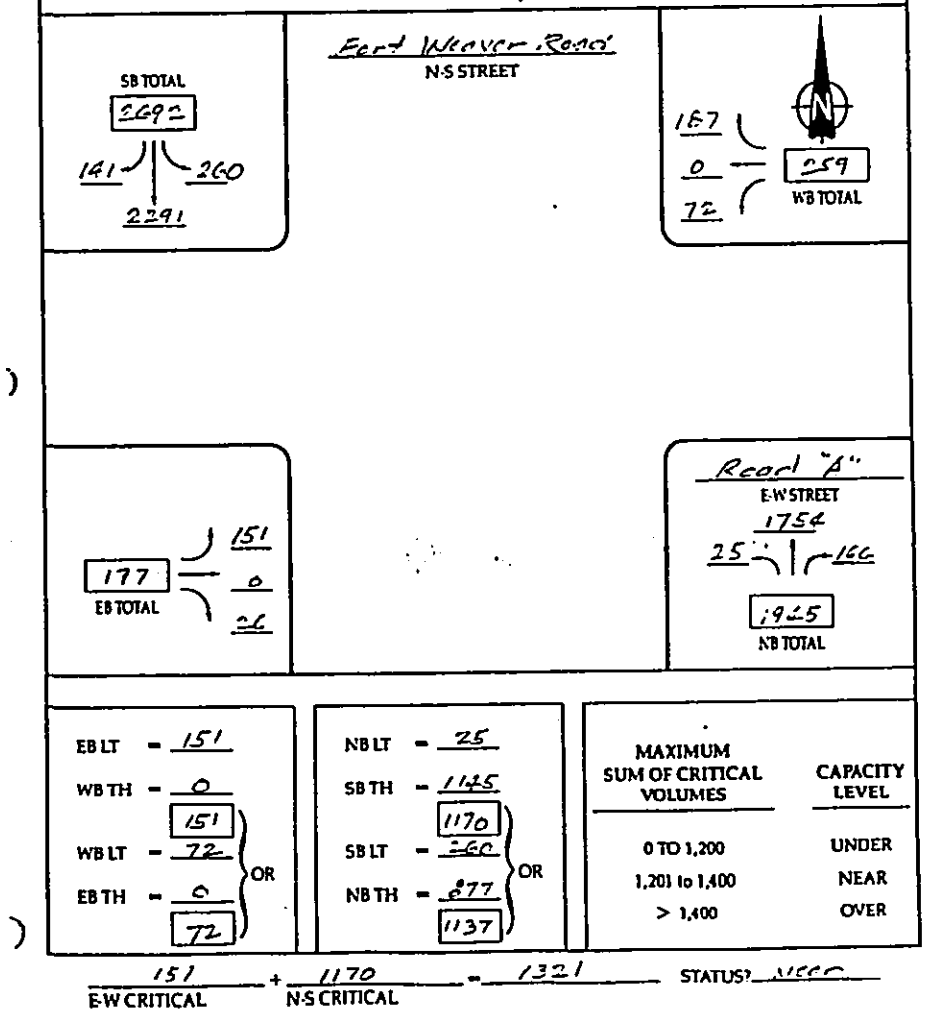
SIGNALIZED INTERSECTIONS 9-81

PLANNING APPLICATION WORKSHEET

Intersection: Ft Weaver Road & Road "A" Date: Sept 1991

Analyst: HCA Time Period Analyzed: 3:30 - 6:30 PM

Project No. West Loch Estates City/State: City & County of Honolulu



EB LT = 151	NB LT = 25	MAXIMUM SUM OF CRITICAL VOLUMES	CAPACITY LEVEL
WB TH = 0	SB TH = 1145		
151	1170		
WB LT = 72	SB LT = 260		
EB TH = 0	NB TH = 877	0 TO 1,200	UNDER
72	1137	1,201 to 1,400	NEAR
OR	OR	> 1,400	OVER

151 (E-W CRITICAL) + 1170 (N-S CRITICAL) = 1321 STATUS? Near

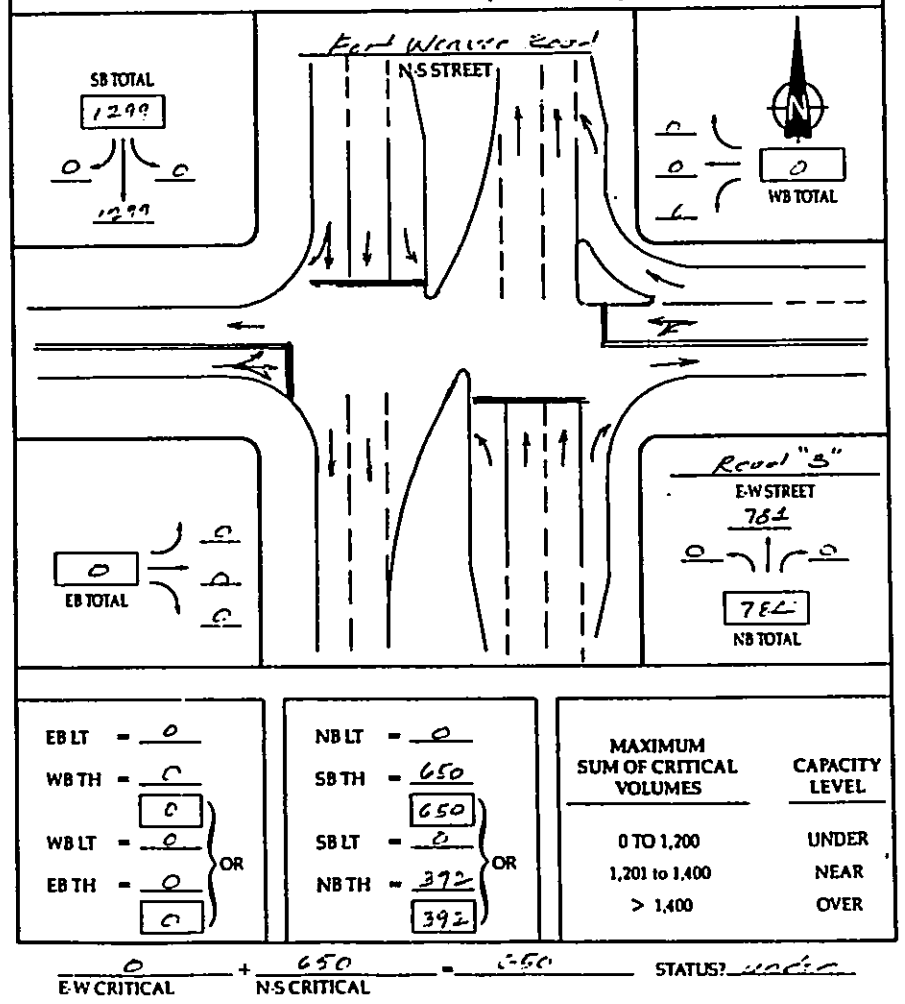
1987 CAPACITY LEVEL

PLANNING APPLICATION WORKSHEET

Intersection: Ft Weaver Road & Road "B" Date: Aug 19 1987

Analyst: HCA Time Period Analyzed: 3:30 - 4:30 PM

Project No. 1257 Loch Estates City/State: City & County of Honolulu



EB LT = 0	NB LT = 0			
WB TH = 0	SB TH = 650			
0	650			
WB LT = 0	SB LT = 0			
EB TH = 0	NB TH = 392			
0	392			
OR	OR	MAXIMUM SUM OF CRITICAL VOLUMES	CAPACITY LEVEL	
		0 TO 1,200	UNDER	
		1,201 to 1,400	NEAR	
		> 1,400	OVER	

0 (E-W CRITICAL) + 650 (N-S CRITICAL) = 650 STATUS? under

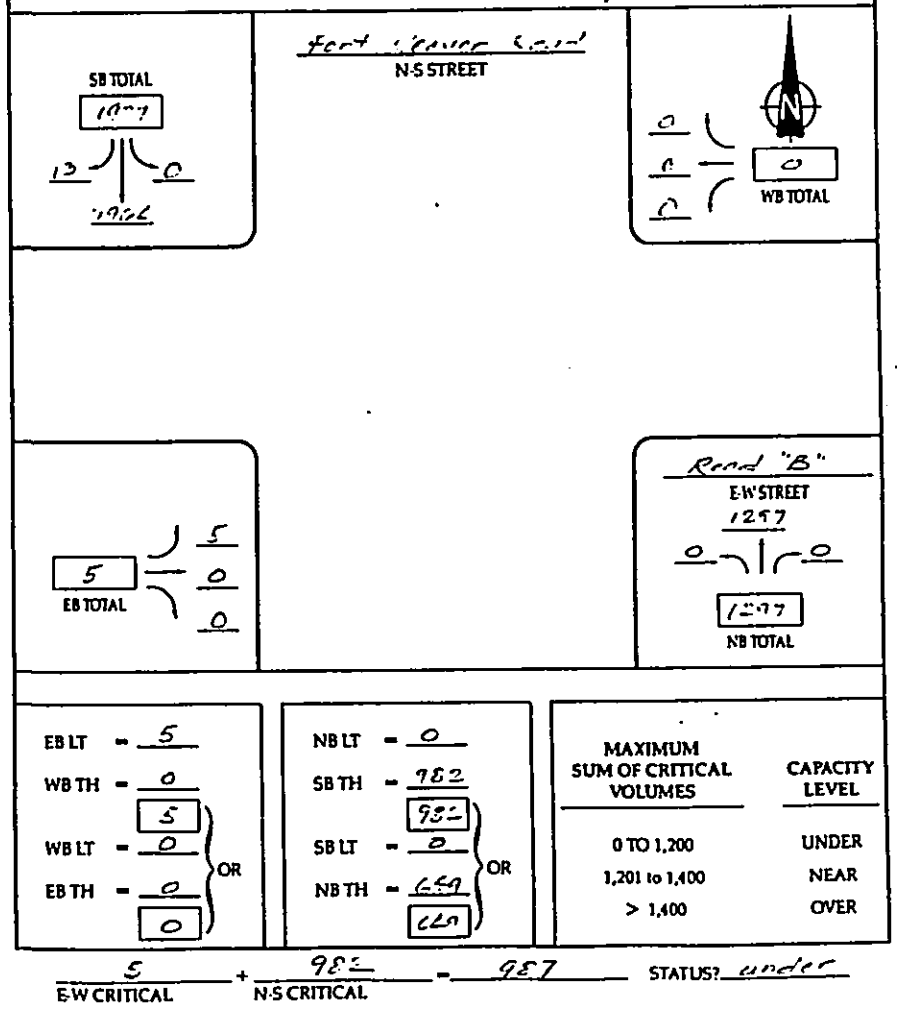
1991 CAPACITY LEVEL WITHOUT WEST LOOP

PLANNING APPLICATION WORKSHEET

Intersection: Ft Weaver Road & Road "B" Date: Sept 1991

Analyst: HCA Time Period Analyzed: 3:30 - 4:30 PM

Project No. 1257 Loch Estates City/State: City & County of Honolulu



EB LT = 5	NB LT = 0			
WB TH = 0	SB TH = 982			
5	982			
WB LT = 0	SB LT = 0			
EB TH = 0	NB TH = 649			
0	649			
OR	OR	MAXIMUM SUM OF CRITICAL VOLUMES	CAPACITY LEVEL	
		0 TO 1,200	UNDER	
		1,201 to 1,400	NEAR	
		> 1,400	OVER	

5 (E-W CRITICAL) + 982 (N-S CRITICAL) = 987 STATUS? under

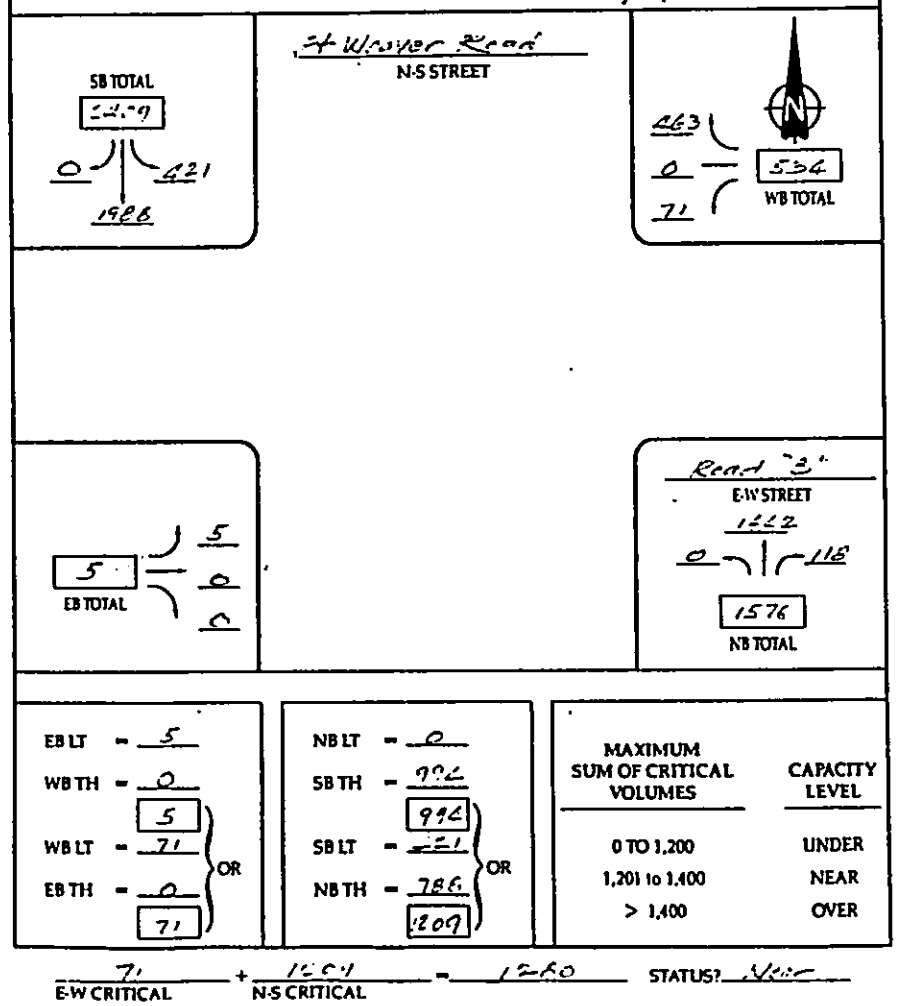
1991 CAPACITY LEVEL WITH WEST LOOP

PLANNING APPLICATION WORKSHEET

Intersection: Ft Wainer Road & Road "B" Date: Sept 1991

Analyst: HCA Time Period Analyzed: 5:30-6:30 PM

Project No. West Loch Estates City/State: City & County of Honolulu



EB LT = 5	NB LT = 0	MAXIMUM SUM OF CRITICAL VOLUMES	CAPACITY LEVEL
WB TH = 0	SB TH = 902		
5	902		
WB LT = 71 OR	SB LT = 221 OR	0 TO 1,200	UNDER
EB TH = 0	NB TH = 786	1,201 to 1,400	NEAR
71	1209	> 1,400	OVER

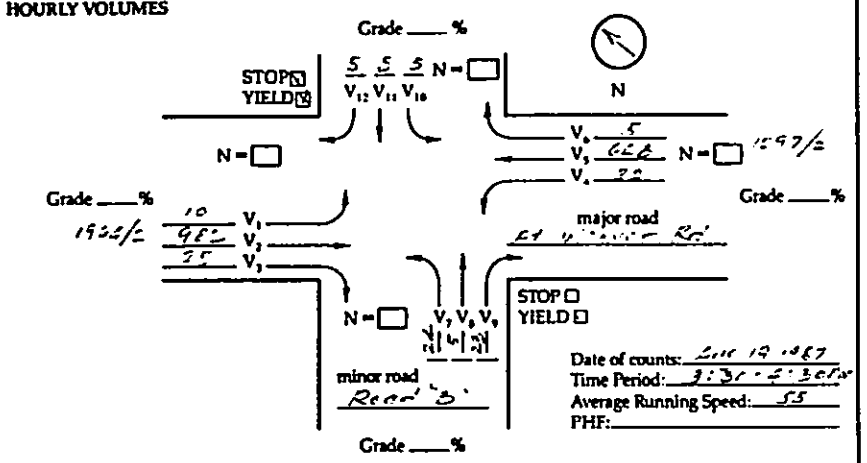
71 (E-W CRITICAL) + 1209 (N-S CRITICAL) = 1280 STATUS? Near

1997 LOS WITHOUT SIGNALIZATION

WORKSHEET FOR FOUR-LEG INTERSECTIONS Page 1

Location: Waianae - Ewa Beach Name: Ft Weaver Rd & Road "B"

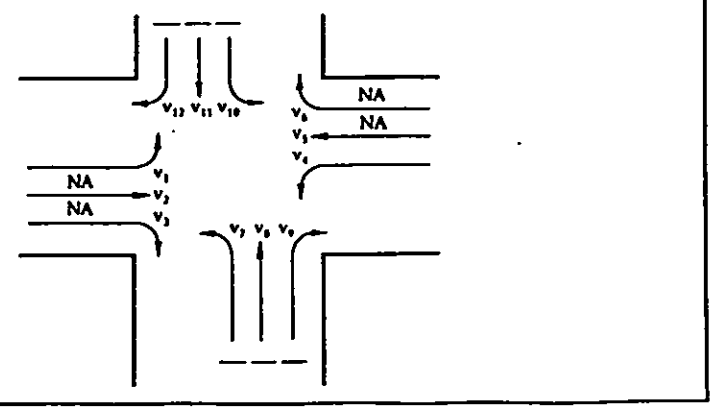
HOURLY VOLUMES



VOLUME ADJUSTMENTS

Movement No.	1	2	3	4	5	6	7	8	9	10	11	12
Volume (vph)	10	915	25	22	668	5	24	5	23	5	5	5
Vol. (pcph), see Table 10-1	10			22		24	5	23	5	5	5	

VOLUMES IN PCPH



WORKSHEET FOR FOUR-LEG INTERSECTIONS — Page 2

	V_o	V_{12}
STEP 1: RT From Minor Street		
Conflicting Flows, V_c	$1/2\,V_3 + V_2 = V_{c0}$ $\frac{12}{}+\frac{982}{}=\frac{994}{}$ vph	$1/2\,V_6 + V_5 = V_{c12}$ $\frac{2}{}+\frac{648}{}=\frac{650}{}$ vph
Critical Gap, T_c (Tab. 10-2)	$\frac{5.5}{}$ (sec)	$\frac{5.5}{}$ (sec)
Potential Capacity, c_p (Fig. 10-3)	$c_{p0}=\frac{340}{}$ pcph	$c_{p12}=\frac{530}{}$ pcph
Percent of c_p Utilized	$(v_o/c_{p0})\times 100=\frac{6.76}{}\%$	$(v_{12}/c_{p12})\times 100=\frac{0.92}{}\%$
Impedance Factor, P (Fig. 10-5)	$P_o=\frac{0.96}{}$	$P_{12}=\frac{0.99}{}$
Actual Capacity, c_m	$c_{m0}=c_{p0}=\frac{340}{}$ pcph	$c_{m12}=c_{p12}=\frac{531}{}$ pcph
	V_4	V_1
STEP 2: LT From Major Street		
Conflicting Flows, V_c	$V_3 + V_2 = V_{c4}$ $\frac{25}{}+\frac{982}{}=\frac{1007}{}$ vph	$V_6 + V_5 = V_{c1}$ $\frac{5}{}+\frac{648}{}=\frac{653}{}$ vph
Critical Gap, T_c (Tab. 10-2)	$\frac{6.0}{}$ (sec)	$\frac{6.0}{}$ (sec)
Potential Capacity, c_p (Fig. 10-3)	$c_{p4}=\frac{260}{}$ pcph	$c_{p1}=\frac{450}{}$ pcph
Percent of c_p Utilized	$(v_4/c_{p4})\times 100=\frac{8.46}{}\%$	$(v_1/c_{p1})\times 100=\frac{3.22}{}\%$
Impedance Factor, P (Fig. 10-5)	$P_4=\frac{0.94}{}$	$P_1=\frac{0.98}{}$
Actual Capacity, c_m	$c_{m4}=c_{p4}=\frac{260}{}$ pcph	$c_{m1}=c_{p1}=\frac{450}{}$ pcph
	V_8	V_{11}
STEP 3: TH From Minor Street		
Conflicting Flows, V_c	$1/2V_3+V_2+V_1+V_8+V_9+V_4=V_{c8}$ $\frac{12}{}+\frac{982}{}+\frac{10}{}+$ $\frac{5}{}+\frac{648}{}+\frac{22}{}=\frac{1679}{}$ vph	$1/2V_6+V_5+V_4+V_9+V_2+V_1=V_{c11}$ $\frac{2}{}+\frac{648}{}+\frac{22}{}+$ $\frac{25}{}+\frac{982}{}+\frac{10}{}=\frac{1689}{}$ vph
Critical Gap, T_c (Tab. 10-2)	$\frac{7.0}{}$ (sec)	$\frac{7.0}{}$ (sec)
Potential Capacity, c_p (Fig. 10-3)	$c_{p8}=\frac{72}{}$ pcph	$c_{p11}=\frac{72}{}$ pcph
Percent of c_p Utilized	$(v_8/c_{p8})\times 100=\frac{7.14}{}\%$	$(v_{11}/c_{p13})\times 100=\frac{7.14}{}\%$
Impedance Factor, P (Fig. 10-5)	$P_8=\frac{0.96}{}$	$P_{11}=\frac{0.96}{}$
Actual Capacity, c_m	$c_{m8}=c_{p8}\times P_1\times P_4$ $\frac{69}{}=\frac{70}{}\times$ $\frac{.98}{}\times\frac{.94}{}$ (pcph)	$c_{m11}=c_{p11}\times P_1\times P_4$ $\frac{62}{}=\frac{70}{}\times$ $\frac{.96}{}\times\frac{.94}{}$ (pcph)
	V_9	V_{10}
STEP 4: LT From Minor Street		
Conflicting Flows, V_c	V_{c8} (step 3) $+ V_{11} + V_{12} = V_{c9}$ $\frac{62}{}+\frac{5}{}+\frac{5}{}=\frac{72}{}$ vph	V_{c11} (step 3) $+ V_8 + V_9 = V_{c10}$ $\frac{62}{}+\frac{5}{}+\frac{23}{}=\frac{90}{}$ vph
Critical Gap, T_c (Tab. 10-2)	$\frac{7.5}{}$ (sec)	$\frac{7.5}{}$ (sec)
Potential Capacity, c_p (Fig. 10-3)	$c_{p9}=\frac{730}{}$ pcph	$c_{p10}=\frac{710}{}$ pcph
Actual Capacity, c_m	$c_{m9}=c_{p9}\times P_1\times P_4\times P_{11}\times P_{12}$ $\frac{639}{}=\frac{730}{}\times\frac{.96}{}\times$ $\frac{.92}{}\times\frac{.96}{}\times\frac{.99}{}$ (pcph)	$c_{m10}=c_{p10}\times P_4\times P_1\times P_8\times P_9$ $\frac{590}{}=\frac{710}{}\times\frac{.94}{}\times$ $\frac{.94}{}\times\frac{.96}{}\times\frac{.96}{}$ (pcph)

WORKSHEET FOR FOUR-LEG INTERSECTIONS — Page 3

SHARED-LANE CAPACITY

$$c_{SH}=\frac{v_1+v_2}{(v_1/c_{m1})+(v_2/c_{m2})}$$ where 2 movements share a lane

$$c_{SH}=\frac{v_1+v_2+v_3}{(v_1/c_{m1})+(v_2/c_{m2})+(v_3/c_{m3})}$$ where 3 movements share a lane

MINOR STREET APPROACH MOVEMENTS 7, 8, 9

Movement	v(pcph)	c_m(pcph)	c_{SH}(pcph)	$c_R=c_{SH}-v$	LOS
7	24	639	639	615	A
8	5	64	64	59	E
9	23	340	340	317	B

MINOR STREET APPROACH MOVEMENTS 10, 11, 12

Movement	v(pcph)	c_m(pcph)	c_{SH}(pcph)	$c_R=c_{SH}-v$	LOS
10	5	590	590	585	A
11	5	64	64	59	E
12	5	530	530	525	A

MAJOR STREET LEFT TURNS 1, 4

Movement	v (pcph)	c_m (pcph)	$c_R=c_m-v$	LOS
1	10	450	440	A
4	22	260	238	B

COMMENTS:

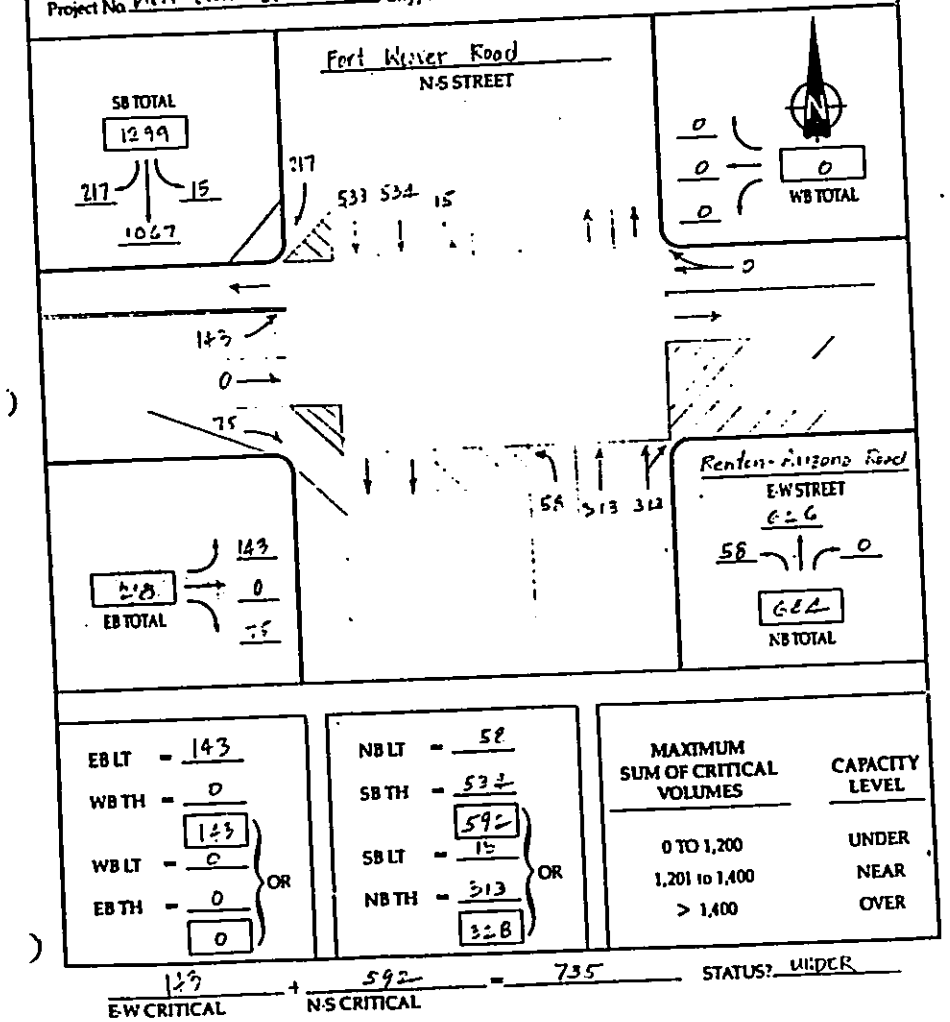
1987 CAPACITY LEVEL

PLANNING APPLICATION WORKSHEET

Intersection: Fort Weaver Road & Renton-Arizona Sts. Date: Sept. 3, 1987

Analyst: Conrad Higashienna Time Period Analyzed: 3:30 to 4:30 PM

Project No. West Loch Estates City/State: Waipahu Hawaii



EB LT	143	NB LT	58	MAXIMUM SUM OF CRITICAL VOLUMES
WB TH	0	SB TH	534	0 TO 1,200 — UNDER
	143		592	1,201 to 1,400 — NEAR
WB LT	0	SB LT	15	> 1,400 — OVER
EB TH	0	NB TH	313	
	0		328	
OR		OR		

143 (E-W CRITICAL) + 592 (N-S CRITICAL) = 735 STATUS? UNDER

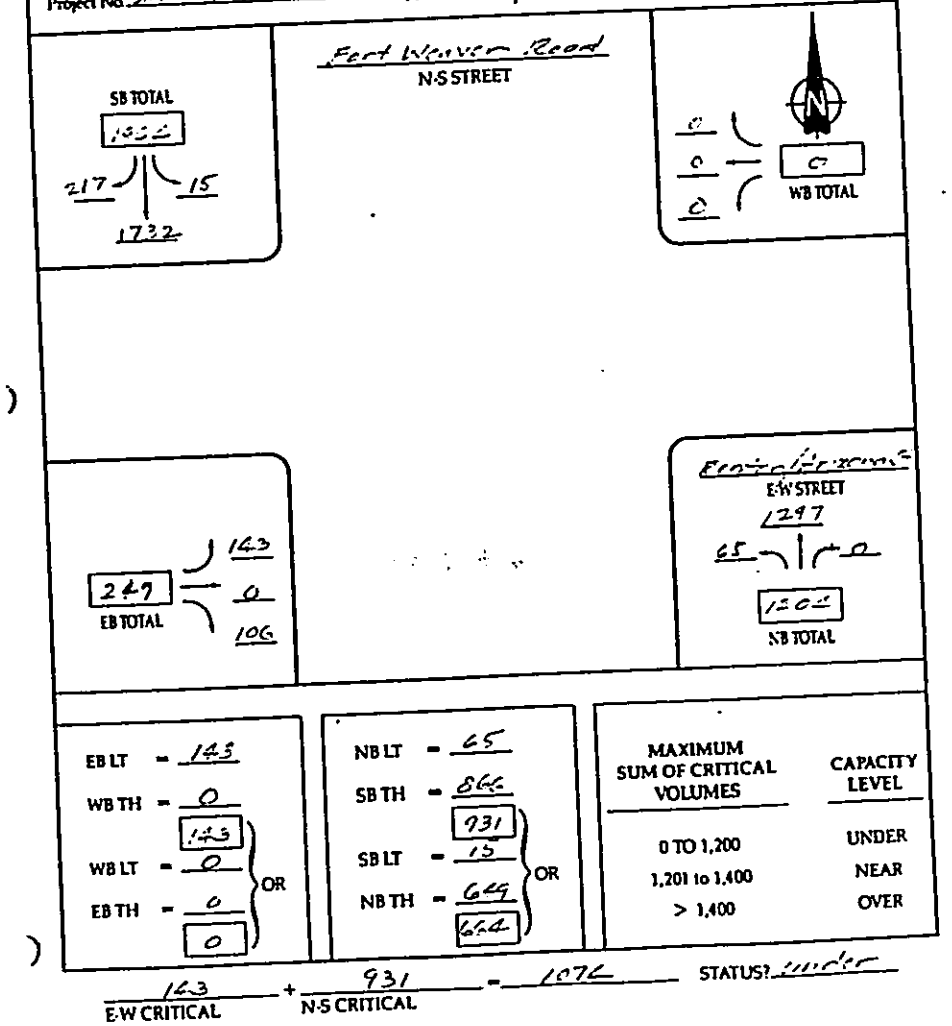
1991 CAPACITY LEVEL WITHOUT WEST LOCH

PLANNING APPLICATION WORKSHEET

Intersection: Ft Weaver Rd & Renton/Arizona Road Date: Const 1991

Analyst: HCA Time Period Analyzed: 3:30-4:30

Project No. West Loch Estates City/State: City & County of Honolulu



EB LT	143	NB LT	65	MAXIMUM SUM OF CRITICAL VOLUMES
WB TH	0	SB TH	866	0 TO 1,200 — UNDER
	143		931	1,201 to 1,400 — NEAR
WB LT	0	SB LT	15	> 1,400 — OVER
EB TH	0	NB TH	649	
	0		664	
OR		OR		

143 (E-W CRITICAL) + 931 (N-S CRITICAL) = 1074 STATUS? Under

1991 CAPACITY LEVEL WITH WEST LOCH

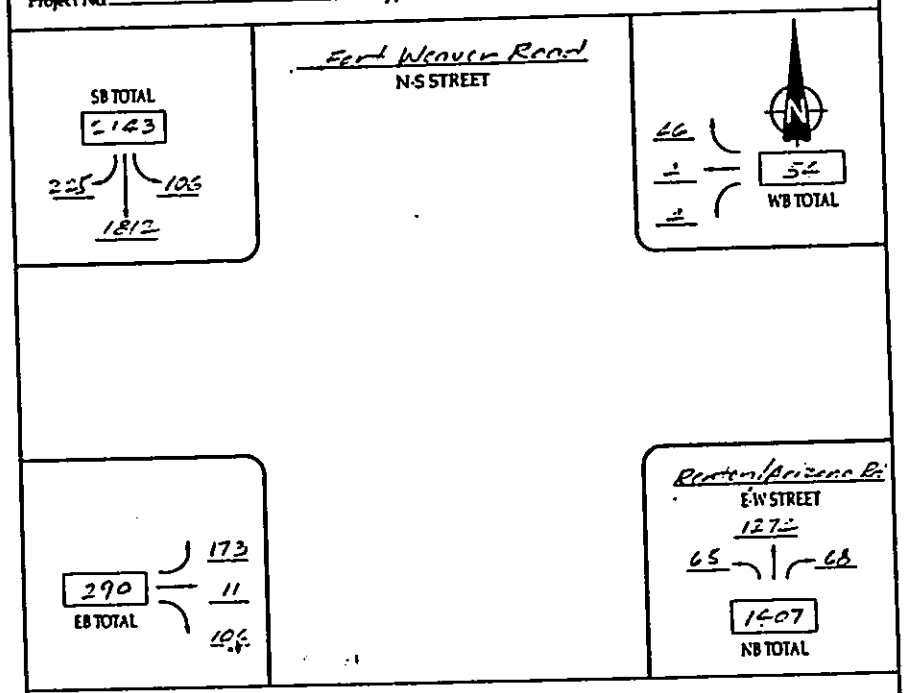
SIGNALIZED INTERSECTIONS 9-81

PLANNING APPLICATION WORKSHEET

Intersection: Ft Weaver Rd & Renton/Arizona Rd Date: Sept 1991

Analyst: _____ Time Period Analyzed: 3:30 - 4:30 PM

Project No. _____ City/State: _____



EB LT = 173	NB LT = 65	MAXIMUM SUM OF CRITICAL VOLUMES	CAPACITY LEVEL
WB TH = 4	SB TH = 906	0 TO 1,200	UNDER
177	971	1,201 to 1,400	NEAR
WB LT = 2	SB LT = 106	> 1,400	OVER
EB TH = 11	NB TH = 637		
15	743		

177 (E-W CRITICAL) + 971 (N-S CRITICAL) = 1148 STATUS? under

1987 CAPACITY LEVEL

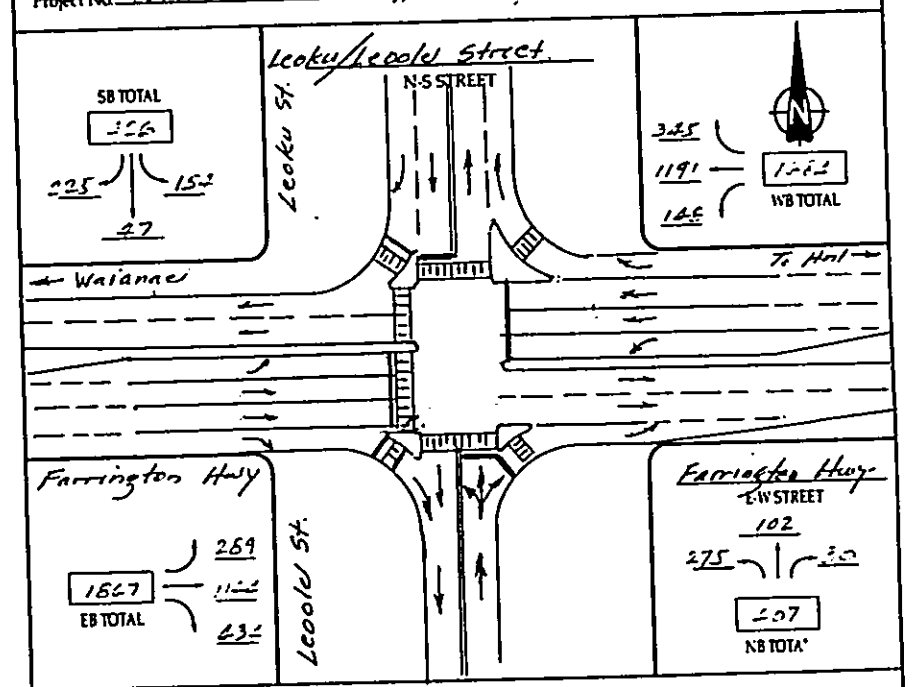
SIGNALIZED INTERSECTIONS 9-81

PLANNING APPLICATION WORKSHEET

Intersection: Farrington Hwy & Leoku/Leoole Date: August 19 1987

Analyst: HCA Time Period Analyzed: 3:30 - 4:30 PM

Project No. West Loch Estates City/State: City & County Honolulu



EB LT = 289	NB LT = 275	MAXIMUM SUM OF CRITICAL VOLUMES	CAPACITY LEVEL
WB TH = 595	SB TH = 47	0 TO 1,200	UNDER
884	322	1,201 to 1,400	NEAR
WB LT = 148	SB LT = 154	> 1,400	OVER
EB TH = 572	NB TH = 102		
720	256		

884 (E-W CRITICAL) + 322 (N-S CRITICAL) = 1206 STATUS? Near

1991 CAPACITY LEVEL WITHOUT WEST LOCH

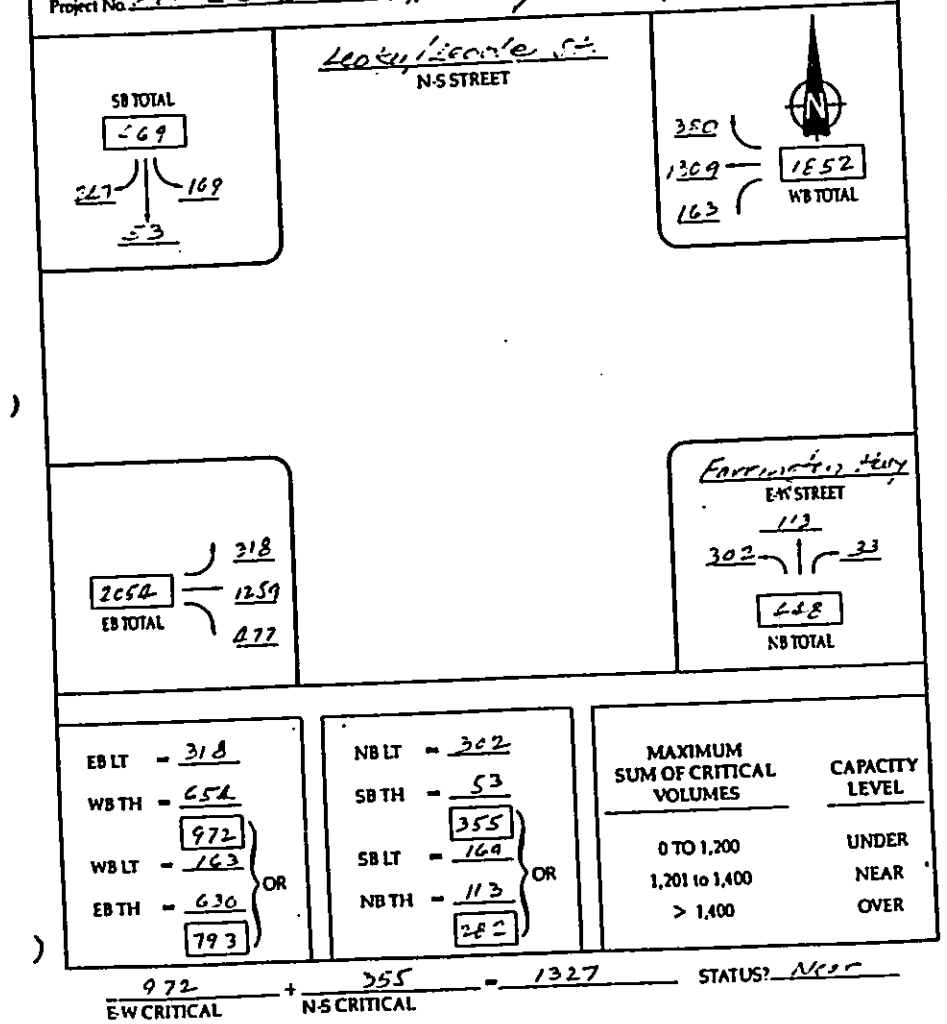
SIGNALIZED INTERSECTIONS 9-81

PLANNING APPLICATION WORKSHEET

Intersection: Farrington Hwy & Leoku/Leoole Date: Sept 1991

Analyst: HCA Time Period Analyzed: 3:30 - 4:30 PM

Project No: West Loch Estates City/State: City & County of Honolulu



EB LT = 318		NB LT = 302		MAXIMUM SUM OF CRITICAL VOLUMES	CAPACITY LEVEL
WB TH = 654	972	SB TH = 53	355	0 TO 1,200	UNDER
WB LT = 163	OR	SB LT = 169	OR	1,201 to 1,400	NEAR
EB TH = 630	793	NB TH = 113	282	> 1,400	OVER

972 (E-W CRITICAL) + 355 (N-S CRITICAL) = 1327 STATUS? NEAR

1991 CAPACITY LEVEL WITH WEST LOCH

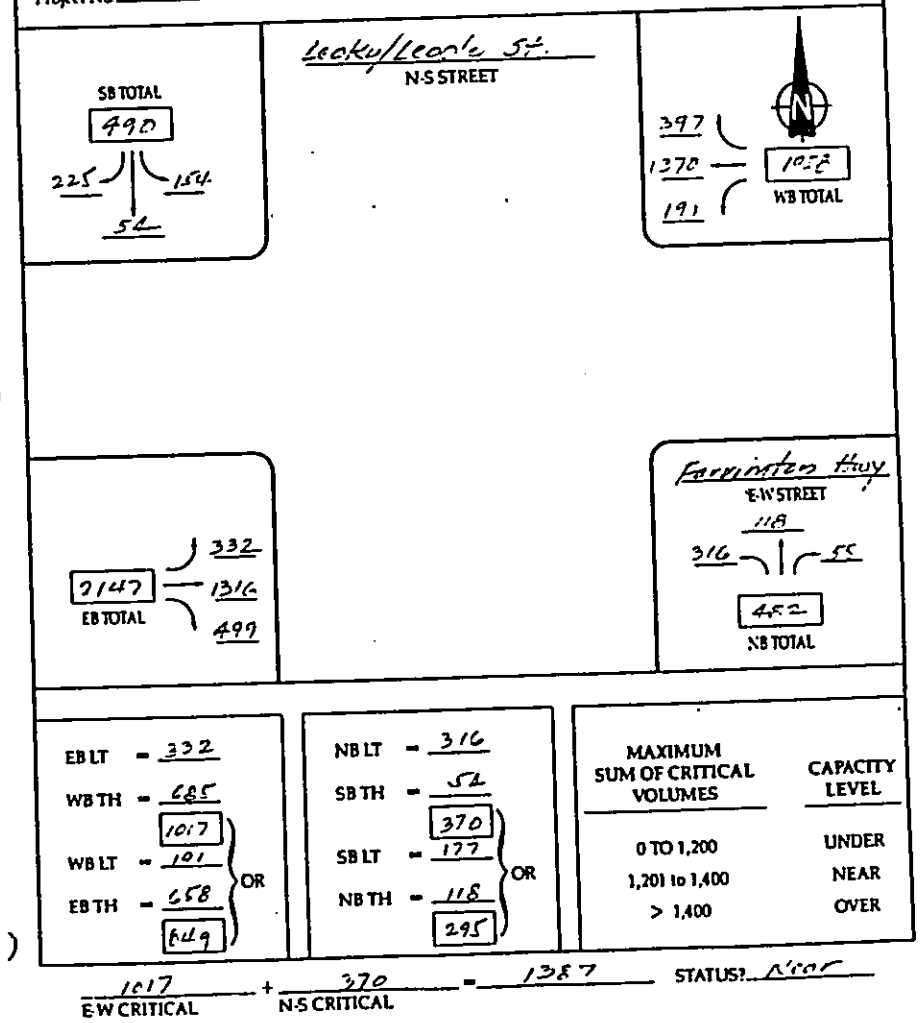
SIGNALIZED INTERSECTIONS 9-81

PLANNING APPLICATION WORKSHEET

Intersection: Farrington Hwy & Leoku/Leoole Date: Sept 1991

Analyst: HCA Time Period Analyzed: 3:30 - 4:30 PM

Project No: WEST LOCH ESTATES City/State: CITY & COUNTY OF HONOLULU



EB LT = 332		NB LT = 316		MAXIMUM SUM OF CRITICAL VOLUMES	CAPACITY LEVEL
WB TH = 685	1017	SB TH = 52	370	0 TO 1,200	UNDER
WB LT = 101	OR	SB LT = 177	OR	1,201 to 1,400	NEAR
EB TH = 658	849	NB TH = 118	295	> 1,400	OVER

1017 (E-W CRITICAL) + 370 (N-S CRITICAL) = 1387 STATUS? NEAR

APPENDIX G

Socio-Economic Impact Assessment For Proposed West Loch Estates Subdivision Ewa Division, Island of Oahu

by

COMMUNITY RESOURCES, INC.

September 1987

COMMUNITY RESOURCES, INC.

SOCIO-ECONOMIC IMPACT ASSESSMENT FOR PROPOSED WEST LOCH ESTATES SUBDIVISION AND WEST LOCH GOLF COURSE AND SHORELINE PARK, EWA DIVISION, ISLAND OF OAHU

September 1987

Prepared for:

R. M. Towill Corporation

Prepared by:

Community Resources, Inc.

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ACKNOWLEDGEMENTS

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- Earthplan (Section 4.4 on community issues and concerns; Section 4.5.1 on surrounding civilian uses; and Sections 4.6.1 through 4.6.5 on uses to be displaced);
- John R. K. Clark (Section 4.4.4 on recreational issues);
- David W. Rae (Section 4.6.7 on on relocation).

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1.0 PROJECT DESCRIPTION

The West Loch Estates subdivision -- proposed by the City and County of Honolulu Department of Housing and Community Development -- is a two-phase, 1,500-unit housing project which will also include:

- a 3.6-acre commercial site for convenience-type activities;
- a 2.8-acre park-and-ride facility;
- a 1.7-acre child care facility;
- an 18-acre district park;
- a 6.1-acre elementary school site;
- 34 acres of green belts, buffers, and setbacks, as well as 16 acres of roads and circulation.

In coordination, the City Department of Parks and Recreation is also proposing:

- a new 18-hole, 175-acre municipal golf course; and
- a 39-acre shoreline park extending along the entire coastal area of the West Loch Estates housing project.

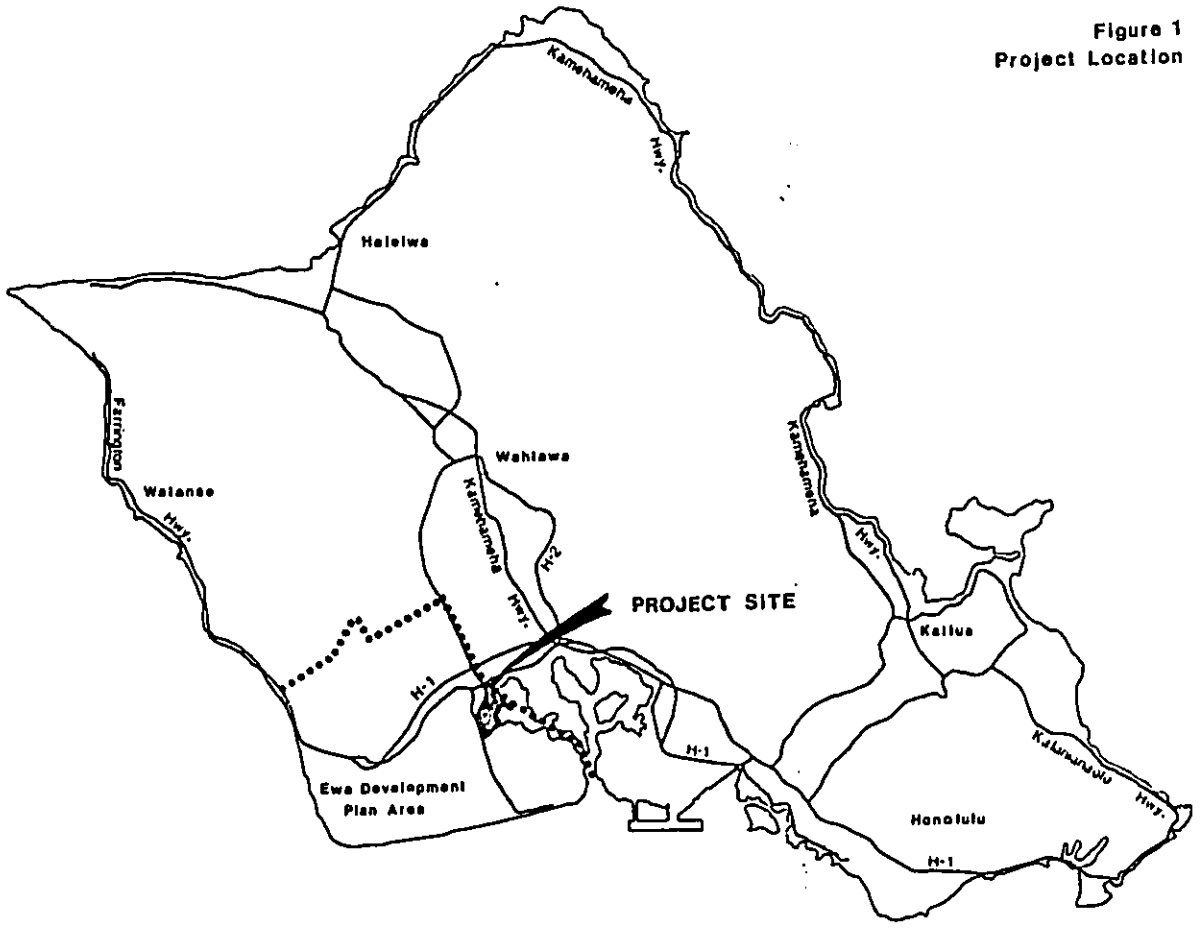
The combined projects -- which will be treated as a single effort for purposes of this report -- are to be situated on approximately 500 acres of land located south of Waipahu between the Fort Weaver Road bypass and the West Loch of Pearl Harbor (Figure 1). Geographically, the major uses within the project site would be the residential housing development (173 acres) and the 175-acre golf course (Figure 2).

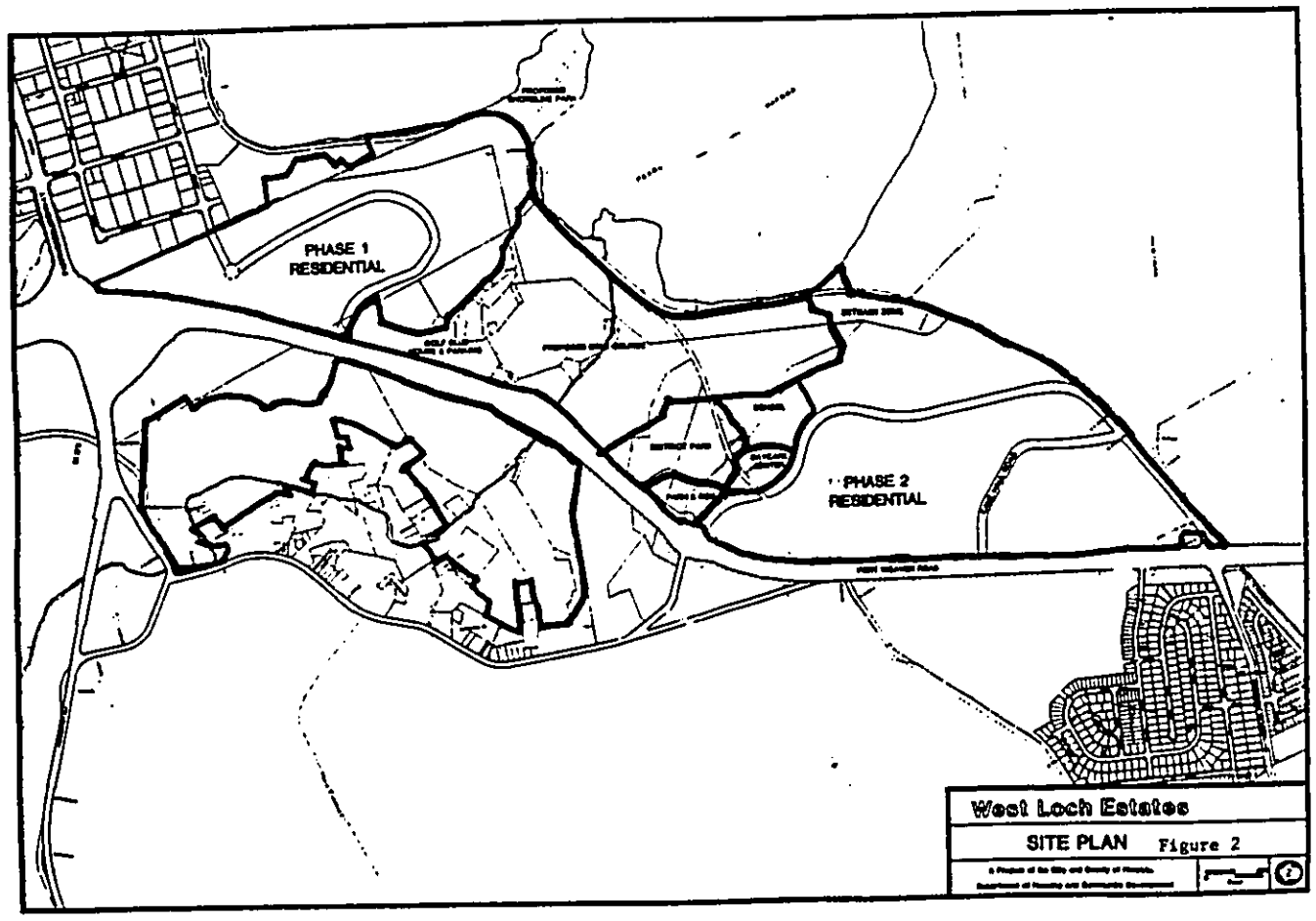
Of the total 1,500 housing units planned for construction, 900 units (60 percent) are proposed for "gap group" families -- i.e., households with incomes too high to qualify for most housing subsidy programs but too low to afford most market housing. Of these 900 units, 150 units would be targeted for the elderly. The remaining 600 units will be sold at market prices. All residential units will be single-family homes, except for the elderly units, which will be townhouses.

Phase I of development is expected to include the construction of the golf course and approximately 586 housing units, along with some roads and green belts. Phase II will include the remaining housing units (approximately 914, including all 150 elderly units), plus all additional activities -- i.e., both parks, the commercial area, and civic amenities.

Construction is expected to begin on Phase I in 1988 and on Phase II in the following year, with all aspects of the project being completed by 1991. It is expected that the majority of residential units will be sold and occupied by 1993.

Figure 1
Project Location





2.0 DESCRIPTION OF SURROUNDING REGION

This section focuses on the general region in which the project is to be located. More detailed descriptions of current socio-economic conditions in (1) the project site itself and (2) immediately surrounding small communities are reserved for Section 4 of this report, which addresses project impacts.

2.1 DEFINITION OF STUDY AREA

For purposes of this study, the surrounding region -- or "study area" -- will be defined as the Ewa Development Plan Area and the Waipahu Census Designated Place (CDP).

The City and County of Honolulu divides the island of Oahu into eight Development Plan Areas (Figure 1). The project falls within the Ewa Development Plan Area, although it borders the Central Oahu Development Plan Area.

Because the Central Oahu Development Plan Area encompasses a large area with several dissimilar communities, it was decided to include only Waipahu in the "study area" for this report. Waipahu is the Central Oahu community closest to the project site and would be closely linked to West Loch Estates by the existing highway system, whereas the other major Central Oahu communities (Mililani and Wahiawa) are located off the H-2 freeway, which represents a separate transportation route to and from Honolulu.

Figure 3 shows the boundaries of the Waipahu CDP. It may be noted that several small communities sometimes considered part of Waipahu -- Village Park, Crestview/Seaview, Waipio Gentry, and the future Waikele area -- are not included in the CDP. These are primarily bedroom communities separated from Waipahu by the H-1 freeway, and they sometimes have community identities to some degree separate from Waipahu.

2.2 HISTORIC AND ECONOMIC FORCES AFFECTING STUDY AREA

The study area has been shaped by at least three significant forces: national defense needs, the growth of large-scale sugar cultivation, and the post-Statehood expansion of single-family, suburban housing opportunities on Oahu.

Military: A significant military establishment developed in the area when the U.S. Navy based Pacific naval operations at Pearl Harbor. Waipahu's growth as an industrial and commercial center is tied in part to nearby defense activities. Many area residents work for the military, either as civilian or uniformed personnel, and two Ewa communities -- Iroquois Point and Barbers Point Naval Air Station Housing -- consist almost entirely of service people and their dependents. The presence of significant numbers of military families in the area would tend to shift population characteristics toward a younger population, with a

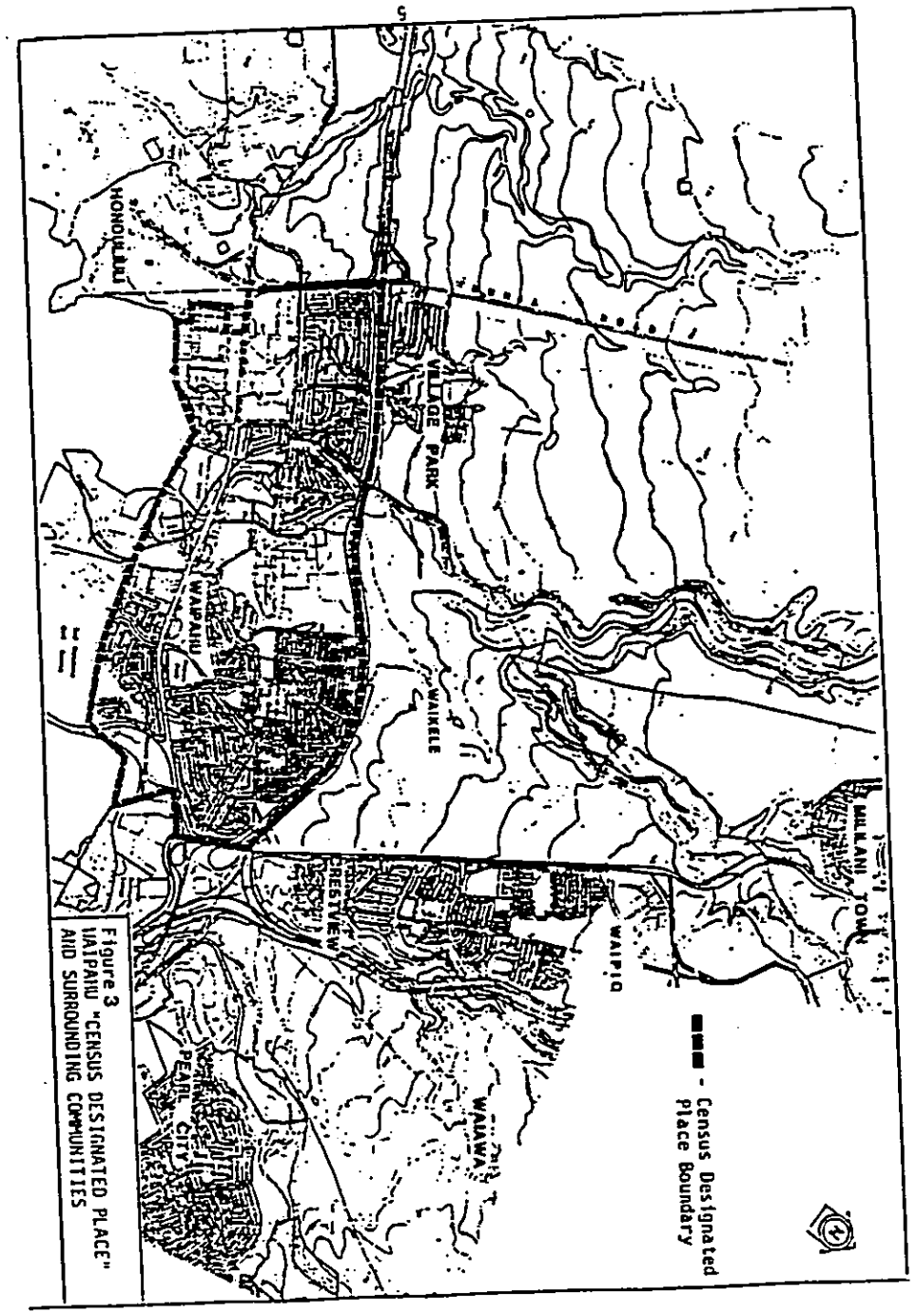


Figure 3
WAIPAHU "CENSUS DESIGNATED PLACE" AND SURROUNDING COMMUNITIES

greater proportion of Caucasians, people born elsewhere in the United States, and with slightly lower education levels.

Sugar: Sugar has been grown on the Ewa Plain since the early days of the industry in Hawaii. Many families with ties to the industry still live in Waipahu and Ewa, and one group of Ewa communities -- called the "Ewa Villages" -- were formed as plantation housing areas. Immigrant groups brought to Hawaii as contract labor still predominate in some communities, along with more recent immigrants. Waipahu's growth can also be tied to the location of the Oahu Sugar Company's major sugar mill there. However, Hawaii's sugar industry has faced increasingly difficult times in recent decades. Since a consolidation in 1970, Oahu Sugar is the only surviving plantation in the study area, and one of only two surviving sugar operations on Oahu. Virtually all the land now cultivated by the Amfac-owned Oahu Sugar Co. is leased from the Campbell Estate, and the leases expire in the early 1990's.

Housing Development and Population Shifts: As the amount of land needed for sugar has decreased, the demand for housing has grown. The agricultural lands in Ewa and around Waipahu have found increasing value to developers seeking to satisfy demand for moderately-priced, single-family homes on Oahu. Thus, Waipahu's and Ewa's population have come to include greater numbers of residents who work in other areas, and whose livelihoods are tied more to the island's general economy than to the military and sugar industries traditionally central to the local communities of Ewa and Waipahu. Increasing numbers of suburbanites would tend to increase the proportion of homeowners, younger families, and persons moving from elsewhere on the island, as well as increasing housing values and monthly mortgage payments.

While much of the population in new housing development meets this "suburbanite" description, the turnover of existing housing stock -- particularly in the Waipahu CDP itself -- has resulted in longtime Hawaii residents "moving up" to higher-priced homes closer to Honolulu, with some tendency for replacement by recent immigrants from the Philippines or, secondarily, Samoa. The recent Filipino immigrants may themselves by "moving up" from rental housing in urban Honolulu to fee-simple homes in Waipahu. A recent survey of Ilocano immigrants found that home-ownership is much higher in Waipahu (60 percent) than in lower Kalihi (33 percent) or upper Kalihi (23 percent) (East-West Population Institute and Operation Manong, 1985, p. 5).

2.3 STUDY AREA EMPLOYMENT AND ECONOMIC BASE

The Hawaii State Department of Transportation's (1982) Urban Transportation Planning Package (UTPP), comprised of special computer printouts, provides 1980 Census data on place of work. Thus, it gives information on the number of jobs located in the study area, as compared with the number of employed persons

living in the area (a topic which will be discussed in the following Section 2.4). The UTPP data provide information on primary workplaces as of April 1980 and thus would exclude second jobs.

State Traffic Assignment Zones (TAZ's) 143 to 146 are roughly comparable to the Waipahu CDP, although this aggregated traffic zone would also include Honouliuli and part of the project site. According to the UTPP data, Waipahu was the site of 5,880 primary jobs in 1980, all of them civilian in nature. The industry with the largest single number of jobs (1,617) was retail trade, thereby underscoring Waipahu's role as a regional center of trade. The industries comprising sugar plantation operations -- agriculture and manufacturing -- provided a combined 1,156 jobs.

TAZ's 137 to 139 encompass southeastern Ewa, the area served by Fort Weaver Road and lying to the south of the project site. The UTPP data indicate a total of 6,170 jobs in 1980, but the majority of these -- 3,303 -- were for active-duty armed forces personnel. The 2,867 civilian jobs were distributed across a wide variety of industries, many of these presumably involving defense-related activities, as well as retail activities and field activities for the sugar plantation.

TAZ's 140 and 142 comprise the remainder of Ewa (plus a sliver of Waianae east of Nanakuli), consisting of Makakilo, Campbell Industrial Park, and other areas served by Farrington Highway. This area had 3,445 jobs in 1980 -- 2,344 civilian and 1,101 military. Expectably, principal civilian industries included manufacturing and retail trade.

Major civilian employers in the study area would include the collective activities at Campbell Industrial Park, which provide approximately 2,500 jobs at present (personal communication, David McCoy, Industrial Real Estate Manager, Campbell Estate, September 11, 1987) and Oahu Sugar Company, which maintains a total payroll of about 450 workers (personal communication, Masao "Cranky" Watanabe, Consultant, Oahu Sugar Co., September 14, 1987).

The principal military installation actually located in the study area -- Barbers Point Naval Air Station -- was the worksite for 2,430 federal Department of Defense personnel in 1985, according to national data reproduced in the 1986 State Data Book, (Hawaii State Department of Planning and Economic Development, 1986, p. 308). Of these, more than 80 percent were active-duty military personnel.

With 18,350 Department of Defense personnel (11,000 of them civilians), Pearl Harbor is a much larger employer. However, while many Pearl Harbor military families live at Iroquois Point within the study area, the vast majority of Pearl Harbor activities and employment are located by the East and Middle Lochs, rather than the West Loch western shore falling in the study area.

According to Naval officials contacted for this report (personal communication, William Liu, Assistant Naval Base Civil Engineer, various dates in August and September 1987), the only substantial military activities on the western shore of West Loch involve an ammunition storage area (further discussed in Section 4.5). Due to the sensitive nature of this facility, the Navy has declined to discuss aspects such as number of personnel; however, it is believed that the numbers are not substantial.

2.4 SOCIO-ECONOMIC CHARACTERISTICS OF STUDY AREA POPULATION

Tables 1 through 4 show selected demographic, income, labor force, and housing characteristics for the City and County of Honolulu, the Waipahu CDP, and the Ewa Development Plan Area. Data presented are from the 1970 and 1980 U.S. Censuses. This time period was one of significant population growth in the study area. Ewa, which had 24,037 residents in 1970, grew by more than 50 percent to 36,234 in 1980. Waipahu's population grew from 24,150 to 29,139.

The most recent estimate of population in the study area is for 1985. The City and County Department of General Planning (personal communication, Steve Young, planner, September 14, 1987) estimates the Ewa Development Plan Area population as 37,400 and the Waipahu CDP population as 29,400. If correct, these estimates suggest much slower study area population growth rates in the 1980's than in the 1970's, possibly due in part to the high interest rates and general slowdown in housing construction experienced during much of the early 1980's.

The City provides updated estimates for total population figures only, and thus a discussion of more detailed characteristics must rely on the Census data contained in Tables 1 though 4.

2.4.1 Ewa

Ewa's largest civilian community is Ewa Beach, located a few miles south of the project site. With a 1980 population of 14,400, Ewa Beach is partially a military support community and partially a bedroom community of commuters to Honolulu. Proximate to Ewa Beach are the military housing areas of Iroquois Point (1980 population of 3,900) and Barbers Point Housing (1980 population of 1,400). In western Ewa, the major community is Makakilo (1980 population of 7,700, with ongoing construction and population growth).

Demographics: Caucasians and Filipinos are the largest ethnic groups among Ewa's population. Almost half of the area's residents are Caucasian (44.5 percent) and almost one quarter are Filipino (24.8 percent); these shares are higher than the 33.1 percent and 12.8 percent shares, respectively, for all of Oahu.

The Ewa area has a relatively young population. Greater percentages of Ewa residents are under five years of age (10.7

Table 1: Total Population and Demographic Characteristics: City and County of Honolulu and Various Parts of Study Area, 1970 and 1980

	CITY AND COUNTY OF HONOLULU 1970		CITY AND COUNTY OF HONOLULU 1980		EWA D.P. AREAS (C.T. 83-86.02) 1970		EWA D.P. AREAS 1980		WAIPAHU (CENSUS DESIGNATED PLACE) 1970		WAIPAHU (CENSUS DESIGNATED PLACE) 1980	
	#	%	#	%	#	%	#	%	#	%	#	%
TOTAL POPULATION	630,528	100.0	762,565	100.0	24,037	100.0	36,234	100.0	24,150	100.0	29,139	100.0
ETHNICITY												
Caucasian	208,102	33.1	239,605	31.4	10,703	44.5	16,124	44.5	5,844	24.2	7,866	27.0
Japanese	165,468	26.2	179,323	23.5	1,977	8.2	2,124	5.9	6,124	25.4	6,124	21.0
Chinese	48,905	7.7	52,237	6.9	482	2.0	1,000	2.8	1,000	4.1	1,000	3.4
Filipino	65,599	10.4	97,511	12.8	5,963	24.8	8,000	22.1	3,000	12.4	4,000	13.7
Hawaiian	52,000	8.5	42,000	5.5	2,900	12.1	1,500	4.1	1,000	4.1	1,500	5.1
Other	90,454	14.3	151,889	19.9	2,012	8.4	3,486	9.6	3,182	13.2	4,649	15.9
AGE												
Less than 5 yr.	63,000	10.0	58,000	7.6	2,600	10.8	2,600	7.2	2,600	10.8	2,600	8.9
5 - 17 yr.	164,000	26.0	164,000	21.5	6,000	25.0	6,000	16.6	6,000	24.8	6,000	20.6
18 - 64 yr.	370,000	58.7	500,000	65.6	14,000	58.2	25,000	69.0	14,000	58.0	18,000	61.8
65 or more yr.	33,528	5.3	40,565	5.3	1,437	6.0	2,634	7.3	1,550	6.4	2,539	8.7
Median age	29.0 yr		30.1 yr		24.6 yr		28.1 yr		24.6 yr		28.1 yr	
PLACE OF BIRTH												
Hawaii	369,000	58.5	435,000	57.0	13,000	54.1	19,000	52.4	13,000	53.8	16,000	54.9
Other U.S.	180,000	28.5	230,000	30.2	7,000	29.1	11,000	30.4	7,000	29.0	9,000	30.9
Foreign country	81,528	12.9	97,565	12.8	4,037	16.8	6,234	17.2	4,150	17.2	4,139	14.2
RESIDENCE 5 YRS. PREVIOUS												
Lived in same house	252,000	40.0	282,000	37.0	10,000	41.6	13,000	35.9	9,000	37.3	10,000	34.3
Same island	78,000	12.4	95,000	12.5	3,000	12.5	4,000	11.0	3,000	12.4	3,000	10.3
Different island	160,000	25.4	194,000	25.5	6,000	25.0	9,000	24.8	6,000	24.8	7,000	24.0
Different state	10,000	1.6	11,000	1.4	500	2.1	1,000	2.8	500	2.1	1,000	3.4
Different country	30,528	4.8	35,565	4.7	1,537	6.4	2,234	6.2	1,650	6.8	2,139	7.3
EDUCATION												
Persons aged 25+	337,000		450,000		12,000		20,000		12,000		16,000	
0-8 years only	70,000	20.8	63,000	14.0	3,000	25.0	2,800	14.0	3,000	25.0	2,400	15.0
H.S. without only	117,000	34.7	144,000	32.0	4,000	33.3	6,400	32.0	4,000	33.3	5,600	35.0
Some post H.S.	80,000	23.8	135,000	30.0	3,000	25.0	6,000	30.0	3,000	25.0	4,800	30.0
College, 4+ yr.	70,000	20.8	108,000	24.0	2,000	16.7	4,800	24.0	2,000	16.7	3,200	20.0
Median	12.1 yr		12.5 yr		12.1 yr		12.5 yr		12.1 yr		12.5 yr	
HOUSEHOLDS												
Total households	178,000		240,000		6,000		10,000		6,000		8,000	
Persons per household	3.5		3.2		4.0		3.6		4.0		3.6	
Owner occupied	98,000	55.1	144,000	60.0	3,000	50.0	6,000	60.0	3,000	50.0	5,000	62.5
Renter occupied	80,000	44.9	96,000	40.0	3,000	50.0	4,000	40.0	3,000	50.0	3,000	37.5
HOUSING UNITS												
Total housing units	185,000		255,000		6,000		10,000		6,000		8,000	
Vacant	7,000	3.8	15,000	5.9	0	0.0	0	0.0	0	0.0	0	0.0
Single family	110,000	59.5	150,000	58.8	4,000	66.7	6,000	60.0	4,000	66.7	5,000	62.5
Multi-family	75,000	40.5	105,000	41.2	2,000	33.3	4,000	40.0	2,000	33.3	3,000	37.5
Median value	$17,000		$90,000		$18,000		$95,000		$17,000		$90,000	
Median rent	$95/mo		$350/mo		$100/mo		$375/mo		$95/mo		$350/mo	

Notes: All figures (except "Total Population and Age") based on 15% sample; hence, numbers represent estimates.
In this and immediately following tables, the small Central Oahu town of Kunia (1980 pop. 829) is counted with Ewa rather than Central Oahu because it falls in one of the Ewa census tracts.
"Persons born abroad or at sea to American parents, including persons born in U.S. territories, and persons born in the "NC" = 1970 category or have "Not Comparable" to 1980 Census allocated non-responses to other categories shown). "N/A" = "Not Available."

Sources: U.S. Bureau of the Census, 1970 Census of Population and Housing--Census Tracts--Honolulu, Hawaii, PHC(1)-144, and 1980 Census of Population and Housing--Census Tracts--Honolulu, Hawaii, PHC80-2-183, and 1980 Summary Tape Files 1-A and 3-A; State of Hawaii, 1973, Community Profiles for Hawaii.

Table 2:
Family Characteristics and Income Levels: City and County of Honolulu and Various Parts of Study Area, 1970 and 1980

	CITY AND COUNTY OF HONOLULU 1970	CITY AND COUNTY OF HONOLULU 1980	EWA D.P. AREA (C.T. 83-86.02) 1970	EWA D.P. AREA (C.T. 83-86.02) 1980	WAIPAHU (CENSUS DESIGNATED PLACE) 1970	WAIPAHU (CENSUS DESIGNATED PLACE) 1980
POPULATION IN FAMILIES	N/A	653,118	N/A	34,071	N/A	27,115
as percentage of total population	N/A	85.6%	N/A	94.0%	N/A	93.1%
NUMBER OF FAMILIES	138,277	178,618	5,229	8,329	5,011	6,133
	%	%	%	%	%	%
HEAD						
Husband/wife	86.8	82.8	89.5	87.9	89.3	78.0
Male only	3.6	4.6	2.4	3.3	3.8	5.2
Female only	9.8	12.7	8.1	8.9	7.9	16.9
WITH OWN CHILDREN UNDER 18	63.4	59.4	75.1	70.8	N/A	65.9
Female head	6.2	7.5	6.8	7.1	N/A	13.9
BELOW POVERTY LEVEL[a]	7.2	7.5	8.7	7.2	7.5	14.4
MEDIAN FAMILY INCOME[a]	$12,035	$23,654	$10,109	$21,000	$11,184	$22,576
NON-FAMILY HOUSEHOLDS	N/A	52,415	N/A	794	N/A	806
percentage below poverty level	N/A	15.9%	N/A	49.6%	N/A	17.5%

Notes: a These figures based on 15% sample; hence, numbers represent estimates.
"N/A" = "Not Available."

Sources: U.S. Bureau of the Census, 1970 Census of Population and Housing--Census Tracts--Honolulu, Hawaii, PHC(1)-HH, and 1980 Census of Population and Housing--Census Tracts--Honolulu, Hawaii, PHC80-2-183, and 1980 Summary Tape Files 1-A and 3-A; State of Hawaii, 1973, Community Profiles for Hawaii.

Table 3:

Labor Force Size and Characteristics: City and County of Honolulu and Various Parts of Study Area, 1970 and 1980

	CITY AND COUNTY OF HONOLULU 1970	CITY AND COUNTY OF HONOLULU 1980	EWA D.P. AREA (C.T. 83-86.02) 1970	EWA D.P. AREA (C.T. 83-86.02) 1980	WAIPAHU (CENSUS DESIGNATED PLACE) 1970	WAIPAHU (CENSUS DESIGNATED PLACE) 1980
POTENTIAL LABOR FORCE (aged 16+)	427,601	674,903	14,110	23,862	13,932	20,309
not in labor force	33.0%	30.8%	38.3%	31.9%	34.0%	32.9%
armed forces	11.5	10.1	25.5	18.5	7.9	7.2
civil. labor force	55.5	59.1	36.3	49.5	58.2	59.8
CIVILIAN LABOR FORCE	237,338	339,863	5,115	11,821	8,105	12,151
unemployed	3.0%	4.8%	4.3%	8.0%	3.7%	6.4%
TOTAL EMPLOYED CIVILIAN LABOR FORCE	230,252	324,113	4,893	10,873	7,803	11,373
	%	%	%	%	%	%
OCCUPATION						
service	15.0	17.6	14.0	19.3	14.6	20.3
manager./profes.	NC	24.7	NC	14.2	NC	12.4
technical, sales & adminis.	NC	33.7	NC	31.0	NC	28.6
farm/fish/forest	NC	1.8	NC	3.9	NC	2.7
precision, craft, repair	NC	11.3	NC	15.5	NC	17.2
operators, fabricators, laborers	NC	10.9	NC	16.3	NC	18.9
INDUSTRY (selected)						
agric., forest, fish, mining	2.1	1.7	N/A	5.1	N/A	2.1
construction	9.5	6.6	6.6	7.5	N/A	10.1
manufacturing	10.3	7.7	18.8	12.0	N/A	13.4
retail trade	18.0	20.6	15.7	20.1	N/A	21.9
financial, insur., real estate	5.6	8.1	2.4	5.2	N/A	0.5
personal, entertain. & recreat. services	7.6	8.1	N/A	5.9	N/A	9.5
health, educ., & professional	18.1	18.5	11.0	12.7	N/A	11.2
public adminis.	12.6	10.9	16.0	13.4	N/A	10.5
COMMUTE TO WORK						
45 minutes or more	N/A	13.4%	N/A	22.6%	N/A	17.8%
mean travel (min.)	N/A	22.6 m	N/A	25.8 m	N/A	26.3 m

Notes: All figures based on 15% sample; hence, numbers represent estimates.
"N/A" = "Not Available" in published form. "NC" = 1970 categories or bases "Not Comparable" to 1980 Census.

Sources: U.S. Bureau of the Census, 1970 Census of Population and Housing--Census Tracts--Honolulu, Hawaii, PHC(1)-HH, and 1980 Census of Population and Housing--Census Tracts--Honolulu, Hawaii, PHC80-2-183, and 1980 Summary Tape Files 1-A and 3-A; State of Hawaii, 1973, Community Profiles for Hawaii.

Table 4: Housing Stock and Characteristics: City and County of Honolulu and Various Parts of Study Area, 1970 and 1980

	CITY AND COUNTY OF HONOLULU		EWA D.P. AREA (C.T. 83-86.02)		WAIPAHU (CENSUS DESIGNATED PLACE)	
	1970	1980	1970	1980	1970	1980
TOTAL YEAR-ROUND HOUSING UNITS	174,107	250,866	5,723	9,466	6,557	7,118
vacant (total)	5.4%	6.2%	4.2%	3.4%	3.5%	2.5%
vacant for sale	0.8	0.8	0.5	1.0	0.6	0.1
vacant for rent	2.5	3.6	1.9	0.6	2.5	1.8
held for occas'l use	N/A	0.9	N/A	0.4	N/A	0.1
other	N/A	3.2	N/A	1.4	N/A	0.5
TOTAL YEAR-ROUND OCCUPIED UNITS	164,763	230,214	5,484	9,139	6,362	6,939
LACKING COMPLETE PLUMBING	3.5%	1.5%	3.0%	0.6%	4.6%	1.3%
1.51 or more persons/room	6.9	7.4	6.9	8.6	10.4	13.8
PERSONS PER HOUSEHOLD	3.60	3.15	4.39	3.98	4.50	4.11
MEDIAN CASH RENT (renter-occupied)	$130	$279	$ 89 to $156	$230 to $372	$155	$295
as % of median family income	12.9%	14.2%	10.6%-18.8%	13.1%-21.3%	16.6%	15.7%
MEDIAN VALUE* (owner-occupied)	$38,400	$130,400	$29,100 to $32,000	$ 96,000 to $120,400	$31,700	$112,000
MEDIAN MONTHLY MORTGAGE* (owner-occupied)	N/A	$494	N/A	$514	N/A	$420
as % of median family income	N/A	25.2%	N/A	29.4%	N/A	22.3%

Notes: * For 1980, median values are for non-condominium housing units.
** Figures based on 15% sample; hence, numbers represent estimates.
The index for "Median Cash Rent" and "Median Value" under Ewa Development Plan Areas reflect ranges among the census tracts comprising these areas.

Sources: U.S. Bureau of the Census, 1970 Census of Population and Housing--Census Tracts--Honolulu, Hawaii, PHC(1)-MM, and 1980 Census of Population and Housing--Census Tracts--Honolulu, Hawaii, HC(80-2-183, and 1980 Summary Tape Files 1-A and 3-A; State of Hawaii, 1973, Community Profiles for Hawaii.

percent) and between five and 17 years of age (27.8 percent), as opposed to Oahu as a whole (7.9 percent and 24.2 percent, respectively). The proportion of residents aged 65 years and older is especially low in Ewa -- senior citizens constitute 7.2 percent of Oahu's population, but only three percent of Ewa's. The youth of the Ewa population can be attributed in large part to the substantial numbers of military force members and dependents living there -- 18.5 percent of Ewa residents aged 16 years and above were in the armed forces in 1980, a figure well above the Oahu-wide average of 10.1 percent.

Ewa residents are somewhat more likely than all Oahu residents to have been born elsewhere in the United States; 36 percent were born outside of Hawaii, while 30.1 percent of total Oahu residents in 1980 were born elsewhere in the United States. Ewa's share of foreign-born residents was similar to Oahu's; thus, the percentage of Hawaii-born residents was lower than for the island as a whole.

As would be expected from data on place of birth and age, Ewa residents show greater mobility than the entire Oahu population. Relatively fewer Ewa than overall Oahu residents reported living in the same house or on the same island in 1980 as in 1975. The principal mobility difference was that Ewa residents were markedly more likely (26.1 percent) to have resided in a different state five years previously than were Oahu residents generally (18.4 percent).

The adult population of Ewa contains proportionately fewer highly-educated people than does Oahu as a whole. While a slightly lower proportion of Ewa residents completed eight or fewer years in school and the proportion of high school graduates is higher, the percentage who have completed four years of education beyond high school (12.6 percent) is considerably lower than for Oahu (21.7 percent).

Family and Income Characteristics: Conventional family patterns, in which both parents are present, are more typical of Ewa than for the island generally. Both parents are present in 87.9 percent of Ewa households, a figure considerably higher than Oahu's 82.8 percent. Family orientation is also shown by the 70.8 percent of Ewa households with children at home, well above the islandwide figure of 59.4 percent.

The incidence of poverty level incomes among Ewa households is similar to that for the island as a whole. Ewa's median family income of $21,000 in 1980 was more than ten percent lower than the islandwide median, but about the same percentage of families (7.2 percent, compared with 7.5 percent for the island as a whole) had incomes below the poverty level, thereby suggesting less variability in income in Ewa than was the case islandwide. The small number of non-family households in Ewa had particularly low incomes -- almost half (49.6 percent) earned less than the poverty level in 1980, compared with 15.9 percent for all non-family households on Oahu.

Labor Force: After adjusting for the high proportion of Ewa residents aged 16 years or above in the military as of 1980, labor force participation rates are relatively lower for Ewa (61 percent) than for Oahu as a whole (66 percent). Other census data indicate the low labor force participation rates are primarily due to proportionately fewer females in the workforce. Additionally, it may be noted that Ewa's 1980 unemployment, at 8.0 percent, was significantly higher than the islandwide average of 4.6 percent.

In terms of occupational category, Ewa workers are more likely than workers islandwide to be found in service employment (19.3 percent, compared with 17.6 percent for all of Oahu); farming, fishing, and forestry (3.9 percent, vs. 1.8 percent); precision, craft, and repair (15.5 percent, compared with 11.3 percent); and operators, fabricators and laborers (16.3 percent, as opposed to 10.9 percent). Also, fewer Ewa workers are employed in managerial and professional or technical, sales and administrative categories than is the case for all of Oahu.

In terms of industry, Ewa workers are more likely than most other Oahu workers to be employed in agriculture, forestry, fishing and mining; construction and manufacturing. However, more Ewa workers (13.4 percent) are employed in public administration than for all of Oahu (10.9 percent); this could be attributed to military and Federal facilities located in the area. The work force in Ewa is less likely than average to be employed in retail trade; finance, insurance and real estate; personal and other services, or health, education and professional services.

Housing: Housing tenure in Ewa resembles the pattern for all of Oahu; 49.8 percent of dwelling units are owner-occupied. Crowded units -- those occupied by more than 1.51 persons per room -- are somewhat more common in Ewa, where 8.5 percent of all homes would be defined as crowded by this standard. This could be related to a larger-than-average family size in Ewa, (3.96 persons per household, compared with 3.15 for all of Oahu). While the 1980 median value of owner-occupied housing was lower than for the island as a whole, median monthly mortgage payments (at $514) were higher than the islandwide average of $494. This would suggest that Ewa homeowners had, in general, purchased their homes more recently than was the islandwide norm, a proposition supported by the fact that Ewa residents were more likely to be in-migrants to Hawaii than Oahu residents as a whole.

2.4.2 Waipahu

The Waipahu CDP includes census tracts 87.01, 87.02, 89.01, and a portion of tract 88. As previously suggested, several of the more suburban-oricnted neighborhoods -- such as Village Park, Waipio and Crestview/Ocean View -- are within the Waipahu ,Neighborhood Board area, but not within the census designated place of Waipahu.

Demographics: Waipahu's ethnic characteristics indicate a substantially greater proportion of Filipinos than is the case for the island as a whole. This is consistent with the historic roots of Waipahu as a plantation community comprised heavily of immigrants. More than 40 percent of Waipahu residents (41.6 percent) reported Filipino ancestry, far greater than the 12.8 percent for the island as a whole. Each of Hawaii's other major ethnic groups show lower representation in Waipahu than for all of Onhu. Differences are most pronounced for Caucasians, who made up 33.1 percent of Oahu's population in 1980 but just 13.5 percent among Waipahu residents.

Waipahu has a relatively young population. Considerably higher proportions of Waipahu residents are less than five years of age (10.7 percent) than for the City and County (7.9 percent); Waipahu's median age of 24.5 years is much younger than all of Oahu's 28.1 years.

The population of Waipahu contains considerably larger numbers born in a foreign country than is the case for the entire island. More than one in every four Waipahu residents (27.9 percent) was born abroad, compared with 14.8 percent of all Oahu residents. Waipahu also has a slightly higher proportion of Hawaii-born residents (56.9 percent) than the county as a whole (55.1 percent), and only about half as many people who were born elsewhere in the United States (15.2 percent, compared with 30.1 percent for all of Oahu).

Mobility patterns, measured by residence five years prior to the 1980 Census, are similar for Oahu and Waipahu residents. The chief differences, as suggested by differences in birthplace, are that greater proportions of Waipahu residents (9.3 percent) than of Oahu residents as a whole (6.6 percent) lived in a different country in 1975. Similarly, relatively fewer Waipahu residents (8.5 percent) reported having lived in a different state in 1975, compared with 18.4 percent for all of the island's population.

Education levels of Waipahu residents are somewhat lower than for Ewa or for all of Oahu. While 14.4 percent of Oahu's population aged 25 years and above completed eight school years or less, the similar statistic for Waipahu was 27.5 percent. Less than ten percent of Waipahu residents (8.7 percent) have four or more years of education beyond high school, compared with 21.7 percent for Oahu residents generally. Education levels rose for Waipahu, as for the island as a whole, between 1970 and 1980. The proportion of Waipahu's population with some education beyond high school almost doubled over the decade, moving from 13 percent to 23.6 percent.

Family and Income Characteristics: Data on family characteristics show that some of the measures associated with poverty apply in Waipahu to a somewhat more widespread degree than for the overall island. The number of families headed by a female (16.9 percent) is greater in Waipahu than the 12.7 percent figure for Oahu. Considerably more households with children present are

headed by women in Waipahu (13.9 percent) than in the island as a whole (7.5 percent).

The incidence of households with incomes below the poverty level is significantly higher in Waipahu (14.4 percent) than for all of Oahu (7.5 percent), although Waipahu's median family income of $22,576 in 1980 was only slightly lower than the islandwide median of $23,554.

Labor Force: Labor force statistics indicate that -- after adjusting for armed forces personnel living in Waipahu -- civilian labor participation rates in Waipahu (35 percent) are similar to those for the island as a whole (34 percent). However, the 1980 civilian unemployment rate in Waipahu (6.4 percent) was higher than the islandwide rate (4.6 percent).

Like Ewa workers, employed Waipahu residents tend to hold service and manual or mechanical labor positions to a greater degree than all island workers. While relatively fewer Waipahu residents are found in managerial and technical, sales and administrative positions (12.4 percent and 28.6 percent, respectively, compared with 24.7 percent and 33.7 percent islandwide), greater proportions are found in other occupations. In service jobs (20.3 percent, compared with 17.6 percent for the county as a whole), precision, craft and repair positions (17.2 percent, relative to 11.3 percent), and operators, fabricators and laborers (18.9 percent, compared with 10.9 percent), Waipahu residents hold greater proportions of jobs than the islandwide population of wage earners.

In terms of industry, similarly to those in Ewa, Waipahu workers tend to be engaged in agriculture, construction, manufacturing, and retail trade; in all of these industries, employment among Waipahu workers is higher than for the island as a whole. The representation of Waipahu workers is considerably lower in finance, insurance, and real estate (0.5 percent, compared to 8.1 percent islandwide) and health, education and professional services (11.2 percent, relative to 18.5 percent for all of Oahu).

Housing: Waipahu's housing stock characteristics are similar to those of the entire county so far as tenure (owner- vs. renter-occupied units) and availability of plumbing facilities are concerned. However, Waipahu contains a larger than average number of "crowded" dwelling units, where crowding is defined as 1.51 persons or more per room. The percentage of such units in Waipahu (13.8 percent) was almost twice the islandwide rate of 7.4 percent. More widespread crowding may be related to Waipahu's relatively large household size; average number of persons per household was 4.11 in 1980, compared with 3.15 for Oahu as a whole.

As of 1980, renters in Waipahu were slightly worse off in comparison to all island renters, while Waipahu homeowners were marginally better off than owners on the entire island. Median

cash rent was $295 for Waipahu, and represented 15.7 percent of median family income. For Oahu as a whole, median cash rent was $279, representing 14.9 percent of median family income.

The median value of owner-occupied housing in Waipahu ($112,000) was lower than the islandwide median in 1980 ($130,400). However, Waipahu homeowners had lower median monthly mortgage payments ($420) compared to Oahu as a whole ($494). The Waipahu median constituted 22.3 percent of median family income, well below the islandwide average of 25.2 percent.

2.5 COMMUNITY ISSUES AND CONCERNS INDEPENDENT OF PROJECT

This sub-section examines current community goals, values, concerns, and issues which are independent of the project but which may interact with public response to the project. Issues and concerns focusing directly on the proposed West Loch housing project are considered a project "social impact" and are addressed in Section 4.

2.5.1 Public Opinion Surveys

2.5.1.1 Islandwide

Aloha United Way and the Health and Community Services Council (1987) recently assembled an overview of results of polls about Hawaii or Oahu resident priorities in regard to various public issues. Sources reviewed include a series of polls sponsored by the Honolulu Advertiser, the 1984 State Plan Survey, a 1986 Chamber of Commerce poll, and the "Hawaii Quarterly Consumer Survey" conducted four times a year since 1983 by SMS Research & Marketing Services.

Collectively, these polls indicate that the major concerns of the 1980's have consistently involved five key priorities: jobs, crime, traffic, education, and housing. Some surveys have also found a sixth major concern -- inflation and the high cost of living. Of consistently lower priority have been issues related to environmental protection, social problems, growth and land use, taxes, and specific economic concerns such as tourism or preservation of agricultural land.

For example, the 1984 State Plan Survey (SMS Research, 1984) asked for reaction to the following statement: "We should have more affordable housing for residents even if we lose prime agricultural land." Fifty percent of Oahu residents agreed; 37 percent disagreed; and 12 percent were undecided.

Of the five or six top issues, exact priorities have shifted with question wording and date of survey.

The "Hawaii Quarterly Consumer Survey" provides perhaps the best overview of true shifts in community priorities, since question wording has been kept uniform. Following is the summary

prepared for the Aloha United Way and Health and Community Services Council, which makes the points that (1) concern over housing seems related to shifts in economic conditions, and (2) public discomfort with traffic conditions has been increasing rapidly in the past few years:

> Oahu residents also answered the question: "What do you think are the two or three most important problems facing Hawaii today -- the ones that government should be working on right now?" ...
>
> Results from the latest Hawaii Quarterly Consumer Survey show that Oahu residents think traffic is the most important problem facing Hawaii today. Concerns about education, housing, and inflation follow close behind.
>
> Problems that fall into the survey's "transportation" category includes major issues like HART and H-3, as well as the basic traffic problems that face people trying to get to and from work. SMS says that the dramatic increase in public concern in this area is due to problems with "traffic" rather than transportation issues.
>
> Concern over traffic problems continues to rise over the last three years as concern about a former number one problem -- inflation and cost of living -- drops. The survey notes that concern over housing and education also rise as the economy gets better.
>
> The SMS survey suggests that the rise in public concern about traffic problems is different than the other problems ... For housing, the level of concern rose sharply as the economy got better back in 1984. As incomes rose to meet the real estate market, concern over housing dropped off again ...
>
> With traffic, a rise is expected to accompany better economic conditions, but not to the extent the survey shows. And issues like H-3 do not appear to be drawing greater attention than they did in 1983. Rather, the traffic is not getting any better, and DOT road crews are working on some of Oahu's major thoroughfares.
>
> The survey has been tracking some 20 problems since 1983, and no single issue has shown the kind of public concern that is given to traffic today. (Aloha United Way and Health and Community Services Council, 1987, p. 17)

2.5.1.2 Study Area

There have been few recent published opinion surveys taken in Ewa or Waipahu. The most recent mail-out survey by the Ewa

Neighborhood Board was conducted in August 1984. Caution in interpreting results is suggested by the fact that the return rate was under five percent (452 replies, out of 9,780 questionnaires mailed out).

Results (published in the August 1986 Ewa Neighborhood Board newsletter) include: (1) about 73 percent of respondents favoring major developments such as Ewa Marina and Ko Olina (West Beach), and 57 percent in favor of the then less well-known "Ewa Expandable" housing project; (2) on a list of 11 community objectives, the top priorities included need to control aircraft noise and need for police sub-stations in Ewa and Makakilo; (3) on the same list, an item about "coordination of future housing developments with the development of adequate public facilities" was ranked approximately in the middle of the list.

The Waipahu Neighborhood Board sponsored a mail-out survey of residents in December 1985, although a low return rate (under three percent) suggests even greater need for caution in interpreting results. Major issues raised in the Waipahu survey included crime and quality of City street maintenance. Considered next most important were needs to repair public school buildings and complaints about trash and abandoned vehicle dumping on the streets. (NOTE: The Board also conducted a survey in 1987, but results have yet to be tabulated.)

A 1982 Waipahu telephone survey commissioned by Amfac (SMS Research, 1982) has been cited with Amfac permission in past social impact assessments in the area (Community Resources, 1985). Some of the major conclusions from this survey -- the most recent to be conducted using scientific methods of random selection -- were:

- As of 1982, the "need to keep Oahu Sugar Company in business" and the need for more "housing that families making less than $40,000 can afford" were essentially tied for first place out of a list of 19 community goals.
- The perceived need was definitely for lower- to middle-income housing, since there was very little concern expressed about need for more "high quality housing."
- While there was some concern at the time over population growth and traffic, a majority of the sample back in 1982 considered traffic "not a problem" -- a perception which may have changed in the intervening years.

The 1982 survey also found that 76 percent of the Waipahu sample agreed with the statement that "Many of Waipahu's important problems can be solved by well-planned growth." Only 19 percent chose the alternative statement that "Any growth, no matter how well-planned, will just add to Waipahu's problems."

2.5.2 Issues and Concerns of Neighborhood Boards

To provide further information about community issues and concerns, the minutes of major community organizations were examined for the past year (August 1986 through August 1987). Because of the large number of organizations in the area, this analysis was restricted to the two Neighborhood Boards, which are elective in nature and therefore among the most representative of community groups.

It may be noted that:

- The entire project is within the boundaries of the area represented by the Ewa Neighborhood Board, as well as the Ewa Development Plan area.
- Positions taken to date on the West Loch project by each of the two Neighborhood Boards are given in Section 4.4.

2.5.2.1 Ewa Neighborhood Board No. 23

In the past year, the Ewa Board has dealt with few issues which were of a strongly controversial, divisive nature. At the same time, the Board has been reviewing implications of a number of major development proposals. Board members have supported most such proposals.

Because this Board represents a wide variety of communities distributed over a large area (as compared to the Waipahu Board, which represents an essentially contiguous urban area), the the Board's concerns are often regional in scope. Many have been related to land use, in the context of planning and building the City's "Secondary Urban Center" in the Ewa area. Such concerns have focused on the cumulative impacts of various planned developments and the adequacy of existing infrastructure and public services to accommodate anticipated growth.

More specifically:

(1) Proposed major developments triggered discussion of issues such as water availability and water system development; infrastructure costs and responsibility for funding; housing types and availability; and environmental review processes. The focus of these discussions tended to be on ways that infrastructure could accommodate growth, which Board members are expecting to occur which they simply desire to be well-planned.

(2) Housing project proposals raised particular concerns about infrastructure adequacy and also about traffic impacts. The perspective on traffic -- like other infrastructure concerns -- was that it was a serious problem to be planned for and resolved, not a reason for halting growth.

Additionally, Ewa residents and Board members supported efforts to establish community associations to address "undesirable activities" (e.g., cockfighting, raising livestock, and speeding on streets) in recent area housing projects such as the Ewa Expandable development.

(3) Ewa residents have also been strongly concerned about the condition of local schools. Issues related to repair and maintenance of dilapidated classrooms, lack of funding for needed improvements, and need for an overall plan to accommodate the community's educational needs in the upcoming period of expected rapid population growth.

(4) There have also been calls for general community improvements to parks and ballfields -- e.g., lighting of ball courts; repairs to restrooms, bleachers, and backstops; and speedier provision of planned new facilities.

(5) The Ewa Board has given substantial time in the past year to potential community hazards -- e.g., chemical dumping at Campbell Industrial Park; Hawaiian Electric Company's use of hazardous chemicals in its Kahe plant transformers and plans to begin burning fuel with more sulphur; cane-burning activities of Oahu Sugar Co.; and the civil defense evacuation plan.

(6) Ewa residents are eager to participate in the development planning process, and they are willing to try to effect local solutions to many problems. Among such efforts have been establishment of a Neighborhood Watch and various community clean-up efforts.

2.5.2.2 Waipahu Neighborhood Board No. 22

Like the Ewa Board, the Waipahu Board for the past year has been examining community issues and development proposals in a straightforward way, with few emotion-charged controversies. (Just prior to the study period, the Board had expressed concerns over the proposed City Waiola Estates housing project, emphasizing that it supported more housing in the area but was concerned about assuring a balanced mix of housing types.)

Since August 1986, the Board has been focusing on a wide variety of community issues ranging from public services to school improvements to standard review of development proposals. The nature and style of comments (from both Board members and residents) suggest various themes and values:

(1) As reflected by Board minutes, most residents welcome development opportunities for the community and acknowledge Waipahu as a major growth area. This pro-development attitude is qualified by desires for (a) effective citizen input to the decision-making process, and (b) adequate attention to traffic and other negative side effects of growth. Concern over traffic has been increasing, but in

the sense of a problem to be solved rather than a reason to halt development.

(2) Discussions of "affordable" housing have been characterized (as in the case of Waiola Estates) by a desire for a well-balanced mix of different types of housing and economic development. There is some fear that Waipahu could become a stagnant community plagued by problems of crime and poverty if such a mix is not achieved.

(3) Perhaps related to the foregoing is a strong concern over the number of care homes, halfway houses, and special treatment centers (STC's) in Waipahu for people with drug, mental illness, or similar problems. Residents believe Waipahu now has a disproportionate share of such facilities on Oahu, and they complain that STC residents create problems by asking for handouts or other behaviors.

(4) The quality of Waipahu schools has been a particularly emotional issue, with regional community leaders worrying that schools cannot improve without a good mix of students from different income levels and residents of some newer subdivisions fighting for the right to bus their children to Pearl City.

(5) Residents often feel Waipahu does not receive its fair share of police protection and other public services. Particular concerns have been raised about educational and child care facilities; repair and maintenance of roads and recreational facilities; traffic; and provision of drainage and sewer improvements.

(6) At the same time, as in Ewa, Waipahu residents and Board members have themselves taken the initiative to effect local solutions to problems such as littering, abandoned cars, dumping and burning of trash in vacant areas, gang violence and drug-related activities, and provision of more child care.

3.0 CONTEXT FOR IMPACT ASSESSMENT

Specific project impacts are discussed in Section 4. This section provides information on matters considered to constitute important context for the impact assessment: (1) What additional housing is planned for the study area? (2) Will residents find employment opportunities in the region? (3) What major new infrastructure improvements are planned which may affect the character of the region?

Given the nature of topics examined in this section (particularly employment), the study area under consideration is expanded to encompass all of Ewa and Central Oahu, and not just Ewa and Waipahu. While most socio-economic impacts of the project may be expected to be confined to the Ewa-Waipahu area, West Loch Estates residents may travel to employment in a variety of directions: south to the Ewa Beach/Barbers Point area; west to the Ko Olina/Campbell Industrial/Kapolei complex; east to Honolulu; or north to the military and future high-technology park in the Mililani/Wahiawa area.

3.1 PLANNED AND PROPOSED NEW HOUSING

3.1.1 Housing for All Market Segments

The Ewa Development Plan area is designated as Oahu's "Secondary Urban Center" under the Oahu General Plan. Substantial residential growth is expected, consistent with plans to increase Ewa's population from about 37,400 in 1985 (unpublished estimate, City and County of Honolulu, Department of General Planning, 1987) to an allocated figure of 83,100 in the year 2005. Additional housing development is also planned in the adjacent Central Oahu Development Plan area.

While a number of major housing projects are being planned, many are not yet part of the City and County of Honolulu's official Development Plans for Ewa or Central Oahu. Therefore, when describing these projects, a distinction will be maintained between "proposed" and "planned" housing. "Proposed" housing includes projects for which Development Plan approval is still being sought, while "planned" projects are on the Development Plans.

Table 5 details the number of proposed and planned housing units for Ewa and Central Oahu expected to be built through 1993, when the West Loch project units may be fully absorbed. This table shows that much of the housing planned for this period -- fully 33 percent -- is still in the proposal stage, lacking necessary Development Plan approvals.

The total number of planned units between now and 1993 comes to 11,033 (7,213 in Ewa and 3,820 in Central Oahu), while the additional proposed units total 5,289 (1,500 in Ewa and 3,789 in Central Oahu).

Table 5:

Available New Housing Units, Ewa and Central Oahu, 1987 - 1993

	1987	1988	1989	1990	1991	1992	1993	Total
Planned Housing:								
--Ewa	250	463	1050	1300	1300	1300	1300	7213[1]
--Central Oahu	1277	340	340	688	495	340	340	3820[2]
Portions of Planned Housing for "Gap Group" Market:								
--Ewa				61	164	164	164	967[3]
--Central Oahu			102	102	102	102	102	762-972[4]
Proposed Housing:[5]								
--Ewa			500	500	500			1500
--Central Oahu				500	993	1148	1148	3789

Notes: (1) Includes Gentry-Fort Weaver, Makakilo, Kapolei Village, and Gentry-Ewa projects.

(2) Includes Mililani, Waikele, and Village Park.

(3) Includes 250 gap group Units at Gentry-Ewa, for which delivery date is unknown.

(4) Includes 150-360 gap group units at Village Park, for which delivery date is unknown.

(5) Many proposed projects, in initial announcements, include gap group components, but plans remain speculative at this time.

Source: John Child and Company, "Market Assessments for West Loch Estates," Appendices B & C. 1987.

It should be noted that actual housing construction and sales are highly dependent on interest rates and other market conditions. However, assuming that the schedules suggested in Table 5 can be met, West Loch Estates would increase the inventory of planned housing by 20.8 percent by 1993 for Ewa alone, and by 13.6 percent for the combined Ewa and Central Oahu areas.

If all "proposed" projects counted in Table 5 also win approval, West Loch estates would increase the total inventory by 17.7 percent for Ewa alone, and by 9.2 percent for the combined Ewa and Central Oahu areas.

3.1.2 Housing for the Gap Group

According to the project market analysis prepared by John Child & Co. (1987), much of the planned housing in the study area will be moderately-priced, but relatively little is expected to be priced within reach of gap group families.

Using a unit price of $120,000 as a gap group maximum standard, the following projects are planned between 1987 and 1993:

- About 40 percent of housing units built in the Kapolei Village project by the Hawaii Housing Authority and the City Department of Housing and Community Development would be gap group units. While the delivery dates of the gap group units is not yet known, 717 of the 1,750 planned Kapolei Village units to be built between 1987 and 1993 could be expected to be gap group homes.

- The Gentry-Ewa project will include 250 multi-family gap group units. No delivery date is provided, but for purposes of this analysis it is assumed that they will be built by 1993.

- From 25 to 35 percent of the Amfac Waikele project in Central Oahu is expected to consist of gap group units. While the delivery dates of these specific units have not been given, it is assumed that 30 percent of Waikele units in the time period, or 612 units, would be for the gap group.

- The Village Park expansion in Central Oahu, just above Waipahu, contains 30 acres for subsidized housing. This could yield from 150 single-family units to about 360 multi-family units. Again, no delivery date is available for this particular project, but it will be assumed here that these units would be completed by 1993.

Thus, given the foregoing somewhat optimistic assumptions, already-planned housing projects would add just 967 gap group units in Ewa, plus from 762 to 972 units in Central Oahu.

Development of West Loch Estates -- with 900 units affordable by the gap group and below -- will therefore almost double the supply of new gap group units in Ewa, and result in a 32 to 34 percent increase in the supply of new gap group housing units in the combined Ewa/Central Oahu area.

3.2 FUTURE EMPLOYMENT PROSPECTS

3.2.1 Introduction

A major public policy question about future housing development on Oahu is whether residents will have the opportunity to find employment close to their homes, as opposed to commuting to Honolulu. That issue represents the focus of this section. It should be noted, however, that it is at this time difficult if not impossible to address two related questions:

- Will future residents actually be interested in nearby jobs, since most will already have employment elsewhere (as evidenced by their ability to afford a new home)? No studies have been carried out to research the actual extent to which new residents switch to nearby jobs.
- Will the jobs to be developed in the area provide sufficient income to support mortgage payments or rents? Many of the planned future jobs (e.g., resort or technology park employment) would not provide sufficient income to afford housing based on a single paycheck, but most Hawaii families now depend on several paychecks to cover housing costs.

As a preliminary statement, it may be assumed that most West Loch Estates primary wage-earners would already have established jobs (many perhaps already located in Ewa/Central Oahu, but others in Honolulu) which they would be unlikely to drop on short notice for new jobs closer to their new home. At the same time, secondary wage-earners in the home and new labor force entrants from these households would be more likely to apply for new jobs opening up fairly near their homes. However, this assumption is subject to verification as the Ewa area actually develops.

Employment in the general region of the project site is expected to increase significantly in future years. This section presents an overview of potential new job opportunities that may occur due to major projects which are currently planned or proposed in the area. These include projects which have received government approvals, at least at the City Development Plan level, and others which still require Development Plan amendments.

Future job estimates were obtained largely through personal communication with developers of individual projects. Potential

employment at the Kapolei Town Center, Ko Olina, and Campbell Industrial Park were interpolated from a recent study prepared for Campbell Estate (Leventhal, 1986). This study presented high-, mid-, and low-range estimates. A recent update evaluation of the study's findings indicate that the original estimates now appear to be conservative. This means the original high-range estimates now are considered to be mid-range estimates, and new high-estimates are being made (personal communication, Michael Warren, Manager, Residential/Resort Properties, Campbell Estate, September 4, 1987). Therefore, estimates for the projects mentioned above will be those from the high-range of the Leventhal study.

Additional employment in the area is estimated in this section for years 1993, 1998, and the ultimate total at final build-out. The year 1993 was selected because it is assumed that most of West Loch's housing units will be occupied by that time, thus providing a key timeframe for evaluating the potential of jobs for residents of the project. The following five-year period, to the year 1998, can be expected to be a period in which residents of the West Loch Estates may seek second jobs; housewives may enter or re-enter the job market; and others may seek new jobs.

3.2.2 Planned Future Projects

Table 6 lists eight projects in the Ewa and Central Oahu areas which have approval from the City and County Department of General Planning (DGP). This signifies they have gone through the Development Plan review process and have received the necessary land use reclassification on the DGP Development Plan maps. Most of the projects have been ongoing for some time and have essentially completed the requirements for governmental review.

Totals from Table 6 show that the eight projects are expected to generate an estimated additional 14,285 direct on-site jobs by 1993; 22,415 jobs by 1998; and an ultimate total exceeding 27,800. In the long term, the Mililani Technology Park is projected to be the largest generator of new jobs, producing an estimated 8,800 jobs by the year 2003 (personal communication, Kent Keith, Project Manager, September 3, 1987). The Ko Olina Resort project and the continued expansion of the Campbell Industrial Park are also expected to create a significant number of jobs in the future. Estimates for these projects were interpolated from figures presented in the Levanthal report. For the purpose of estimating additional future employment, it was assumed that there are 2,500 existing jobs at the Campbell Industrial Park (personal communication, David McCoy, Industrial Real Estate Manager, Campbell Estate, September 11, 1987).

Amfac's Waikele development project has a total of 56 acres for commercial, retail, office, and light industrial activities. Due to the project's location, the most promising uses appear to be retail and office. Ultimately, it is anticipated the site will provide a total of 300,000 square feet of leaseable area. The developer estimates this will create approximately 2,000

Table 6:

Estimated Cumulative Additional Employment in the Study Area
(Direct On-Site Employment)

Project	By 1993	by 1998	Ultimate Total
Planned (with Development Plan approvals)			
Ko Olina (West Beach)	3,370	5,130	5,130
Campbell Industrial Park (includes the Barbers Point Harbor)	1,450	2,900	4,910
Mililani Technology Park	2,800	5,600	8,800
Gentry Industrial Park	4,150	4,150	4,150
Waikele Retail/Office/ Industrial Center	1,000	2,000	2,000
Mililani Town Center	1,200	2,320	2,320
St. Francis Hospital	250	250	500
H-POWER	65	65	65
Subtotal	14,285	22,415	27,875
Proposed			
Kapolei Town Center (includes the Makakilo Shopping Center)	8,230	13,270	19,373
Amfac Theme Park	900	1,200	1,200
Waiawa Ridge	0	0	3,415
Camp Malakole Industrial Area	50	100	100
Subtotal	9,180	14,570	24,088
TOTAL POTENTIAL NEW JOBS	23,465	36,985	51,963

jobs on-site, half of which are projected to be generated by 1993 (personal communication, Chris Kanazawa, Vice President, Amfac Property Development Corporation, September 2, 1987).

Developer estimates of future jobs were not available for the Gentry Industrial Park or Mililani Town Center projects. However, methods for calculating potential employment were derived through discussions with representatives of each project. At the Gentry Industrial Park, where warehousing is the primary activity, it was suggested that employment could be calculated by assuming two jobs per 1,000 square feet of leaseable floor area (personal communication, Charles Pang, Leasing Manager, Gentry Companies, September 4, 1987). Based on a total of 120 acres at the site and a 60 percent lot coverage, a total of 6,200 jobs may be located at the park at build-out. Current estimates indicate the site is presently about one-third completed. Therefore, it is assumed there are currently about 2,050 jobs at Gentry, and an additional 4,150 may be added in the future. Build-out is expected to occur by 1993.

Future job estimates for the Mililani Town Center were made by assuming one job per 250 square feet of floor area. Developer estimates indicate the project will contain a total of 580,000 square feet of floor area at completion. The first phase of the project will open late in 1987 and is projected to be completed within ten years. According to Brad Myers, the Project Manager for the Town Center (personal communication, September 8, 1987), it may reasonably be assumed that 300,000 square feet of leaseable space will be available by 1993. This would provide approximately 1,200 jobs by that year, with an ultimate total of 2,320 by 1998.

One final project with current approval is the new St. Francis Hospital which is expected to be completed in 1989 across from the West Loch Estates project. The initial phase of construction is projected to provide approximately 250 jobs. In the long term, the hospital is expected to double in size, providing a total of about 500 jobs.

3.2.3 Proposed Future Projects

Table 6 also lists four projects which still require full government review and approval, a process which may take several years. During this process, project proposals can be, and often are, substantially changed. However, these potential projects do provide implications for possible employment in the area.

Totals from Table 6 show that these proposed projects could add an additional 9,180 on-site jobs by 1993; 14,570 jobs by 1998; and an ultimate 24,000 at build-out. By far the major producer of jobs could be Campbell Estate's Kapolei Town Center. Long planned to be the secondary urban center on Oahu, the Kapolei project is expected to be a self-contained community providing a full range of job types. In the long term, over 19,000 new jobs are projected to be created in the new town center.

Figures for 1993 and 1998, as shown in the table, are interpolated from figures presented in the Levanthal report.

The proposed development of Waiawa Ridge may also provide a significant number of jobs in the future. Actually, the City Council in 1986 gave approval for 90 acres of commercial/industrial activities at Waiawa. However, there are no current plans for developing this site by the developer (personal communication, Tosh Hosoda, Planning Director, Gentry Companies, September 9, 1987). The estimated number of 3,415 jobs eventually to be created by the project was obtained from the environmental impact statement for the project (Environmental Communications, Inc., 1986).

One final potential project listed on Table 6 is the Camp Malakole Industrial Area. The developer for this project is currently seeking Development Plan approval from the City. The site, located adjacent to the Barbers Point Harbor, is proposed to provide about 70 acres for warehousing activities for harbor-related uses. A total of about 100 jobs is expected to be created at the site, half of these by the year 1993 (personal communication, Mark Hastert, Helber Hastert & Kimura Planners, September 9, 1987).

3.2.4 Total Potential Job Opportunities

Table 6 shows that current developer plans and estimates total to an estimated 23,400 additional jobs in the Ewa and Central Oahu areas by the year 1993; almost 37,000 by 1998; and over 51,000 in the long-term.

In addition to these on-site jobs, thousands of construction and indirect and induced jobs could also be created. For example, the UTPP 1980 census data cited in Section 2.3 indicates that, for each 1,000 residents in the existing Ewa/Central Oahu population, there were 110 commercial, neighborhood industrial, and local governmental support jobs. In other words, a substantial suburban or urban development automatically generates jobs required to service and support the population. Some of these types of jobs would be included in the foregoing job figures (particularly at Waikele and Kapolei Town Center), but others of these jobs would be located elsewhere -- such as in the West Loch Estates commercial area or additional staff for existing Waipahu and Ewa Beach shopping areas.

Care must be taken when using developer estimates for projecting future employment. Problems involved in these estimates include the varying methods by which numbers are calculated; the fact that availability of commercial or industrial acreage does not necessarily imply its use in the future for that purpose; and the ultimate reality that market forces will actually determine the timing and number of jobs eventually created.

Nonetheless, numbers in Table 6, plus other projects which may be unknown at this point, indicate a substantial number of jobs in the area for future residents of the project.

3.3 MAJOR INFRASTRUCTURE IMPROVEMENTS

This brief sub-section will focus on major planned infrastructure improvements expected to substantially affect the character of the region. (NOTE: The question of infrastructure and public service adequacy to support the project will be separately examined in Section 4.3.)

The primary infrastructure improvement which affects the character of an area is new roadway construction. The current Development Plan facilities map indicates two major roadway construction projects in the Ewa area. The first project, which is already underway, is the expansion of the H-1 Freeway from Kunia Road to Makakilo. New lanes are being added to the freeway in both directions. The second project is the future expansion of Ft. Weaver Road (additional lanes in two directions) from the Ewa town area to Ewa Beach. Both these projects are planned for completion within the next six years, according to the Development Plan facilities map.

Other roadway projects, planned for sometime beyond the next six years, include the expansion of Farrington Highway from Ft. Weaver Road to the Kapolei Town Center area; a new road to the west and parallel with Ft. Weaver Road extending from the proposed Ewa Marina project to the H-1 Freeway; and improvements to Renton Road from Ewa town to the West Beach area.

Within the next six years, additional infrastructure or public facility improvements planned for Ewa include the expansion of the Honouliuli Sewage Treatment Plant from 25 million gallons per day (mgd) to 37.5 mgd; new fire and police facilities in the West Beach and Kapolei areas; and several new community parks.

A recently formed private corporation, the Ewa Plains Water Development Corporation, will develop extensive water systems throughout Ewa during the coming years. The water systems will provide both potable and non-potable water to the West Beach project, Campbell Industrial Park, the Gentry Ewa housing project, and the proposed Ewa Marina. The water systems will be dedicated to the County once they are operational.

4.0 PROJECT IMPACTS

This section addresses socio-economic impacts of the proposed West Loch Estates housing project. The initial three sub-sections focus on relatively tangible topics -- population, employment, and adequacy of public services and infrastructure. The last three sub-sections deal with more qualitative "social" topics -- community issues and concerns; compatibility with neighboring uses; and displacement.

4.1 POPULATION GROWTH TRENDS AND IMPACTS

This section provides islandwide and study area growth trends, and assesses the project in the context of City policies on population distribution.

4.1.1 Islandwide Growth Trends

Oahu's growth rate has been declining since 1950, although the island's population continues to increase. From 1950 to 1960, island population grew at an annual rate of 3.5 percent; from 1960 to 1970, 2.3 percent; and from 1970 to 1980, 1.9 percent. The provisional population estimate for the City and County of Honolulu, as of July 1, 1986, was 816,700 (Hawaii State Department of Business and Economic Development, Hawaii State Data Center, 1987). This would indicate a 1980-1986 annual growth rate of 1.2 percent.

4.1.2 Oahu General Plan Population Guidelines

The Oahu General Plan indicates guidelines for the distribution of resident population for the year 2005. Table 7 shows these guidelines with (1) estimated 1984 populations for each Development Plan area; (2) year 2005 guidelines for the percentage of total island population to be located in each area; and (3) the range of year 2005 population derived from the percentage ranges.

The Ewa Development Plan area is expected to grow from a 1984 population of approximately 36,000 to 83,100 in 2005. Expected growth is based on a model which considers both population capacity for housing developments approved as of 1985 and also estimated additional future housing demand as constrained by land use policies. The expected population of 83,100 is lower than the General Plan guideline range of 85,905 to 95,450.

4.1.3 Study Area Growth Trends

During the 1970's, population in the Ewa development plan area grew by an annual average rate of 4.1 percent. This was a slightly lower rate than for the neighboring Central Oahu development plan area (4.3 percent), but considerably higher than the islandwide rate of 1.9 percent.

Table 7:
Development Plan Area Population Guidelines

DP Area	1984 Population	Projected Year 2005 Population	Year 2005 General Plan Pop. Guidelines %	Year 2005 General Plan Pop. Guidelines Actual
Primary Urban Center	436,400	480,000	47.5-52.5	453,388-501,113
Ewa	36,000	83,100	9.0-10.0	85,905-95,450
Central Oahu	114,400	139,800	12.8-14.2	122,176-135,539
East Honolulu	45,600	58,500	6.2-6.8	59,179-64,906
Koolaupoko	113,300	124,200	12.4-13.6	118,358-129,812
Koolauloa	12,100	13,800	1.3-1.5	12,409-14,318
North Shore	14,000	15,600	1.6-1.8	15,272-17,181
Waianae	33,400	39,300	4.2-4.6	40,089-43,907
Total	805,300	954,500	95.0-105.0	906,775-1,002,225

Source: City and County of Honoulu, Department of General Planning, "Residential Development Implications of the Development Plans," 1985.

Virtually all of the 1970 - 1980 growth in Ewa took place in census tracts 83 and 86.01. Census tract 83 includes the community of Ewa Beach, while 86.01 includes Makakilo. Since 1980, residential growth has continued in Ewa Beach and Makakilo, and in smaller subdivision projects such as the City's "Ewa Expandable" project.

As noted in Section 2.4, Ewa's population growth in the early 1980's slowed almost to zero, reflecting the high interest rates and lack of new housing starts through 1984.

According to Department of General Planning (DGP) estimates (City and County of Honolulu, Department of General Planning, 1985), Ewa residential development will increase to higher levels through the year 2005. However, housing is not expected to be built at rates sufficient to meet the year 2005 population guideline. Reasons for this shortfall indicated in the DGP analysis include:

- o Residential projects committed in Ewa were not projected to begin until 1987, and would not reach the 1,000 units per year level until 1990. Of the projects identified as committed by DGP, the Ewa Marina project delivery has been set back to "indefinite" status.

- o A shortage of 19.7 percent in the number of Ewa housing units expected to be built, compared with the number needed to meet the population guideline. This is attributed to a shortage of development plan-approved capacity for new housing.

4.1.4 On-Site Population From Project

New housing development at the project site will add to the population of the Ewa development plan area. Estimating the size of project population depends upon assumptions about the average household size of future residents.

Household sizes will differ among residents of the elderly and single-family units. Elderly families are assumed to average 1.8 persons per household -- a figure equal to the average household size of elderly families in public housing managed by Hawaii Housing Authority (Hawaii Housing Authority, 1987).

For single-family housing, the Department of General Planning assumes 3.3 persons per unit in assessing population impacts. This figure may be somewhat high, as household sizes in Ewa and Central Oahu, as reported by developers, tend to show smaller families. At Mililani, 3.03 persons per unit were reported for single-family homes priced between $160,000 and $219,000, and 2.93 persons per unit were reported for single-family units priced between $115,000 and $164,000 (John Child & Co., 1987). Therefore, the population impact is calculated using 3.0 persons per unit as the lower range for single-family units and 3.3 persons per unit as the upper range.

Derivation of project population is shown in Table 8. The table indicates that the project will produce an Ewa population higher by from 4,320 to 4,725 persons than in the absence of the project. It is noted earlier in this section that projected population for Ewa would be from 2,805 to 12,350 below the guideline range recommended by the Oahu General Plan.

The Oahu General Plan population guideline for Ewa, coupled with projected population, provides sufficient room for new housing to accomodate the project. Project impacts, then, will principally be to provide new housing at an earlier time than could be completed by other projects, and to cause a greater proportion of Ewa's new population to consist of households in the gap group.

Table 8:
Range of Projected Population at West Loch Estates

Housing type	Units	Household size	Population
Elderly	150	1.8	270
Single family	1350	3.0 -- 3.3	4050 -- 4455
Total	1500	NA	4320 -- 4725

Source: Community Resources, Inc.

4.2 PROJECT EMPLOYMENT IMPACTS

Employment impacts at the project site will result from development of certain non-housing uses at the site. Permanent jobs created will include:

- o 22 positions at the public golf course (personal communication, David Mills, Chief, Golf Courses Branch, Department of Parks and Recreation, September 10, 1987);

- o 46 to 51 positions at the elementary school site, if it is accepted by the Department of Education (personal communication, Ed Hasegawa, Business Specialist, Hawaii State Department of Education, September 15, 1987).

- o a maximum of 200 retail and service jobs at the commercial center, based on an islandwide average of one

employee per 250 square feet of leasable area and a planned leaseable area of 50,000 square feet;

- o up to 20 positions at the day care center (personal communication, Lynn Koga, Supervising Principal, KCAA Pre-Schools of Hawaii, September 15, 1987);

- o a possible single additional job at the park and ride bus transportation facility (personal communication, Howard Takara, Chief, Bus Systems Division, Department of Transportation Services, September 3, 1987).

Thus, potential employment at the completed West Loch Estates project totals approximately 290 positions. (See Section 3.2 for a discussion of other possible future nearby job opportunities for project residents.)

4.3 ADEQUACY OF PUBLIC SERVICES

This section reviews the availability of public services to accommodate the West Loch Estates project.

As noted in Section 3, the project site is located in the Ewa area, where residential and employment growth has started and is expected to increase to constitute Oahu's "Secondary Urban Center" by the year 2005. Public services are generally in place or being developed to accommodate the project.

The following analysis is necessarily limited to the adequacy of public services for the West Loch Estates project alone.

The cumulative impact of all planned and proposed residential growth in Ewa must be separately addressed (outside of individual project EIS's) by the City and County through comprehensive infrastructure planning processes. Comprehensive infrastructure development has already begun, exemplified by actions such as:

- o the creation of a privately-chartered authority to build and operate water facilities for all Ewa development;

- o agency planning, as by the Honolulu Fire Department, in identifying new Ewa facilities to be developed as service demand increases;

- o identification of land to be dedicated for public uses such as school and park sites, as Ewa rojects are submitted for planning approvals; and

- o formulation of regional service plans, as mandated for the Hawaii State Department of Education by the 1987 State Legislature.

4.3.1 Hospitals and Health Care

Medical service providers have already begun to move the locus of services leeward, in recognition of population growth in Ewa and Central Oahu. Kahi Mohala, a psychiatric treatment facility, located its statewide facility in Ewa, and three new hospitals have been built or are under development between Moanalua and Waipahu.

Kaiser Foundation Health Plan has opened its new central hospital in Moanalua. Kaiser subscribers in the project area can also use services at Waipahu's Punawai Clinic. The Punawai Clinic is considered adequate to accommodate additional population in the next few years, but Kaiser will consider building another clinic in Ewa in the future (personal communication, Ron Hayashi, Assistant Health Program Manager, Kaiser Foundation Health Plan, September 1, 1987).

A new hospital is being developed on the former Leeward Hospital site near Pearl Ridge Shopping Center. The Pali Momi Medical Center is expected to open in October 1988, with a 116-bed hospital, ambulatory services center, and medical office building. Pali Momi officials expect the medical center to draw most patients from the communities bounded by Halawa Valley and Ewa. These consumers now travel to Honolulu for medical attention (personal communication, Rod Keller, Pacific Region Director of Development, Health Care International, August 31, 1987).

St. Francis Hospital-West is being developed on a 22-acre site near West Loch Estates. The initial phase of the project will include a medical office building, scheduled to open in July, 1988, and a 100-bed hospital/medical center slated to start operations in August, 1989. The hospital will include 30 beds for obstetric patients, an emergency/trauma unit, and fast response services via private ambulance and helicopter. The ultimate project may result in as much as 100 additional beds, and future plans remain flexible to respond to identified service gaps (personal communication, Eugene Tiwanak, Assistant Administrator, St. Francis Medical Center, September 4, 1987).

4.3.2 Emergency Services

Ambulances stationed at the Waipahu Fire Station would respond to emergencies at the project site. Backup service is provided by the City ambulance at Aiea. Private ambulance service is also planned from the new St. Francis Hospital-West facility located near West Loch Estates.

Ambulance service is considered to be adequate to handle the level of current services (personal communication, Donna Maiava, Acting Chief, Emergency Medical Services Branch, State Department of Health, September 1, 1987). At least 95 percent of calls in the area are answered within 20 minutes. Average response time in the Ewa area is about 15 minutes.

Ambulance service is provided by the City Department of Health under contract with the State Department of Health. Ewa is considered to be of first priority on Oahu for a new ambulance unit, if additional funding is provided.

4.3.3 Fire Protection

Primary fire protection for the project site will come from the Waipahu Fire Station, which consists of one engine company (15 firefighters) and one ladder company (six firefighters). Secondary service is available from the Ewa Beach and Pearl City engine companies. The Honolulu Fire Department can also call upon the U.S. Navy for assistance from the Barbers Point Naval Air Station fire company, under a mutual aid agreement.

Fire protection is considered adequate. Response time from the Waipahu Fire Station is estimated to be four to five minutes (personal communication, Battalion Chief Kenneth Word, Administrative Services Officer, Honolulu Fire Department, September 1, 1987).

New facilities are planned for the Ewa district which should reduce future response time to the project site. One additional fire station will be built in Ewa, and two new stations are possible. The Fire Department is seeking land to build stations at Tenney Village and at Campbell Industrial Park. These facilities are shown on the Development Plan public facilities map as "site undetermined" projects to be built in the "six years and beyond" timeframe. According to the Honolulu Fire Chief, the Tenney Village station is sought for completion by 1991 (letter from Frank K. Kahoohanohano, Fire Chief, to Michael M. H. Moon, Director of Housing and Community Development, June 15,1987).

4.3.4 Sewage Treatment

Development at the project site will be served by the City's Ewa and Waipahu sewer systems. The project's first increment will connect with the Waipahu system, and a 1,200-foot long, 12-inch wide relief line is planned to extend from the project site to the Kunia Pump Station. The line may be upgraded to 15-inch width if necessary (personal communication, Jay Hamai, Engineer, Wastewater Division, Department of Public Works, September 1, 1987). Waste from the golf course clubhouse and park comfort stations will also be routed to the Waipahu system.

The second increment of the project will connect to Ewa sewers through lines running under Fort Weaver Road to an 84 inch interceptor line at Geiger Road. Waste will be treated at the Honouliuli sewage treatment plant. A pump station will be constructed at or near the project site to facilitate flows.

Both sewer systems to be used have the additional capacity needed, with the identified improvements. Provision has already been made for project load at the Honouliuli plant.

4.3.5 Education

The Hawaii State Department of Education (DOE) has estimated that project population would include 240 to 480 elementary school-age children, from 90 to 170 intermediate students, and from 160 to 240 high school children (letter from Charles T. Toguchi, Superintendent of Education, to Mike Moon, Director of Housing and Community Development, June 8, 1987).

Students from West Loch Estates would normally be assigned to Ewa Elementary, Ilima Intermediate, and Campbell High School. The Department of Education is currently seeking funds to expand Ewa Elementary's capacity with an eight classroom building which would accommodate 200 additional students. Capital improvement funds will be sought in the 1989 state budget; the building could then be completed by September, 1991 (personal communication, Tom Nakai, Director, Facilities and Support Services Branch, Office of Business Services, Department of Education, August 31, 1987).

At the request of the State Legislature (H.R. 179, H.D. 1 of 1987), the Department of Education is formulating a comprehensive plan for new school and library facilities in Ewa. The Department tentatively identifies a need for one new high school, one or two intermediate schools and six elementary schools. Most or all of the selected sites will be dedicated to the DOE by project developers. However, the DOE is not certain which sites will be selected.

It is expected that students from the project site will attend Ewa Elementary, Ilima Intermediate, and Campbell High School on a temporary basis until new schools are built. Capacities of these schools will depend on the progress of other area residential developers. At the elementary school level, DOE officials would have the options of accommodating increased enrollments in portable classrooms or of providing transportation to other schools in the region -- including Kaimilo, Puakea, and Barbers Point Elementary.

A school site at West Loch Estates has been reserved for DOE in the subdivision plans. The parcel is approximately six acres in size. Acceptance of the site and ultimate development will be decided upon by DOE. If the site is not needed by DOE, it would be returned to the City for other purposes yet to be decided on.

4.3.6 Library Services

West Loch Estates residents will be served by the Ewa Beach Library (affiliated with Ewa Beach Elementary School), a public library at Waipahu, and the Pearl City regional library. The Pearl City library was recently expanded.

The Office of Library Services of the Hawaii State Department of Education expects to construct new (and/or to expand existing) facilities in leeward Oahu, although the pace of new facilities will be determined by actual development in Ewa

(personal communication, Clyde Okinaga, Administrative Services Officer, Office of Library Services, August 31, 1987).

Library planners feel that existing libraries are adequate to accommodate additional users from West Loch Estates. It should be noted that, to the extent that residents travel to Honolulu for work or recreation, Hawaii's statewide library system will make all libraries available to project residents.

4.3.7 Water Supply

Uses at the project site will require a supply of potable and non-potable water. Current plans call for irrigation of the public golf course with non-potable water.

Potable water demand for the project is estimated at approximately 750,000 gallons per day (personal communication, George Hiu, Engineer, Board of Water Supply, September 9, 1987). The Board of Water Supply will make about 800,000 gallons per day available, sufficient to service both project increments. A new well at the Waipio Heights 3 well site will provide the new source, and water will be stored at the Board of Water Supply's "595" reservoir (personal communication, Richard Fujii, Engineer, Planning Branch, Board of Water Supply, August 31, 1987).

Sources of, and methods for conveying, non-potable water are still under study. Land in the general vicinity of the project site is believed to have supported taro and rice cultivation. Thus, engineers believe that spring and other subsurface water is probably not brackish, since brackish water would not have supported these crops.

There does appear to be a plentiful supply of subsurface water in the area planned for a golf course. If the subsurface water tests reveal sufficiently low salinity, an irrigation system could be devised using a combination of sand drains, infiltration galleries, sump collection, and pumping against grade to water hazards when the water would be stored (personal communication, Fujii, September 4, 1987). Drawing caprock water or using treated effluent from the Honouliuli sewage treatment plant represent possible alternatives.

4.3.8 Parks

Project residents would be served by parks and recreation programs in Ewa and Waipahu. In addition, the project site will include a new district park and a shoreline park.

Current facilities in the general area include two neighborhood parks, Asing Field, and the Ewa Mahiko park. Asing Field has athletic fields and is located on the future project site; it will be redeveloped as part of the project. Ewa Mahiko is a new neighborhood park located near the "Ewa Expandable" subdivision. The nearest Ewa facility with recreation staff is the Ewa Beach Community Park. The area's current district park complex is the

Waipahu Recreation Center, which has a swimming pool, gymnasium, athletic fields, playing courts, and a multi-purpose building.

District park staff anticipate that current facilities will be able to adequately serve new residents at the project (personal communication, Don Akiyama, Acting Leeward District Supervisor, Department of Parks and Recreation, September 1, 1987). However, growing area population will make development of new parks necessary in the longer term.

An 18-acre site is being reserved at West Loch Estates for development of a new district park. Under the "City and County Recreation Park and Facility Standards" included in the Department of Parks and Recreation's Long Range Plan (1980), a project of this approximate size should be served by at least one neighborhood park on a four- to six-acre site. Both the district park and the 39-acre shoreline park developments will satisfy recreation facility needs of West Loch Estates residents, as well as increasing opportunities for Ewa and Waipahu residents.

4.3.9 Police Protection

Police services to the project will be provided from the Pearl City substation. The Honolulu Police Department indicates that "Our Pearl City District station ... is already operating at near maximum capability... Our ability to provide adequate services for the community will depend primarily on the availability of funding for sufficient personnel, equipment, and communications..." (letter from Douglas G. Gibb, Chief of Police to Mike M.H. Moon, Director of Housing and Community Development, June 2, 1987).

Department officials foresee the need for a new police substation in the Ewa district, with the timing dependent upon the pace of new growth (personal communication, Brandon Stone, Management Analyst, Office of the Chief, Honolulu Police Department, September 8, 1987). A new station is planned in the general vicinity of the new shopping center at Makakilo; it is shown on the "Within Six Years" time frame, with site undetermined, on the Ewa development plan public facilities map.

The Pearl City substation reports no unusual current police problems on the project site. Most police attention to the area relates to traffic congestion on Fort Weaver Road (personal communication, Major Lee Donahue, Commander of Pearl City Substation, Honolulu Police Department, September 9, 1987).

4.3.10 Public Transportation

Bus service at the project site is provided on the Ewa Beach route, which travels along Fort Weaver Road on the line between Ewa Beach and Ala Moana Center. Bus routes will be adjusted to serve the new population at West Loch Estates, and new buses and routes will be added as population grows (personal communication,

Howard Takara, Chief, Bus Systems Division, Department of Transportation Services, September 3, 1987).

Phase II of the project is planned to include a "park-and-ride" facility for bus service. The park-and-ride facility would function as a terminal for buses, where bus riders could park their automobiles or transfer from local lines to more direct service to Honolulu and other destinations. The park-and-ride facility will provide more convenient and possibly more frequent service to West Loch Estates residents, and it will improve area bus service generally.

Project residents with special transportation needs related to disability will be eligible for "Handi-Van" service provided by the City and County of Honolulu. Handi-Vans presently serve the Ewa area as part of an islandwide system. Passengers pay $1.00 per ride; must reserve a spot at least 24 hours in advance; and must meet certain eligibility criteria tied to the non-ambulatory nature of their disability and inability to ride regular buses.

4.3.11 Solid Waste Disposal

City trash collection at the project site will be provided from an existing baseyard at Pearl City. Refuse collected at West Loch Estates will be taken to the landfill at Waimanalo Gulch, and would be deposited at the H-POWER plant at Campbell Industrial Park when that plant is completed.

A total of three new routes will have to be created to service the project site. This may have personnel and equipment implications, depending on the timing of new growth elsewhere in the district (personal communication, Frank Doyle, Chief, Refuse Division, Department of Public Works, September 4 and 9, 1987).

4.3.12 Utilities (Electricity and Telephone)

Telephone service to the project will be provided by Hawaiian Telephone Company, and electricity will be provided by Hawaiian Electric Company. Identification of specific service requirements by each utility will require review of specific subdivision plans, which have not yet been completed.

Project electric demand has been estimated at about five million volts per day. Two sets of electric lines abut the project. An existing pole line runs along Ft. Weaver Road, containing one 46-KV circuit. Another electrical line with two 46-KV circuits runs along the Oahu Railway and Land Co. former railroad right-of-way and then along the West Loch shoreline. Power to the site will come from either the Kahe or Waiau existing generating plants. Hawaiian Electric Co. (HECO) is likely to need a new transformer station at or near the project site (personal communication, Gary Funasaki, Engineer, Ronald Ho & Associates, West Loch Estates utilities consultants, September 10, 1987).

Additionally, HECO has recently begun a study to determine a corridor routing for a new 138-KV line from the Waiau power plant to the Campbell Industrial Park sub-station, in order to (1) increase capacity to the Ewa area, in light of proposed major new development; and (2) improve reliability of the overall system, in light of islandwide and regional power outages in the early 1980's (personal communication, David Nagata, project manager, HECO Engineering Department, September 18, 1987). The ultimate corridor will be 70 feet wide or less, with power lines mounted on single-pole structures 90 to 100 feet high.

One potential corridor would include the existing 46-KV route along the right-of-way for the Oahu Railway and Land Co., through the West Loch Estates project site. City agencies and members of the public will be given the opportunity to comment on the compatibility of possible corridors with existing or proposed residential development at public hearings to begin in November 1987. A preferred alignment for the corridor will be announced in April 1988, with final selection targeted for June 1988.

Telephone service will be provided from existing switching sites, of which there are two in the project's general vicinity. Switching stations are located in Waipahu, near Waikele Street and on Renton Road in Ewa (personal communication, Frank Ito, Plant Engineer, Hawaiian Telephone, September 9, 1987). An underground telephone cable linking Hickam Air Force Base and Kunia crosses the mauka portion of the project site. The telephone company expects that the cable will not be disturbed, or that project development can be coordinated with relocation of the cable. An additional switching station may be needed to service residential growth in this area; location will depend upon negotiations between the utility and residential developers. About 4,000 square feet of land would be needed to accommodate a new switching station.

4.4 COMMUNITY ISSUES AND CONCERNS

This sub-section identifies preliminary issues and concerns related to the West Loch project. Two sets of issues -- compatibility with nearby uses and displacement of current uses or residents -- will be given separate and more expanded treatment in the following, final sub-sections of the report.

4.4.1 Introduction

4.4.1.1 Information Sources for This Section

To provide community input to the West Loch Estates planning process, the City established ad hoc advisory group consisting of representatives of major Ewa and Waipahu groups (Section 4.4.1.2).

Also, in the course of preparing this social impact assessment, informal interviews were held with approximately 25 people from the community (Table 9) to identify preliminary community issues related to the proposed West Loch project.

Table 9:

List of People Interviewed

(Note: Those interviewed provided their comments as individuals and not as representatives of their organizations. Organizational affiliations are provided only to provide some indication of the interests and networks of those interviewed.)

Donald Adriano	Firefighter, Honolulu Fire Department
C. O. Andy Anderson	President, Waipahu 2000 Community Association Waipahu Neighborhood Board Waipahu Community Association
Charles Dick Beamer	President, Ewa Beach Community Association Ewa Neighborhood Board
Steve Berendzen	U.S. Fish and Wildlife Service
Tony Bise	President, Ewa Housing Foundation, Inc.
Ed Castanos	President, Ewa Community Association
James K. Chung	Treasurer, Hoaeae Point Community Association
Mike Crozier	Representative, Hawaii State Legislature Community Advisory Committee of the Ewa Secondary Urban Center Kapolei Task Force
Bill DeMent	Field Engineer and Land Manager, Oahu Sugar Company
Shirley Head	President, Honouliuli Doshi Kai
Cal Kawamoto	Chair, Waipahu Neighborhood Board Executive Director, Waipahu Cultural Garden Park Vice president, Waipahu Community Association Vice president, Waipahu 2000 Community Council
Rodney Kealoha	Captain, Honolulu Fire Department Waipahu Station

(CONTINUED)

Table 9:

List of People Interviewed
(Continued)

Benjamin Paul Kekona	President, Hoaeae Point Community Association
Tamae Kekona	Secretary, Hoaeae Point Community Association
Emogene Martin	Chair, Ewa Neighborhood Board Community Advisory Committee of the Ewa Secondary Urban Center
Francis Oishi	Biologist, Division of Aquatic Resources, State Department of Land and Natural Resources
Paul Oshiro	Representative, Hawaii State Legislature Ewa Beach Community Association Community Advisory Committee of the Ewa Secondary Urban Center
Dave Parsons	Ewa Neighborhood Board Ewa Beach Community Association Community Advisory Committee of the Ewa Secondary Urban Center
Theodore Redoble	Resident west of Old Fort Weaver Road
Mike Shire	Chief Engineer, Chevron USA
Loreen Stern	Secretary, Waipahu Community Association
Kay Sunada	Former president, Honouliuli Doshi Kai
Peter Tagalog	President, Ota Camp Makibaka Association, Inc. Waipahu Community Association
Ronald Tongg	President, Tongg Ranch, Inc.
Sharon Walsh	Resident west of Old Fort Weaver Road
Howard Wilson	Part-time fisher in area

Note that those interviewed provided their comments as individuals and not as representatives of their organizations. Organizational affiliations are provided only to indicate some of the networks and interests of those interviewed.

In the course of the interviews, people who may represent three community perspectives were contacted:

- Those who may not live in the immediate vicinity, but could provide indications of regional impacts on the Ewa and Waipahu regions;
- Those who live near the project site, and may have more long-range and direct contact with the proposed community -- including residents of Ewa, Honouliuli and the area designated for relocated Ota Camp residents; and
- Those who live, work, or hold property on the project site, and would be directly impacted if the proposed project were implemented.

Each person was informed that the information they provided would be summarized in the EIS and that individual conversations would remain confidential. The basic piece of information used to explain the project to informants was the "Environmental Impact Statement Preparation Notice For the West Loch Subdivision, Ewa, Oahu, Hawaii," prepared in July 1987. The interviews were either one-to-one meetings or telephone interviews.

The sources for organizational positions on this project included minutes of Neighborhood Board meetings and published letters and testimony.

4.4.1.2 Positions Taken on the Project by Study Area Groups

Organizational positions or testimony on West Loch have been presented by the following groups (all of which currently participate in an ad hoc advisory committee which meets with the City to review plans and make recommendations):

- Ewa Neighborhood Board No. 23,
- Ewa Beach Community Association,
- Waipahu Neighborhood Board No. 22,
- Waipahu Cultural Garden Park,
- Waipahu 2000 Community Council, and
- Waipahu Business Association.

West Loch lies within the area of the Ewa Neighborhood Board, and is contiguous to the boundary of the Waipahu Neighborhood Board.

Except for the Ewa Neighborhood Board, all of these organizations support the West Loch project. The primary reason is the provision of housing. Waipahu organizations also stressed the need for the shoreline park and the positive impacts of the new community on existing businesses (based on review of "Meeting of the Planning Commission: Minutes," July 30, 1987).

At its June 18, 1987 meeting, the Ewa Neighborhood Board voted to submit a number of comments as initial concerns "... with the explanation that the Board has not had sufficient time to fully discuss this issue prior to the required deadline and that we reserve the right to submit additional items of concern to be addressed in the Environmental Assessment" (Ewa Neighborhood Board No. 23, minutes of regular meeting, June 16, 1987).

The list of 13 concerns focused on the City's role as a developer and financial feasibility; the adequacy of roadways; and public services and facilities; the water supply and tsunami precautions (letter from the Ewa Neighborhood Board No. 23 to the Department of Housing and Community Development, dated June 18, 1987).

4.4.2 General Overview of Community Issues and Concerns Related to the West Loch Project

This section provides an indication of community reactions at a given point in time (mid-August to mid-September, 1987), based on the interview process previously described. The interviews and review of published organizational positions provide information very early in the overall EIS process. Only some of those interviewed were aware of all of the project's components; their input was therefore based on their initial reactions to information presented to them during the interviews. Changes in attitude and issues may occur in time, given changes in the project and other events or influences in the community.

Because the interviews were conducted for <u>issue identification only</u>, no attempt was made to quantify the responses, or to assess the extent of project support or opposition.

In general, the project's concept was well received by almost all interviewed. The regional leaders, in particular, liked the proposed land uses because these were appropriate to the current needs of the community.

The project's concept was less important, however, to those who would be more directly impacted. Those who live near the project site tended to be more specific about their concerns about property value impacts, physical infrastructure, and public services.

On-site informants understandably placed more importance on their potential displacement than on regional benefits. Both nearby residents and on-site informants tended to express a dissatisfaction with their access to project information.

The housing component was the aspect of the project which the community tended to view most favorably. Regardless of one's opinion of specific project components, almost everyone acknowledged the need for housing.

Regional community leaders and organizations tended to appreciate the proposed "60/40 housing mix", in which 60 percent of the proposed units would be tailored to the income levels of gap group families and the remaining would be offered at market value. Recommendations for effective management and design controls were seen as possible ways to ensure a quality, planned development.

West Loch's recreational component was also seen by many as an asset to the community. Again, some made recommendations intended to retain the overall quality and family-oriented characteristics in recreational areas, including the golf course. Potential displacees did not appreciate the proposed recreational uses, however, mostly because, at the time of the interviews, such uses would occur on their present sites.

Traffic headed the list of concerns related to infrastructure, followed by drainage (a concern expressed primarily by nearby residents). People also asked about the preparedness of public schools to meet the demands of this and other Ewa proposals.

An issue raised mostly by nearby and on-site residents is a lack of information about the project. Potential displacees were especially critical of receiving no project information prior to notices of potential site entries and preliminary relocation schedules.

A few regional leaders expressed concern about the City's ability to implement the West Loch Estates plans as proposed.

4.4.3 Housing

4.4.3.1 Community Reactions to the Housing Component

The project's housing component appears to be the most positive aspect of the project from the community perspective. The following summarizes viewpoints expressed in informant interviews:

- The need for housing was acknowledged by almost all, and many people cited examples they knew of personally in which there are "doubling up" and crowding situations because of high housing costs.

- Many people, particularly the regional leaders, stressed that they support the project, as long as the housing mix and concept remain intact. The 60/40 housing mix was seen as an asset by both Ewa and Waipahu leaders because both wanted to see a mix of family incomes and housing types in any further development in the area.

- Both Ewa and Waipahu leaders wanted to minimize any form of subsidized housing. Modular housing units were highly discouraged, as well as ohana units.

- People were generally positive about the proposed elderly housing.

- To maintain the project's intent of a planned community, the regional leaders stressed the need for a well-managed community. It was suggested that the City be assertive in the formation of a homeowners association which will set and monitor design and maintenance standards for the entire project area.

- A few people were concerned that the intent of the gap group housing might be lost if the new homeowner re-sells the property at market rate to make a profit.

4.4.3.2 Analysis and Recommended Mitigations

The predominantly favorable reaction to the housing component reflects the region's general attitude toward growth in the area. Both the Ewa and Waipahu communities have been exposed repeatedly over the past few years to proposals of large developments. They have since formulated community goals which strive for the encouragement and promotion of projects which will allow planned growth which is sensitive to the physical and social environments.

Having articulated these goals, these communities are generally receptive to the large-scale growth anticipated for Ewa. Their concerns typically focus less on the magnitude of a proposal than on qualitative aspects such as the exact housing types and mix, as well as other measures which would assure "quality" development.

City representatives have indicated to community groups that they are exploring existing planned communities and their covenants to see which controls might be most effective for the West Loch community. They have also indicated that they will assist the West Loch residents in forming a community association.

It is recommended that, in addition to establishing design controls and management controls, the City also consider maintaining an active and ongoing role with West Loch in some voting or advisory capacity. This would be similar to the phased retention of representation by private developers in planned communities such as Village Park and The Gentry at Waipio.

It is noted that, regarding the re-sale of gap group units, the City will retain the first option to purchase the unit at a price prescribed by law. This will help in retaining the balanced mix of housing by minimizing the introduction of housing intended for gap group incomes to the more expensive market.

4.4.4 Recreation

4.4.4.1 Existing Conditions

The Navy controls the waters of West Loch and generally any civilian use must be approved by the Navy. On nearby Waipio peninsula, between Makalena Golf Course and the project area, shoreline usage requires formal permission and identification. Navy security guards regularly patrol the roads and evict anyone without proper permits.

The waters off the project area shoreline are also off-limits to the general public. Navy patrol boats make runs through the area and illegal boaters and fishers are asked to leave. Further, signs are posted along the shoreline which warns against trespassing and the use of waters.

By Presidential Executive Order 8143 of May 26, 1939, all waters up to the high water mark within Pearl Harbor are owned by the Navy. Furthermore, by Civil Actions 290, 291, 292, and 296, all fishing rights in Pearl Harbor were acquired by the Navy (Department of Navy response letter to 1987 Development Plan annual amendment review package, April 1987).

Due to sensitive activities and other operational requirements at Pearl Harbor, recreational use of Navy waters -- particularly those of West Loch -- is prohibited without the consent of the Navy. The particular sensitivity of West Loch is due to the location of the Navy ammunition storage facility in the area (see Section 4.5.2).

Nevertheless, the area is sometimes illegally used by people in the following manner:

- Crabbing -- Catches include Samoan crabs, blue pincher crabs and "gangster" crabs (believed to be a cross-breed between Samoan and blue pincher crabs). Small boats are often used to set out and recovering crab nets in the inlet. Because the water is shallow along much of the shoreline, people are also observed walking and laying their nets.

- Fishing -- Catches include papio, mullet, tilapia, and occasional runs of oio and halalu. At one time, the area was known for its plentiful schools of mullet, and occasionally schools are still seen offshore.

- Digging for clams and oysters -- Even though there is currently a statewide ban on this activity, people are occasionally seen doing this in several inlets along the shore.

At present, there are a number of old and dilapidated piers in the area.

The proposed park extending along the coastline of the West Loch Estates project does not include boatramps or any other type of structures that would promote in-water activities. Current designs call for repair of and/or improvements to a number of the existing fishing piers, largely on Hoaeae Point. Such improvements to existing piers or construction of additional piers would require approval from the Navy, which would likely be granted because such use would be an on-shore rather than in-water recreational activity (personal communication, Bill Liu, Assistant Naval Base Civil Engineer, September 2, 1987).

In addition to the water usage are the polo and rodeo activities related to the equestrian facilities on lands leased by the Estate to Tongg Ranch and another lessee. The Tongg Ranch has equestrian facilities which include pastures and paddocks, two polo fields and a riding area. Recreational activities associated with these facilities include polo games, private polo lessons, and the training and exercising of polo ponies.

The Asing Park is another recreational site within the project boundaries. This field park is used occasionally for ball games, although old-timers in the area indicated that this park was well-used before facilities were built in Ewa Beach.

4.4.4.2 Community Reactions to the Recreation Component

The project's objectives of providing a shoreline park, a district park, and a golf course were generally viewed as benefits to the regional and West Loch residents. The following summarizes community reactions to the recreation component:

- The proposed shoreline park was favorably received by almost all informants, particularly the Waipahu residents.

- Regional leaders tended to encourage measures which would retain the intended family-orientation and general attractiveness of the park. These measures included (1) prohibiting vehicular parking and traffic on the Hoaeae peninsula, and (2) monitoring the shoreline park for loitering and vandalism.

- There were a few inquiries about water recreation, but almost all of those interviewed felt that water sports would not be appropriate. Some did not feel that the waters were clean; others felt that, because this was not

a beachfront development, people do not expect active water use. Some felt that pole fishing might be appropriate. A few of those interviewed had used the West Loch waters for crabbing and digging for clams in the past, and a few people were observed fishing and crabbing in the area during site visits.

- o The golf course was generally preferred over the existing agricultural uses. People saw the golf course as:
  - providing permanent open space;
  - cutting down on dust, ash, and stray animals (e.g., dislocated rats or stray cats and dogs) which coincide with cane burning; and
  - possibly increasing nearby property values.
- o Some questioned the need for another golf course, however, since there are others being planned for Ewa. This was especially important to current on-site users who felt the golf course was not worth their displacement.

4.4.4.3 Potential Recreational Opportunities and Constraints

The project's water recreation potential is limited by the following:

- o Navy operational restrictions and geographical boundaries; and
- o limited water circulation in the inner loch areas which may cause stagnant conditions leading to higher bacterial counts and greater accumulations of pesticides, herbicides, and other toxic substances transported by streams and runoff.

Increased shoreline access will nevertheless be a recreational asset and it is recommended that the current activities of fishing and crabbing be enhanced. Appropriately-placed fishing piers would allow people to reach the deeper waters of the loch without having to use a boat or other water craft. Existing examples of this are the fishing piers in Ahukini and Waimea on the island of Kauai. Both are well-used and popular. It is further recommended that lay and throw nets be prohibited.

The project's impacts on current water recreation activities are anticipated to be beneficial in that current users will no longer need the privacy for illegal water entries. They may find that increased water usage may decrease their catch, however.

Although the 3.7-acre Asing Park will be displaced, the general land-based recreational opportunities will be increased. The proposed 39-acre shoreline park and 18-acre district park

will result in more recreational facilities available to the community.

Further, these facilities are consistent with the desires expressed by the community informants and representatives. The Waipahu community has long since been exploring ways to obtain a shoreline park this project is seen as meeting this goal. The Ewa community leaders also expressed a desire for more passive park areas.

It is recommended that community suggestions of stringent security and limited parking be considered on this project. Because of the large land areas of these parks, user safety and attractiveness should be given much attention.

This project will displace the polo activities. While the operation has an alternate site in Palehua, their relocation will entail sitework and relocation ((based on letter from Tongg Ranch to the City Department of Planning dated June 22, 1987).

4.4.5 Physical Infrastructure and Public Services

4.4.5.1 Community Reactions

The following is a summary of such concerns:

- o Traffic was a major concern for many of those interviewed. The most frequently-raised location of this traffic in the H-1 on-ramp off Kunia Road. It was felt that this area already is backed up with the completion of the Fort Weaver Road, and that traffic would be exacerbated with this and any other new development. The most frequent solution was the proposed "North - South Road," which would be located further west and be a direct H-1 linkage for Ewa Beach residents.
- o Drainage was a concern for people in Honouliuli. Because a portion of the area is low in elevation, people were concerned about the effect of increased runoff due to golf course landscaping.
- o The adequacy of the water supply was raised by a few people.
- o Many people were concerned about the preparedness of police, fire and educational services to deal with the growth from this project, as well as other new developments in the area.

4.4.5.2 Analysis and Recommended Mitigations

Generally, these types of questions are asked of all proposed developments in the area, and community leaders do not seem

to require the individual developments to solve the regional problems.

Although concerns related to infrastructure and public services were frequently expressed, there was no feeling that the project should be halted until all of these problems are solved.

As discussed in Section 4.4.3.2, the Ewa and Waipahu communities are generally prepared for relatively large developments. Their questions pertaining to roadway adequacy and the capacity of police and other public services are directed more towards the responsible agency, rather than the specific developer. They would like to make sure that these projects are accommodated, as long as regional goals and objectives can be met.

4.4.6 Informational Needs and City's Role as Developer

4.4.6.1 Community Issues Concerning Informational Needs and City's Developer Role

Some of those interviewed, particularly the nearby and on-site residents, complained that they did not have any information about the project until very recently. They felt that, since they would be the most directly impacted, they should have been informed earlier in the process.

Some of them indicated that they did not know anything about the project except for letters from the City Department of Housing and Community Development informing them that project consultants may be entering their areas for land tests. The Honeae Point residents (see following Section 4.5) claimed that their first awareness of the project was when they were approached by City relocation officers. Since they come under Estate lessees, residential renters reportedly were not notified about the project, unless their landlord or the original lessee had informed them.

Most of the on-site and nearby community organizations had not received formal presentations by City representatives of this writing (mid-September 1987). Further, many were unfamiliar with the formal mechanism of Neighborhood Board representation and they were dissatisfied with these representatives for not notifying them.

Regarding the City's role as developer, there was some skepticism from a few people that the project could be implemented as currently proposed. Questions of financial feasibility and overall ability of a public entity to implement a "quality" development were raised, and it was suggested that such development be left in the hands of the private sector.

4.4.6.2 Analysis and Recommended Mitigations

Both the foregoing issues are related to credibility.

In the first instance, the first impression of the on-site and nearby residents was negative because it was tied to displacement and land acquisition. Consequently, rumors heightened apprehensions and fears. These people will probably continue to question the integrity of the project until they are satisfied that they will receive fair and equitable treatment.

Note, however, that, prior to these interviews, City presentations were made to some community organizations, including the Ewa and Waipahu Neighborhood Boards. Further, representatives from these organizations participate in an ad hoc advisory committee which meets with the City to review plans and make recommendations. In a sense, then, some of the information gaps are also due to the lack of networking of these representatives, although it should also be noted that the July 1987 Ewa Neighborhood Board newsletter did contain a small article about the West Loch Estates project.

The solution to this situation is an information program whereby the appropriate organizations are given presentations about the project. Recognize, however, that any information program targeting these people will need to acknowledge that this effort is being made months after the regional organizations learned about the project. Further, the presentations should be tailored to address the different interests of these organizations. As further discussed in the remainder of this report, these different interests would include: displacement for the Honeae Point Community Association; land acquisition and infrastructure impacts for the Honouliuli Doshi Kai; residential contiguity for the "new Ota Camp" residents; and infrastructure and other impacts for the Ewa Community Association.

In the developer-related issues, some people simply do not believe the City -- or any other public entity -- can, or should, implement this type of project. Continued informational programs can address this issue, although successful execution of the project is probably the only real solution to this issue.

4.5 COMPATIBILITY WITH SURROUNDING USES

The following discussion will be divided into two parts: civilian and military uses. The discussion of civilian uses will be, like the foregoing sub-section, primarily based on interviews with community informants. The discussion of compatibility with the U.S. Naval operations will be based on direct contacts with Naval personnel. (It may be noted that the question of compatibility with Naval operations did not emerge as an issue in the interviews with community residents and leaders.)

4.5.1 Civilian Uses

4.5.1.1 Existing Characteristics

As indicated in Figure 4, immediately surrounding uses include:

- Relocated Ota Camp residents, to the north of Residential Increment 1;
- Farrington Highway and two medical facilities (one currently under construction) to the north of the western section of golf course;
- The small community of Honouliuli (a mixture of residential uses, few support commercial establishments, small-scale agricultural operations, and vacant land west of the portion of golf course west of Fort Weaver Road);
- A cattle slaughterhouse immediately south of the golf course; and
- Further south, the Ewa community across Fort Weaver Road west of Residential Increment 2.

Kahi Mohala, a Browns School psychiatric hospital, is located across the Old Fort Weaver Road, north of the western section of proposed golf course. Currently under construction, the St. Francis medical hospital is adjacent to the northeast corner of the western section of the golf course.

The three residential communities have distinct identities:

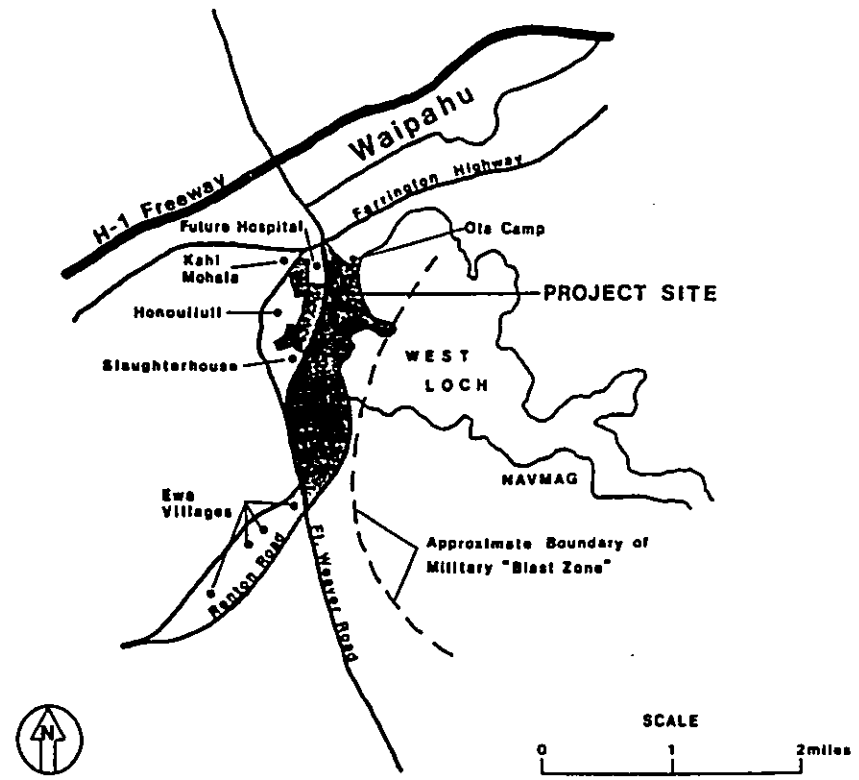
Honouliuli is sandwiched between the Old Fort Weaver Road and the proposed golf course. It is a community of mostly single-family dwellings on lands owned by individual owners. Two convenience stores, one gas station, and two beauty salons front the Old Fort Weaver Road.

Approximately 100 to 120 housing units are in this area (Real Estate Data, Inc., 1986). Based on an average of 3.5 persons per household, it is estimated that 350 to 420 people may live in this area. Many residents are Japanese or Filipino.

It was stressed by current and former Honouliuli residents that this community has always retained an identity separate from the plantations, even though many of them initially worked there. They claim community cohesiveness, which is primarily embodied in their community association called Honouliuli Doshi Kai, roughly translated into the "Honouliuli Helping Each Other" (personal communication with Kay Sunada, former president, Honouliuli Doshi Kai, September 9, 1987).

Figure 4

Communities/Uses Near the Project Site



This organization has a membership of over 100, although many members no longer live here. Their common bond is past and current residence in Honouliuli, and they have frequent socials and support activities (personal communication with Shirley Head, President, Honouliuli Doshi Kai, September 9, 1987).

The relocated Ota Camp residents live in Waipahu, on the northern boundary of the project site. These residents formerly lived in 25 houses in the original Ota Camp which was located further east in Waipahu. In the early 1970's, they were asked to move. In asking for relocation assistance, they had four conditions -- simultaneous relocation, single-family dwellings, a Waipahu location, and community-based control.

In the mid-1970's, they were relocated in 31 homes on their present site. The homes are mostly three-bedroom, two-bath units. Initially rentals, these units are now leased with options to buy at a future date.

This is a close, mostly Filipino, community. Relocation and related lawsuits often required much of their energy and time, as reflected in their organization's name -- the Ota Camp Makibaka ("Struggle") Association (personal communication with Pete Tagalog, President, Ota Camp Makibaka Association, September 3, 1987).

The Ewa community is a series of former, but distinct, plantation villages located west of Fort Weaver Road, perpendicular to the proposed Residential Increment 2.

Over the past few years, the concerns of this community have primarily focused on coordinating, funding and building new and improved houses. To facilitate this effort, the Ewa Housing Foundation, Inc. was formed as an umbrella organization for these former plantation towns (personal communication with Tony Bise, President, Ewa Housing Foundation, Inc., September 8, 1987).

More recently, another organization was formed to address more regional concerns, and issues other than housing ones. This is the Ewa Community Association and the move for a more regional perspective is underway (personal communication with Ed Castanos, President, Ewa Community Association, September 9, 1987).

Adjacent to the southern corner of the western section of the golf course is the Kahua Meat Company, Inc., which is a cattle processing operation. This is one of the island's two slaughterhouses serving the cattle ranches.

4.5.1.2 Reactions of Nearby Residents

Summary: The project's relationship to the surrounding communities was seen from two perspectives. On one hand, the nearby Honouliuli and relocated Ota Camp residents have distinct and independent community identities. Some nearby residents were

wary that their status quo would be disturbed by a new community and that existing small businesses might have difficulty competing with the proposed town center.

Nearby residents also anticipated some changes which may benefit them, however. Increase in property values, access to new shopping and recreational facilities, more customers for existing businesses, elimination of some incompatible agricultural uses (such as those related to cane burning) -- these were seen as potential benefits, providing these nearby communities could retain a separate identity.

Specifics: Reactions of Honouliuli, the "new Ota Camp," and Ewa residents are summarized as follows:

- Because of social ties with on-site residents, initial reactions generally focussed on residential displacement. It is noted, however, that on-site residents do not belong to any of the four community organizations mentioned in Section 4.5.1.1.
- Honouliuli informants were particularly concerned about the acquisition of lands owned by Honouliuli residents. The lands of three families are currently intended for acquisition if the project is implemented, and Honouliuli informants wanted assurances of equitable and fair settlements.
- The Honouliuli and "new Ota Camp" informants basically wanted to retain identities separate from the new community.
- These informants also saw potentials for community benefits, however, primarily in the form of terminating incompatible agricultural activities (mostly cane burning) increased land values for properties fronting the golf course, and access to proposed recreational, commercial and public facilities.
- Honouliuli informants were apprehensive about the impacts of proposed commercial establishments on the small Honouliuli establishments, although increased patronage was also seen as a plus.
- Honouliuli informants expressed concern about further drainage impacts because of reported increased runoff due to the construction of the nearby hospital.
- All, including the Ewa informants, were concerned about traffic increases.

Further, regional Waipahu leaders discussed systemic relationships with the proposed West Loch community. They felt that the traffic generated would have more impact on the Waipahu roadway system rather than Ewa's. On the other hand, it was also

felt that until the regional Ewa development is well underway, the new West Loch residents will utilize the closer Waipahu shops, restaurants and service establishments.

4.5.1.3 Analysis and Recommended Mitigations

The compatibility of West Loch with existing surrounding uses depends on a number of factors, some of which include:

- o the general acceptance of existing communities of the concept behind the proposed project;
- o similarities between the social and economic characteristics of the existing communities and new residents; and
- o potential conflicts between residential and non-residential uses.

Acceptance of the concept behind West Loch, though not necessarily the project itself, would be based on an acknowledgment of a major housing need and some awareness of how this project would address this need. Many of the regional community leaders are keenly aware of the island's housing crisis and had some knowledge that project is pending. They generally approved of the goals and concept on which West Loch is based.

Informants living in Honouliuli, the "new Ota Camp," and Ewa, however, were mostly unaware of the proposed project. Further, by the time of the interviews, they were already aware of sensitivities and emotionalism surrounding the displacement of on-site residents and acquisition of small parcels of land. Consequently, there is some resistance to the idea of having any development on the project site which might displace these people or cause others to lose their land through City acquisition.

As was discussed in Section 4.4.6, much of this initial apprehension and criticism by nearby and on-site residents is due to access to project information. This impact can therefore be alleviated through effective and ongoing information programs.

The social and economic characteristics of the existing communities and new residents will mostly likely be different.

The existing communities are relatively homogeneous -- they share common backgrounds as described in Section 4.5.1.1, and have actively worked together on common community objectives.

There is a mixture of housing types. Some appear to be only a few years old; others are original houses in the old plantation camps. In some areas, recent improvements are evident in new stone walls and paving. In other areas, the structures are deteriorated and in need of repair.

The new residents will originate from various parts of the island and state. Based on the target housing mix, there will also be a more representative cross-section of the general community in West Loch.

While they may not share identical backgrounds, however, social compatibility is still possible because of a common Hawaii identity. The common areas -- such as schools, parks, and shopping areas -- will allow for social interactions which can lead to further appreciation of the diversities and complexities of local culture.

A sense of economic disparity could occur because of the "newness" of the planned community. The newer house would generally have more value and, if strict design controls are enforced, the entire development could maintain an overall attractiveness.

Achieving this overall attractiveness would be more difficult for the existing communities, mostly because of the age differentials in the structures and the lack of centralized management controls. An example of where there appears to be economic disparity is the Gentry at Waipio and the older adjacent Seaview and Crestview developments.

Appearances of economic disparities can be alleviated, however, through landscaped buffers and beautification program in the existing communities. It is highly possible that the project will motivate some of the nearby residents to initiate cleanup and beautification programs.

Potential conflicts between residential and non-residential uses need to be minimized through buffers and locating residences away from uses which might be incompatible. The psychiatric and medical hospitals will probably not have problems with West Loch Estates, since these facilities would be closer to the golf course anyway. Further, the medical facility would be conveniently located for West Loch residents.

The project needs to address potential problems with he cattle processing plant, however. The visual, olfactory, and noise factors associated with the slaughtering of animals may be offensive to the new residents and other site users.

The operation will probably not present much problem for the adjacent golfers because they will only be in the area for a short while. The activities on the eastern section of West Loch will be separated by Fort Weaver Road. Nevertheless, facilities directly across Fort Weaver Road should probably accommodate incidental and temporary uses, such as a shopping area, rather than permanent residences.

4.5.2 U.S. Naval Uses

Naval use of the West Loch waters was discussed in Section 4.4.4. This section will focus on proximity to the 640-acre parcel on which the Naval Magazine (NAVMAG), Lualualei, West Loch Branch, is located. This is an ammunition storage facility. For reasons of national security, the U.S. Navy will not reveal the nature or quantity of ammunition stored at the site.

4.5.2.1 Current Situation and Naval Policies

There are two aspects to the question of compatibility: public safety and potential for conflict along border areas.

It is beyond the scope of a socio-economic report to conduct a comprehensive assessment of public safety issues, particularly when relevant data are classified. However, following is a summary of the Naval position contained in the Department of the Navy's April 1987 response to the 1987 Development annual amendment review package, which contained the West Loch Estates housing proposal:

- The project site is outside the facility's "Explosive Safety Quantity Distance," or blast zone (Figure 4). (NOTE: The U.S. Geological Quadrangle maps suggest the blast zone, which appears to be about 7,500 feet in radius, may include the very tip of Hoaeae Point, which is planned for shoreline park purposes.)

- However, such zones "are established at practical limits and do not guarantee absolute safety outside the zone."

- As previously stated in other hearings before the State Land Use Commission, the Navy's position in regard to residential developments "is that the land bordering ammunitiion storage areas be left in agriculture."

- If the proposed housing development does occur, "consideration should be given to establishing a buffer zone such as an open space park, golf course, a roadway, or a parking lot along any portion of this development bordering the station."

There are only about 500 feet of West Loch Estates property actually bordering federal property; this border area is located at the southeastern part of the project site, just west of the wildlife reserve. However, it should also be noted that the Navy recently condemned some 781 acres of Campbell Estate land south of the project and west of the NAVMAG facility (on either side of the Ewa-West Loch Access Road into the ammunition storage facility), and some of this property is separated from the West Loch Estates land by only a few hundred feet or less of sugarcane. The condemned property, like the adjacent land, is under cultivation by Oahu Sugar Company, and the Navy has no plans to terminate either the lease to Oahu Sugar or the agricultural activity

(personal communication, Bill Liu, Assistant Naval Base Civil Engineer, September 14, 1987).

At the closest point, proposed housing sites within the West Loch Estates property are about 8,000 feet from the main docking facility at NAVMAG. At the present time, there are no security fences or military patrols along this area, although unauthorized persons entering on foot would be intercepted and warned off if they penetrated further into federal property.

The Navy has no immediate reason to anticipate difficulties in terms of West Loch Estates residents wandering on foot into the federal area. The wildlife refuge along the shore provides one natural barrier, and there is little in a sugarcane field to attract curious explorers on a nature hike. However, if problems do occur with increasing numbers of people approaching the NAVMAG facility, the Navy might erect fences and signs, and/or increase patrols (personal communication, ibid., September 14, 1987).

4.5.2.2 Recommended Mitigations

The Navy has made its recommendation that portions of the project bordering the facility be kept in extremely low-density uses.

The major additional recommendation would be for increased communication between the City and the Navy in further project planning. The Navy has requested consulted party status for this EIS.

4.6 DISPLACEMENT

As indicated in Section 4.4.6, one emerging community issue has to do with communication between the City and those people whose land would be acquired and/or whose homes or businesses could be displaced.

In any public project requiring condemnation of property and/or displacement of people, there is the potential for controversy. The negative impacts of displacement must be weighed by decision makers against the benefits of housing provision and other public purposes served by the project.

Legal procedures established for condemnation and possible relocation assistance will result in official determinations of individual displacement impacts. The purpose of this sub-section is to disclose general impacts. The major focus will be on describing the uses and approximate numbers of residents and businesses to be displaced.

4.6.1 Overview of Land Tenure

All but nine acres of the approximately 500-acre site are owned by the Estate of James Campbell. Based on a map generated

by the Estate (dated January 10, 1986) and interviews with various people knowledgeable of the site, it is estimated that the Estate has approximately 25 leases on the site. Over half of these (14) are for residential purposes on Hoaeae Point.

The remaining leases allow for agricultural and industrial uses throughout the rest of the project site. Uses currently occurring under these leases include the following:

- o equipment storage,
- o sugar cane cultivation,
- o a used auto parts and towing operation,
- o pasture and equestrian activities, and
- o headquarters for a ranch.

At least two of these agriculture-related lessees have sub-leased a portion of their leased land or have established landlord-tenant agreements. Oahu Sugar Co. has approximately six sub-leases which lie within the project boundaries. No residential uses are permitted on these lands, and current uses are related to raising chickens and livestock, equipment storage, and equestrian activities (personal communications with Bill DeMent, Field Engineer and Land Manager, Oahu Sugar Company, September 3 and 8, 1987).

Tongg Ranch, Inc. has landlord-tenant agreements for at least 13 residential structures on lands leased from Campbell Estate (personal communication with Ronald Tongg, President of Tongg Ranch, Inc., September 9, 1987).

Approximately nine acres within the project site are currently owned by seven landowners other than Campbell Estate and are intended for acquisition if the project is implemented (personal communication with Howard Murai, City Department of Housing and Community Development, various dates from August 31 through September 11, 1987).

Of these nine acres, approximately six -- owned by three landowners -- are located east of Fort Weaver Road. These lots appear to be used primarily for an used auto parts and towing operation, and for transportation purposes.

The remaining three acres are distributed among four separately-owned parcels and are located west of Fort Weaver Road. One of these parcels is occupied by renters; the other two have no residential uses, but may have small-scale agricultural activities for personal use.

4.6.2 Overview of Existing On-Site Uses

This section is based on information provided by on-site users and others knowledgeable about the project site, as well as on field observations and on the aforementioned map generated by the Estate. The project area is predominantly in agricultural or related uses; residential and commercial/industrial activities also occur on the site. Major uses are indicated in Figure 5.

The project site can be divided into two sections defined by Fort Weaver Road. The "eastern section" of the site is sandwiched between Fort Weaver Road and the waters of Pearl Harbor. The "western section" lies between Fort Weaver Road and the Honouliuli community.

The eastern portion of the project area has residential uses, agricultural activities, and commercial/industrial operations. The residential uses on this part of the project site are generally in two clusters. One cluster of about 22 units is situated on the Hoaeae peninsula. Further south, the other cluster of about 14 homes fronts Fort Weaver Road, near its junction with the Old Fort Weaver Road. Real estate data based on tax maps suggest there may be another nine units in other parts of the eastern project site.

Agricultural uses on the eastern portion of the site include a ranch headquarters, equestrian activities and support facilities, and the raising of cows and goats, as well as sugar cane cultivation on parts of the site.

This portion of the project area also has industrial uses. There is a used auto parts and towing operation, as well as storage of equipment and vehicles. Along the length of the shoreline there is a petroleum - energy corridor.

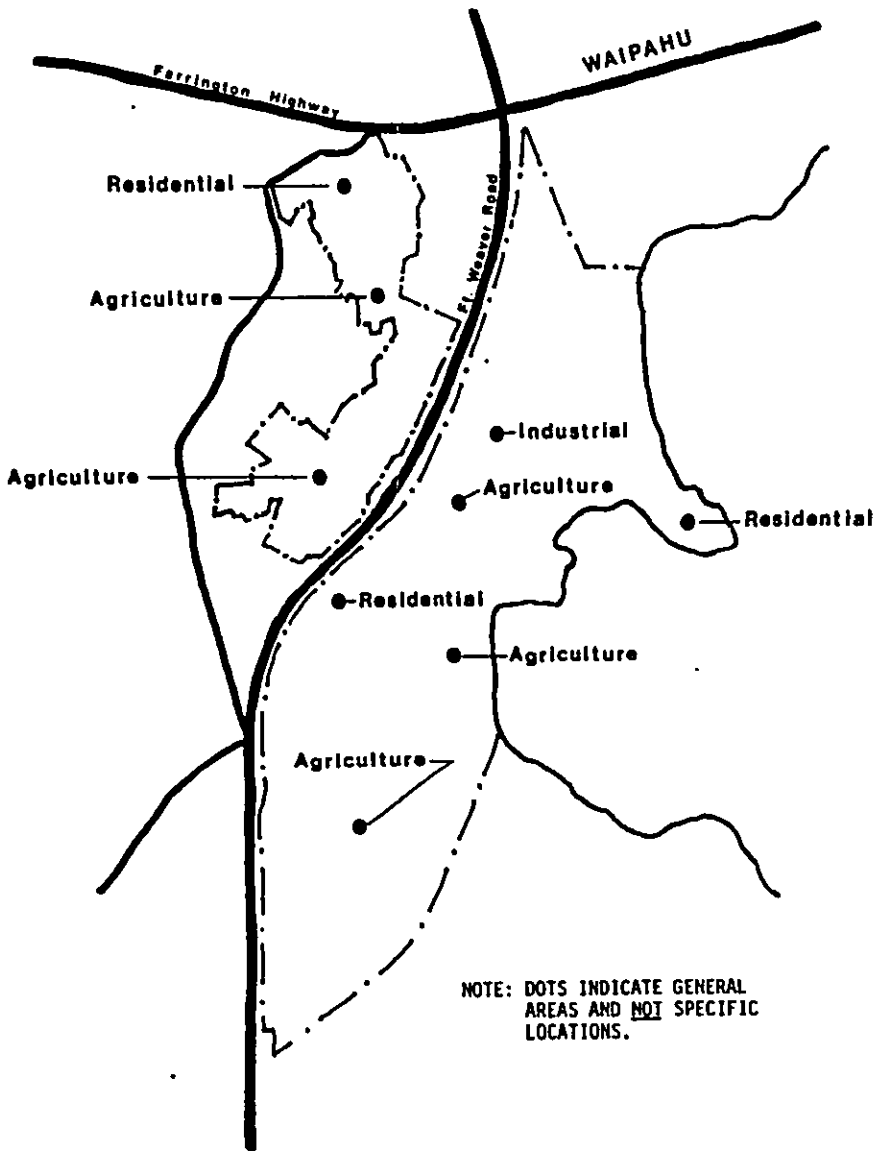
There is less activity on the western part of the project site, across the highway. Almost all of this portion is used for agriculture. Most of this is in sugar cane cultivation, and there is some land used for cattle grazing and raising chickens. There are about three residential units on the northern portion of this site.

4.6.3 Agricultural and Pastoral Uses

Agricultural and pastoral uses are found throughout the site. Lessees of the Estate conduct agricultural activities which include:

- o sugar cane cultivation,
- o a rodeo roping ring and support facilities,
- o raising of cattle, and
- o headquarters for a ranch.

Figure 5
General Vicinity of Existing Uses



The 36-acre portion leased to Tongg Ranch comprises the central headquarters for the ranch (which otherwise consists of a total 6,000 acres of pasture land in Kunia and Palehua). Ranch facilities on the West Loch project siteinclude storage facilities for equipment, marketing, cattle stockyards, pastures, paddock area, two polo fields, and equestrian riding areas, as well as residential units which were discussed in the previous section. Four full-time employees and seven part-time volunteers serve this site (based on letter from Tongg Ranch to the City Department of Planning dated June 22, 1987, and on personal communication with Ronald Tongg, President, Tongg Ranch, Inc., September 9, 1987).

Oahu Sugar Company leases these lands primarily for sugar cane cultivation. As more houses were built in Honouliuli, however, some of the agricultural activities became incompatible with nearby residents. Those lands closest to the residential areas were fallowed and sub-leased to others.

In the project site, Oahu Sugar Company sub-leases approximately five parcels, none of which are permitted residential uses. Uses on these parcels include -- on the eastern portion of the site -- raising goats and cattle, the storing of agricultural equipment and facilities for equestrian activities, and -- on the western portion of the site -- raising chickens (personal communications with Bill DeMent, Field Engineer and Land Manager, Oahu Sugar Company, September 3 and 8, 1987).

4.6.4 Residential Uses of the Site

There are several types of residential uses on the project site, as follows:

Lessees of the Estate of James Campbell: Hoaeae Point is divided into 15 lots of sizes ranging from 0.4 acres to 1.6 acres. Most of these are less than an acre. Beginning in 1947, Campbell Estate granted 30-year leases which ended in the late 1970s. Since then, the occupants are on a month-to-month lease.

These lots are leased by 14 families, each of which belongs to the Hoaeae Point Community Association. With non-profit status, the association owns the water line serving their homes and funds the maintenance of the road leading to their homes. The individual lessees are responsible for erecting and improving their own structures, as well as for home insurance and property taxes. One of the Hoaeae Point parcels is vacant, and another is occupied by renters only. There are 22 units on these parcels, 12 of which are occupied by month-to-month lessees. Monthly rent is $100 per structure (personal communication with three officers of the Hoaeae Point Community Association, August 26, 1987).

Renters or Sub-Lessees: Ten of the Hoaeae Point houses are rented, or occupied by family members of the lessees.

It was estimated that around 90 people live on the peninsula, and that most of these are renters and/or related to the lessees. It was felt that the population has been relatively stable in numbers over the years (personal communication with three officers of the Hoaeae Point Community Association, August 26, 1987).

The Tongg Ranch has nine quonset huts, two duplexes, and three houses on the eastern portion of the project site. Four units are occupied by people who provide services to the Ranch. The remaining 12 are rented to the general public. Monthly rents range from $475.00 to $675.00. Standard landlord - tenant agreements exist between the ranch and its renters. It was estimated that approximately 60 people live in these units (based on letter from Tongg Ranch to the City Department of Planning dated June 22, 1987, and on personal communication with Ronald Tongg, President, Tongg Ranch, Inc., September 9, 1987).

In addition, three on-site rental units are located on the western section of the site. These units -- and the land on which they sit -- are owned by an entity other than the Estate. Approximately 15 people live in these units under a month-to-month rental agreement (personal communication with Sharon Walsh, relative of landowner, September 8, 1987).

Possible Owner-Occupants: There are a number of parcels owned in fee by parties other than Campbell Estate. Based on property tax information collected by a private vendor (Real Estate Data, Inc., 1986), there may be nine dwelling structures on these properties. However, it was not possible to verify this through field observation or interviews. Some of these units may be occupied by owners, and others by renters or lessees.

It is possible that these units may house around ten to twenty people, (based on household sizes of only one to two persons, to reflect current uncertainties about the actual existence of these units).

Residential Totals: In total, approximately 170 to 190 people live on the project site in up to 48 units. Most of these people occupy their units under rental agreements.

4.6.5 Commercial, Industrial, and Other On-Site Uses

Commercial and industrial uses also occur on the eastern section of project site. At Hoaeae Point, residential lessees reportedly also operate a tour bus company, an auto repair shop, a woodworking service, and a party rental supplies business.

Also on the eastern section is a used auto parts and towing operation on land leased from three landowners, one of whom is the Estate. Another parcel is leased from the Estate for the storage of vehicles and equipment.

Along the length of the shoreline is a petroleum pipeline and energy corridor which will not be displaced by the proposed project.

The other existing use is Asing Park, a 3.7-acre park for with a basketball court, ball field, and a comfort station.

4.6.6 Notification

As of this writing (September 15, 1987), no formal notification of displacement had yet been transmitted, although planning for notification was underway. Contact had been established between City representatives and some potential displacees, and a presentation was made to the Hoaeae Point Community Association on September 9, 1987.

Also, the City and County of Honolulu had made initial offers of acquisitions to owners of land comprising the project site.

4.6.7 Relocation and Other Potential Mitigations

Condemnation procedures require reimbursement of landowners, lessees, and tenants for the fair market value of property acquired by the City. Additionally, relocation assistance measures described below provide further cash and in-kind measures to displacees, including renters.

At the same time, it may be expected that some displacees -- businesses as well as residents -- may have expectations or needs beyond those which are covered by laws governing relocation assistance. This has yet to be determined in any definitive way. As previously recommended in Section 4.4.6.2, communication between City agencies and affected residents or property holders needs to be augmented, in order to match the strong efforts being made on the regional level.

Following is a summary of applicable provisions for persons displaced by public projects:

4.6.7.1 Basis of Relocation and Displacement Provisions

Relocation assistance to displaced individuals and businesses is in accordance with State statutes and administrative rules. The applicable State statute is Hawaii Revised Statues, Chapter 111. The applicable administrative rule is Hawaii Housing Authority, Title 17, Chapter 503. The following discussion is taken directly from documents provided by the Department of Housing and Community Development.

4.6.7.2 Relocation Assistance to Displaced Tenants

Individuals who rent housing, either through leases or subleases on land to be acquired for the West Loch project, are entitled to relocation assistance. This assistance consists of payments for moving expenses, rental assistance, and aid in finding replacement housing.

Moving assistance may be either a fixed payment for a self-mover or reimbursement, for expenses at the tenant's discretion. If the tenant elects for a fixed payment, he/she would be entitled to payment according to a graduated scale based on the number of rooms of furniture and belongings to be moved. The amount ranges from $135 to $300. If the tenant decides on reimbursement, the tenant need only submit receipts for expenses. The tenant is entitled to either the fixed payment or the reimbursement, whichever is higher.

Mover may also be eligible for rental assistance if they have lived in their homes for at least the last 90 days prior to the City's formal notification of intent to acquire. Tenants will be entitled to the difference between their present rent and the rent of the their new home, for a period of two years up to a maximum payment of $1,500.

Tenants are also eligible for assistance in locating a new home. Such assistance will be given by the Department of Housing and Community Development.

4.6.7.3 Relocation Assistance to Displaced Homeowners

Homeowners who are displaced are entitled to money payments as well as assistance in finding a new home. If the homeowner buys and moves into a replacement home, he/she will be entitled to the difference in cost between the price paid for their present home and the new home, up to a maximum of $5,000. If the homeowner decides to rent instead of buying a new home, he/she will be entitled to the difference in cost between 24 months of rent and 12 percent of the price paid for the present home, up to a maximum of $5,000.

4.6.7.4 Relocation Assistance to Displaced Businesses, Farmers, and Non-Profit Organizations

Businesses, farmers, and non-profit organizations are entitled to choose between either a moving expense payment or a fixed relocation payment. The moving expense payment will reimburse actual expenses up to a maximum of $5,000. If the business does its own moving, it must submit two estimates provided from bona fide moving firms to receive payment. The business may elect to receive a fixed relocation payment instead of the moving expense payment. In this case the payment will equal the average net earnings of the business up to a maximum of $5,000.

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APPENDIX H

Market Assessments For
West Loch Estates
A Proposed Residential Development
Ewa, Hawaii

by

JOHN CHILD & COMPANY, INC.

September 1987

Report to
R.M. Towill Corporation

Covering
Market Assessments for

WEST LOCH ESTATES

a Proposed Residential Development
Ewa, Hawaii

September 1987

john child
& COMPANY, INC.

REAL ESTATE
APPRAISERS &
CONSULTANTS

50th Golden Anniversary

john child
& COMPANY, INC.

REAL ESTATE APPRAISERS & CONSULTANTS
50th Golden Anniversary

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September 16, 1987

Mr. Bruce Tsuchida
R.M. Towill Corporation
677 Ala Moana Boulevard
Suite 1010
Honolulu, Hawaii 96813

Dear Mr. Tsuchida:

At your request, John Child & Company, Inc. has prepared market assessments covering the proposed West Loch Estates Development project (West Loch Estates). This letter summarizes our assessments which are presented in the accompanying summary report.

BACKGROUND

R.M. Towill Corporation (Towill) has been retained by the City & County of Honolulu (City) to provide planning and design services for the implementation of West Loch Estates. The development is proposed as an innovative community. Its principle land uses will include 1,500 residential single-family units, an 18-hole golf course, a major shoreline park, neighborhood parks, a park and ride facility, a school site and child care facility. The residential units are proposed to include 60% affordable units and 40% market units. A multi-family residential development consisting of 150 units for elderly housing comprises part of the affordable units total. The remaining 1,350 single-family residential units are divided into 750 units oriented to gap group households, and 600 units priced at market levels.

To complete your assistance, you are undertaking the following Work Elements:

1. Research and Analysis
2. Design Studies
3. Draft Master Plan and Program
4. Final Master Plan and Program.

Robert J. Vernon MAI CRE
Theodore Wrobel, SREA ASA
Karen Chan MAI

Craig T. Smith ASA
Ulson Y. Ewart ASA
Paul D. Cool

As an integral part of the planning and design, you require market assessments for the 1,350 proposed single-family residential units. In this regard, you have asked us to assist you by preparing market assessments for proposed single-family residential development at West Loch Estates.

STUDY OBJECTIVE

The objective of our assistance is to estimate the current and projected market support for the proposed 1,350 single-family residential units in terms of:

1. Property characteristics and amenities
2. Typical market sales prices
3. Projected annual absorption.

The analysis is conducted in two parts. One analysis addresses the 600 market priced single-family units and the other addresses the 750 gap group units. The analyses exclude the 150 multi-family units for elderly housing. Section I of the accompanying report summarizes our methodology and findings for the 600 market priced units. Section II of the report summarizes the analysis covering the 750 gap group single-family units.

LIMITING CONDITIONS AND UNDERLYING ASSUMPTIONS

This report is subject to the limiting conditions and underlying assumptions presented in Addenda A.

ESTIMATED MARKET SUPPORT FOR HOUSING DEVELOPMENT IN EWA AND CENTRAL OAHU

Market Priced Units

The projected residential housing requirements were compared to the projected available inventory in Ewa and Central Oahu. Currently housing supply exceeds demand; however, within one or two years, the existing and planned inventory would be insufficient, and an additional 900 to 1,000 units would be required. However, assuming Waiawa, Mililani Mauka and Ewa by Gentry receive necessary land use and zoning approvals and development proceeded as proposed, the total available inventory would exceed demand from 1990 through about 2000.

As a result, major projects would be expected to delay or decrease the proposed phasing to minimize the surplus inventory. By 2001, housing requirements would be expected to exceed available inventory. Major residential projects would be expected to accelerate development. About 5,000 units in Ewa Marina and Puuloa Estates would be expected to be developed between 2001 and 2005. In addition several thousand residential units could also be developed in Ewa Town Center.

Gap Group Units

The current demand for gap group housing units on Oahu is estimated to be about 30,000 units. Public and private developments which have been oriented to the gap group over the recent past have enjoyed overwhelming market response. However, there have not been a sufficient number of gap group units marketed over recent years to significantly reduce overall demand.

A consequence of this imbalance of supply and demand for gap group housing is a very strong demand for all single-family gap group housing projects which are located within reasonable travel times to employment. The relatively few proposed single-family projects on Oahu which will be oriented to the gap group market would not significantly change this supply/demand relationship over the foreseeable future.

MARKET ASSESSMENTS FOR WEST LOCH ESTATES

Market Priced Units

The market outlook for West Loch Estates supports development of the 600 units over the next three years. The projected housing requirement is expected to remain relatively strong. The most competitive available inventory would be:

- Ewa by Gentry
- Kapolei Village
- Village Park.

Although Makakilo would be in a position to offer competitively priced units, their new inventory is most likely to be priced higher than West Loch Estates. Mililani is also expected to be priced higher and would not be directly competitive.

Selling Prices

Based on the current and projected sales prices of competitive developments, average sales prices of about $140,000 to $150,000 for the West Loch Estates single-family units would be reasonable.

Absorption

Considering the projected housing requirements and available inventory, the 600 market priced housing units would be expected to sell in about three years. The actual sales performance would depend on the timing, pricing and qualifying requirements and subsidies, if any, offered at Ewa by Gentry, Kapolei Village and Village Park.

Gap Group Units

The outlook for the 750 gap group housing units in West Loch Estates is more optimistic. The island-wide market demand for gap group housing is expected to remain very strong over the foreseeable future. While most residential developments in the Central Oahu/Ewa area will have small portions of their inventory oriented to the gap group market, sufficient demand would exist to accommodate all anticipated supply. Currently, the major competing gap group project would be Kahi Kani, a proposed 290±-unit single-family project in Whitmore Village.

Selling Prices

Based on current income qualification levels, mortgage interest rates, and sales prices in competitive gap group projects, the typical sales prices of West Loch Estates gap group single-family units would range between $100,000 and $120,000.

Absorption

Comparable single-family developments oriented to the gap group market have experienced very rapid absorptions. A one- to two-month sell-out is possible for the 750-unit development; however, the West Loch Estates gap group units would be expected to sell within two years.

INTEGRATION OF MARKET
AND GAP GROUP UNITS

The units oriented to the gap group should be designed to blend with the market priced units. While the market priced units would logically be located on all lots which benefit from views or adjoining open spaces, and may be clustered to some extent, it is probable that gap group units will be located on adjoining lots. It is recommended that attention to and design of exterior facades, roof lines, architectural detailing, landscaping, and streetscaping be used to create an overall community in which the market and gap group units are not visibly distinguishable.

* * * * *

We appreciate having the opportunity to assist you. Please call us if you have any questions.

Very truly yours,

JOHN CHILD & COMPANY, INC.

Karen Char, MAI
Executive Vice President

Uson Y. Ewart

Uson Y. Ewart, ASA
Appraiser

I - MARKET ASSESSMENT - MARKET PRICED HOUSING

This section summarizes the study approach and market assessments for market priced units in West Loch Estates.

STUDY APPROACH

The study approach to complete the market assessments included:

- Review of current and projected demand for housing units on Oahu and especially in Ewa and Central Oahu.
- Review of sales absorption rates, sales prices, buyer profiles, and unit characteristics of comparable projects.
- Inventory of competitive under-construction, planned and proposed inventory in all major residential development in Ewa and Central Oahu.
- Review of the competitive strategies of major residential developments in Ewa and Central Oahu.
- Estimate the unit sizes and average sales prices appropriate for West Loch.
- Estimate of average annual absorption of the West Loch single-family units.

REGIONAL BACKGROUND

Trends in Hawaii, Oahu and Ewa were reviewed in terms of population, personal income, employment and economic activity. Significant trends are outlined as follows:

- Resident population of Hawaii is projected to reach 1.3 million by 1990 and 1.5 million by 2005.
- Personal income in Hawaii has increased 8% to 12% annually since 1965 and compares to National levels.
- Employment continues to grow in government, service and retail trades; Hawaii's current unemployment rate of 3.9% compares favorably to National averages.
- Economy of the State is expected to remain strong.
- Resident population of Oahu is expected to reach 954,500 by 2005.

- Most dramatic growth in the past 10 to 15 years occurred in Central Oahu; however, in the next 10 to 20 years growth is expected in Ewa.
- Current population distribution on Oahu includes about 3.0% in Ewa and 5.4% in Central Oahu.

CURRENT HOUSING DEMAND

The historical and current demand for housing on Oahu was reviewed. Significant trends are outlined as follows:

- Since 1981, between 2,500 and 4,000 new housing units have been added annually on Oahu.
- At the same time vacancies have remained relatively low, ranging from 3.1% to 4.7%.
- About 41% of Hawaii's housing inventory is owner-occupied.
- Over the past 15 years, the strongest growth in new housing units has been concentrated in Central Oahu. From 1970 to 1980 occupied housing units in Central Oahu increased from 1,100 to 9,400 and represented 3.7% of Oahu's occupied inventory.
- At the same time occupied housing units in Ewa doubled from 3,600 to 6,300 and represented 2.5% of Oahu's occupied inventory.
- Since 1980, over 23,000 new housing units have been added on Oahu. About 9,400 are single-family units.
- Annual new sales in major projects in Ewa and Central Oahu have averaged as follows:

Mililani	300-400
Makakilo	100-200
Gentry-Waipio	300-400
Village Park	250-300

- Overall, an estimated annual average of 800 to 1,200 units have sold in Ewa and Central Oahu.
- From 1981 to 1985, average sales prices for residential properties on Oahu have remained relatively stable. Since 1986, prices have increased significantly.

- In comparison, average sales prices in Ewa have increased about 5% annually since 1985.

- Average sales prices for single-family residential properties ranged as follows:

	Oahu	Ewa
1981	$191,597	NA
1982	184,227	NA
1983	188,742	NA
1984	187,270	$138,600
1985	188,900	139,100
1986	210,600	144,925
June 1987	261,900	151,850

PROJECTED HOUSING DEMAND

Demand for housing on Oahu is expected to continue to remain strong as population, employment and household incomes continue to increase. Significant trends in projected housing demand are outlined as follows:

- Department of Planning and Economic Development (DPED) projects Oahu's population to increase to 954,000 persons by 2005. The increase in population by 2005 would represent an additional demand for at least 48,200 housing units, assuming an average household size of 2.9 persons on Oahu.

- On Oahu, the primary new demand for housing would be in Ewa and Central Oahu because of new employment opportunities created by:

  - West Beach Resort
  - Expansion of Campbell Industrial Park
  - Barber's Point Harbor
  - Ewa Town Center

- According to DPED, the population of Ewa is expected to double to 83,096 by 2005. However, DPED's estimates of the population in Ewa may be conservative because:

  - Oahu's overall demand for new households could represent at least 48,200 new units.

  - Ewa and Central Oahu would be expected to represent a significant portion of the new demand because of:

    . New job opportunities in Central Oahu.

    . Availability of competitively priced residential properties.

- As a result, historical absorption levels of 800 to 1,200 units would be expected to double to 1,500 to 2,500 units over the next 20 years.

- Overall new housing demand in Ewa and Central Oahu is estimated to be about 42,000 units by 2005. However, considering an average vacancy rate of about 5%, the actual new housing units required would be about 44,200 units by 2005.

EXISTING AND PROJECTED HOUSING INVENTORY

Major residential developments in Ewa and Central Oahu were evaluated in terms of development status. The existing and projected housing inventory is summarized as follows:

- Current unsold inventory in major projects:

	Unsold Inventory	
Project	Single-family	Multi-family
Mililani	506	330
Village Park	231	--
Makakilo	96	24
Total	833	354

- Typical sales prices of the unsold inventory:

	Sales Price Range	
Project	Single-family	Multi-family
Mililani	$115,000-316,000	78,000-160,000
Village Park	135,900-145,200	--
Makakilo	140,000-223,000	78,000-134,000

- Over 52,000 additional units are proposed as follows:

Project	Potential new units
Ewa	
West Loch Estates	1,500
Soda Creek	413
Makakilo	3,000
Kapolei Village	4,000
Puuloa Estates	300-330
Ewa Marina	4,850
West Beach	9,200 [1]
Ewa by Gentry	7,000-8,000
Ewa Town Center	N.A.
Central Oahu	
Mililani Mauka	6,640
Waikele	2,700
Village Park	3,480
Waiawa Ridge	8,000
Total	51,083-52,113

- State land use and County zoning approvals are required to develop the proposed projects. Current approvals permit development as follows:

	Potential new units
Development approvals obtained	3,928
State land use approved	3,265-3,925
State and County approvals required	43,890-44,890

- However, approvals are expected for a significant number of new units. Excluding Ewa Marina, Ewa Town Center and West Beach, 413 under-construction, 14,680 planned and about 22,000 proposed units exist in Ewa and Central Oahu.

- The annual additions could range from about 800 to 3,300 units based on the current schedule. However, new units would be delayed when supply exceeds demand, and 3,300 units are unlikely to be built if the demand were not sufficient to support sales.

[1] Luxury multi-family residential units.

- The proposed price ranges of competitive projects are as follows:

Project	Units	Sales price range
West Beach	9,200	N.A.
Mililani Mauka	5,630	$118,000-280,000
Waikele	8,000	130,000-200,000
Village Park (expansion)	3,480	120,000-195,000
Makakilo	3,000	119,000-190,000
Waiawa Ridge	8,000	130,000-140,000
Ewa by Gentry	7,000-8,000	135,000 (average)
Kapolei Village	4,000	130,000-150,000

ESTIMATED MARKET SUPPORT FOR HOUSING DEVELOPMENT

The projected housing requirements were compared to the projected available inventory. Currently housing supply exceeds demand; however, within one or two years, the existing and planned inventory would be insufficient, and an additional 900 to 1,000 units would be required. However, assuming Waiawa, Mililani Mauka and Ewa by Gentry receive necessary land use and zoning approvals and development proceeded as proposed, the total available inventory would exceed demand from 1990 through about 2000.

As a result, major projects would be expected to delay or decrease the proposed phasing to minimize the surplus inventory. By 2001, housing requirements would be expected to exceed available inventory. Major residential projects would be expected to accelerate development. About 5,000 units in Ewa Marina and Puuloa Estates would be expected to be developed between 2001 and 2005. In addition several thousand residential units could also be developed in Ewa Town Center.

MARKET ASSESSMENT FOR WEST LOCH MARKET UNITS

The market outlook for market priced units in West Loch Estates supports development of the 600 units over the next three or more years. The projected housing requirement is expected to remain relatively strong. The most competitive available inventory would be:

- Ewa by Gentry
- Kapolei Village
- Village Park.

Although Makakilo would be in a position to offer competitively priced units, their new inventory is most likely to be priced higher than West Loch Estates. Mililani is also expected to be priced higher and would not be directly competitive.

Unit Sizes and Prices

Average sales prices for West Loch Estates single-family, units in the $140,000 to $150,000 range would be reasonable based on the current and projected sales prices of competitive developments.

Unit prices would vary based upon unit design and size and lot topography, location and size. The sale prices would range from about $130,000± for small (900#) three-bedroom, 1 1/2 bath units on minimum-sized lots to $190,000± for large (1,800#) four+-bedroom, 2+ bath units on larger view lots.

Absorption

A review of recent absorption rates experienced in comparable residential developments reflect annual sales volumes of 100 to almost 400 units annually. The absorption rates experienced in Mililani, Village Park and Makakilo over the recent past ranged from 100 to 400 units per year.

Considering the projected housing requirements and available inventory, the 600 market priced units would be expected to sell in about three years. The actual sales performance would depend on the timing, pricing and qualifying requirements and subsidies offered at Ewa by Gentry, Village Park and Kapolei Village.

West Loch Estate's estimated market share could range from 15% to 20% of the projected new housing requirement, and could range from about 150 to 250 units annually, depending on the type of units, pricing and marketing efforts, and competitive inventory available.

Unit Mix

If possible and economically viable, presales prior to construction would allow the buyer to select specific unit types to be built. As a result, the unit mix would reflect current market demand. However, if the unit mix must be predetermined, a mix of about 10% two-bedroom, 70% three-bedroom, and 20% four-bedroom units would be recommended based on current market trends.

DESIGN CONSIDERATIONS

Market purchasers are primarily interested in the interior layout of the house. The question that the purchasers must answer is "Can we live in this house?" Therefore, layout would be the most

important, followed by size of the unit and exterior appearance. Two-story units are as desirable as single level units as long as the interior layout is functional and minimizes wasted spaces.

Developers listed the following items in response to a survey covering the elements of a good floor plan:

- Space should be well utilized;
- Kitchen should be well designed and laid out;
- Master bedroom should be roomy;
- Ample cabinet space;
- Efficient traffic patterns within the home;
- Interior layout should be attractive.

Options

The most popular, most widely offered options available to the purchaser includes the following items:

Exterior:
- Lanais
- Garage upgrade
- Roofing upgrade.

Interior:
- Carpet and floor upgrades
- Major appliances
- Window coverings upgrades
- Light fixtures.

The most popular exterior option is the expansion or roofing of the lanai. Once a lanai has been expanded and roofed many families will enclose the area and expand their living area. The second most popular exterior option would be to enclose the carport and have a garage.

The interior home options most often selected are the flooring and carpeting upgrades.

Project/Development Amenities

The project amenities offered in the development are promoted as part of the sales presentation. Amenities such as open space, recreational facilities, and convenience shopping facilities are important and increase the desirability of the project but are not the major factor in the purchase decision.

II - MARKET ASSESSMENT - GAP GROUP HOUSING

This section summarizes the study approach and market assessments for gap group units at West Loch Estates.

STUDY APPROACH

The study approach to complete the gap group market assessments included:

- Review of recent publications covering affordable housing. The articles include:
  - Oahu's Affordable Housing Crisis, Department of Housing and Community Development (DHCD), City & County of Honolulu, dated March 16, 1987.
  - Three-Year Housing Assistance Plan For The City & County of Honolulu, October 1985-September 1988, DHCD, City & County of Honolulu, dated June 1985.
  - Hawaii State Plan: Affordable Housing Issue Paper, Department of Planning and Economic Development, State of Hawaii, dated December 1984.
  - Affordable Housing Issue Paper, Department of Planning and Economic Development (DPED), Hawaii, dated December 1981 - Daly & Associates, Inc.
- Interviews with DHCD and Housing Finance and Development Corporation (HFDC), formerly Hawaii Housing Authority, representatives to evaluate household income levels and housing prices which would qualify as "gap group" based on current definitions.
- Review of absorption rates, sales price range, buyer profile and unit characteristics of comparable projects oriented to the gap group.
- Identification and evaluation of current and proposed competitive residential developments on Oahu sponsored by HFDC, DHCD, or private developers.
- Assessment of the competitiveness of the proposed West Loch Estates project in relation to the current and proposed residential projects on Oahu.

- Estimate of the sales absorption period for the proposed West Loch Estates project based on the absorption rates experienced by recent comparable projects, projected market trends and the competitive position of the West Loch Estates project.

GAP GROUP HOUSING BACKGROUND

Trends in the gap group housing market were reviewed in terms of household incomes, population, and supply and demand relationships on Oahu. Significant trends relating to the gap group market on an island-wide basis are outlined as follows:

- Specific needs of the gap group desiring to become homeowners include: smaller, lower cost "starter homes", and/or reduced initial cost to enable them to qualify to purchase.
- Affordability will remain the primary housing problem on Oahu for the foreseeable future.
- Estimated gap group households on Oahu in 1980 totaled 39,366 households, of which 27,292 were renting.
- Sales prices of homes have risen faster than increases in household income. This has resulted in an increase in the number of gap group households since 1980.
- The number of gap group units developed by the public and private sector has not been sufficient to significantly reduce the overall demand for gap group housing units.
- The problem of housing affordability shows no sign of dissipation in the near future; factors influencing both supply and demand are expected to continue pushing the cost of housing further out of reach of the average household.
- Demand for affordable housing will increase because of increasing numbers of household formations which increase the competition and push prices further upward.
- The outlook from the production (supply) side is not encouraging; rising material costs, coupled with the increasing cost and limited supply of suitable land, can be expected to continue pushing the costs of producing housing units higher.

CURRENT HOUSING DEMAND

The historical and current demand for gap group housing on Oahu was reviewed. Significant trends and findings are outlined as follows:

- There is currently demand for about 30,000 gap group housing units on Oahu.

- The gap group market is an island-wide market. Projects located in reasonable proximity to employment, schools and shopping would effectively compete for the gap group buyer.

- Relatively few gap group projects have been marketed over the recent past. Those which offered a single-family detached unit in a reasonable location attracted more qualified buyers than units available for sale, and consequently, experienced short marketing periods.

- The gap group household is defined in relation to median household income. The DHCD definition is a maximum of 120% of the median household income estimate provided by HUD for metropolitan areas of Hawaii.

- The maximum income levels for typical household sizes under the current DHCD guidelines are as follows:

Gap Group Qualification

Number persons in household	Maximum household income
2	$32,800
3	36,800
4	41,000
5	43,500

- The maximum purchase prices a gap group household could afford, based on household size, income, 10% down payment, and financing at adjustable rates (8.0% interest) and conventional rates (10.0% interest), are summarized as follows:

Gap Group Unit Pricing

	Estimated Maximum Purchase Price	
Number persons in household	Adjustable mortgage	Conventional mortgage
2	$ 93,200	$ 77,900
3	107,300	89,700
4	122,200	102,100
5	131,000	109,500

EXISTING AND PROJECTED HOUSING INVENTORY

While gap group housing developments are generally stand-alone projects, many large residential developments orient a portion of the project inventory to the gap group. A review of major housing projects which are currently being developed or are proposed for development and contain competitive gap group units indicates the following:

- The projects represent 26,940 proposed residential units. About 27% (7,255 units) are estimated as gap group units.

- About 50% (3,628 units) of the gap group units are projected to be single-family units, and 39% (2,850 units) are projected to be multi-family units. The remaining units are either rentals or unspecified at this time.

- About 400 of the 3,600 single-family gap group units have already been marketed and are awaiting building completion.

- The majority of the remaining single-family gap group projects have projected delivery dates in 1990 or beyond.

- About 1,376 gap group units are projected to be marketed from 1987 to 1989.

- About 46% or 632 of the units are single-family units.

- Townhouse units offer a degree of competition, but market patterns have shown that the single-family dwelling is much more desirable to the gap group households which can afford them.

ESTIMATED MARKET SUPPORT FOR GAP GROUP HOUSING

Over 30,000 households on Oahu are in the gap group market. Large numbers of prospective gap group purchasers from a wide geographic area have been attracted to affordably priced units. As a result, the location of the housing units is expected to continue to be a less significant factor within the gap group market, if the right housing product can be offered at an affordable price and the project is not in a very remote or adverse location.

MARKET ASSESSMENT FOR WEST LOCH GAP GROUP UNITS

The projected demand for the 750 gap group housing units in West Loch Estates is very positive. The island-wide market demand for gap group housing is expected to remain very strong over the foreseeable future. While most residential developments in the

Central Oahu/Ewa area will have small portions of their inventory oriented to the gap group market, a sufficient demand would exist to accommodate all anticipated supply. Currently, the major competing gap group project would be Kahi Kani, a proposed 290±-unit single-family project in Whitmore Village.

Unit Sizes and Price

A range of unit sizes in terms of bedroom and bathroom count should be offered. Recommended gap group unit sizes and price ranges are summarized as follows:

Bedroom/ bath count	Net living area excluding carport/garage (])	Estimated selling price
2/1-1½	800- 950	$100,000±
3/2	950-1,050	110,000±
4/2	1,050-1,200	120,000±

Unit Mix

If possible and economically viable, presales prior to construction would allow the buyer to select specific unit types to be built. As a result, the unit mix would reflect current market demand. However, if the unit mix must be predetermined, a mix of about 20% two-bedroom, 60% three-bedroom, and 20% four-bedroom units would be recommended based on current market trends.

Absorption

Comparable single-family development oriented to the gap group market have experienced very rapid absorption rates.

The sales experiences of gap group projects reflect the following absorption data:

- Single-family units generally have much faster absorption rates than other types of projects.
- The average monthly absorption rate for the four single-family projects is 79.2 units.
- The average monthly absorption rate for the four multi-family projects is 23.8 units.
- The absorption rates for single-family units ranges from a low of 10.5 units per month in Makaha to a high of 242 units a month for Hokulele in Kaneohe.

- The range of absorption rates for multi-family dwelling units ranged from a low of 7.5 units a month for Kupono in Waipio to a high of 76 units per month for the Newtown Meadows townhomes.

Gap group units at West Loch Estates could experience a very rapid sell-out such as that experienced in Hokulele; however, an absorption rate of 30± units per month would be reasonable.

Design Consideration

The overriding factor for gap group housing is the size of the house and its interior layout. Storage space is also an important factor for the gap group buyer. Options are generally very limited in comparable projects, and if offered, were very basic; for example, patio for expansion, garage upgrade, or appliance package. Community amenities are typically not important in the purchase decision. Buyers do not want to incur more monthly obligations for maintenance of common areas/recreational facilities. Buyers are very concerned about maximizing their purchasing dollar and meeting monthly debt service obligations. The project should minimize monthly expenses which would be deducted from the maximum loan payments for which purchasers could qualify.

CERTIFICATION

We certify, to the best of our knowledge and belief:

1. Statements of fact in this report are true and correct.

2. Reported analyses, opinions and conclusions are limited only by the reported assumptions and limiting conditions and are our unbiased professional analyses, opinions and conclusions.

3. We have no present or prospective interest in the property which is the subject of this report, and we have no personal interest or bias with respect to the parties involved or the subject matter of this report.

4. Our compensation is not contingent on an action or event resulting from the analyses, opinions, or conclusions in or the use of this report.

5. Our analyses, opinions and conclusions were developed and this report conforms with the requirements of the Code of Professional Ethics and Standards of Professional Practice of the American Institute of Real Estate Appraisers (Appraisal Institute), International Society of Real Estate Appraisers (Society) and American Society of Appraisers (ASA), and the use of this report is subject to the requirements of these professional organizations relating to review by its duly authorized representatives.

6. The Appraisal Institute has a voluntary continuing education program. Karen Char, MAI is currently certified under this program.

7. Uson Y. Ewart made a personal inspection of the property which is the subject of this report.

8. No one other than the undersigned prepared the analysis, opinions and conclusions in this report.

JOHN CHILD & COMPANY, INC.

Karen Char, MAI
Executive Vice President

Uson Y. Ewart

Uson Y. Ewart, ASA
Appraiser

LIMITING CONDITIONS AND UNDERLYING ASSUMPTIONS

This report is subject to the following limiting conditions and underlying assumptions.

Report Format

At the request of the client this report is prepared in summary format. The detailed analysis and supporting documentation are in the files of John Child & Company, Inc.

Property Description

A complete legal description was not reviewed by the appraisers. The appraisers reviewed maps, aerial photographs, site plans, and other descriptive material covering the existing site and proposed development site plans. Conclusions relating to the physical character of the site and its adaptability for residential development is based upon information developed by the various consultants to the City & County of Honolulu and onsite inspections.

Basis of Analysis, Opinions, and Conclusions

The absorption rate conclusions assume the project is marketed as fee simple house-and-lot packages, and reflect the sizes, characteristics, and price ranges concluded as appropriate in the analysis.

The analyses assume the individual developer(s) of West Loch have the experience and expertise to design, construct, and market the individual units on a competitive basis.

The pricing of units oriented to the gap group will vary in relation to median income levels and interest rates. The analysis assumes current gap group pricing levels will remain relatively stable over the projected marketing period.

The analysis, opinions, and conclusions of this report are our informed judgement based on market and economic conditions as of the date of the report.

We have relied on data and information provided by others. We believe the information to be reliable; however, we do not assume any responsibility for the accuracy of information provided by others.

Our analysis, opinions, and conclusions assume:

1. No hidden adverse surface or subsurface, drainage, subsoil, ground water, or geological structures or conditions exist.

2. The client has provided us with all significant, relevant information covering the subject of this report.

No responsibility is assumed for matters legal in character nor for the title which is assumed to be good and merchantable.

Any drawings, maps, photographs, and similar exhibits accompanying this report are included to assist the reader in visualizing the property. No responsibility is assumed for the accuracy of these exhibits.

All applicable public and private zoning codes and regulations, building and health codes, and other factors which affect the utility and value of the property were considered.

Terms of Assignment

Our assistance is limited to preparing this report to be used for your internal information. As a result, in accepting this report, the client specifically agrees that our findings and conclusions are solely for internal decision-making and that our report will not be referred to or presented to any other party for obtaining financing or any other purpose.

We have no obligation to update our report because of events and transactions occurring subsequent to the date of the report.

Neither our fees nor payment were contingent upon the results of the report.

Use of Report

This report may not be reproduced or published without the prior written consent of John Child & Company, Inc., and then only with proper qualification.

This report is valid only if presented in whole, with original photographs and exhibits, if any, and the official seal of John Child & Company, Inc. embossed on the letter of transmittal and certification.

This report conforms with the By-Laws and Regulations of the American Institute of Real Estate Appraisers of the National Association of Realtors, the International Society of Real Estate Appraisers, and the American Society of Appraisers.

The contents of this report, the identity of the appraisers or any reference to John Child & Company, Inc., the American Institute of Real Estate Appraisers, the International Society of Real Estate Appraisers, and the American Society of Appraisers, or to their respective designations may not be disseminated to the public through advertising media, public relations media, news media, sales media, or any other public means of communication.

QUALIFICATIONS OF JOHN CHILD & COMPANY, INC.

John Child & Company, Inc. (John Child) is a professional real estate service corporation which specializes in real estate appraisal and consulting. Founded in 1937, John Child is one of the largest and oldest real estate appraisal and consulting companies in Hawaii. The Company enjoys an established reputation for quality work and professional service. Our reputation is based on our ability to identify and use appropriate and current valuation techniques, our indepth knowledge and analysis of local market conditions and trends, and the extensive training, education and experience of our professional staff.

PROFESSIONAL STAFF

The Company's professional staff has a wide range of real estate experience gained through a range of field experience, professional accomplishments, training and education. As a result, staff members hold designations earned from the major professional organizations.

Our staff members have earned their reputation for quality work and professional service. They qualify as expert witnesses in the courts of Hawaii, California and Massachusetts; instruct and lecture at the University of Hawaii and for various business and professional organizations; serve as review appraisers and arbitrators; and continue to attend courses, seminars and workshops to strengthen their own specialized appraisal skills and education. Our professional staff members include:

- Robert J. Vernon, MAI, CRE, Chairman
- Theodore Wrobel, SREA, ASA, President
- Karen Char, MAI, Executive Vice President
- Craig T. Smith, ASA, Appraiser
- Uson Y. Ewart, ASA, Appraiser
- Paul D. Cool, Appraiser
- Thomas J. Sullivan, Appraiser
- Darlene Ariola, Research Assistant
- Cheryl Emery, Research Assistant
- May Wong, Research Assistant
- Elizabeth Kimura, Research Assistant

All of our professional staff have attended recent seminars on FHLBB R41c and have been involved in preparing appraisal reports according to the FHLBB standards. The education and professional experiences of our staff members are outlined in their accompanying resumes.

SCOPE OF PROFESSIONAL SERVICES

The Company's real estate appraisal and consulting practice includes:

- Appraisal of real estate
- Highest and best use studies
- Market and financial feasibility analyses
- Economic and fiscal impact assessments
- Arbitration
- Litigation support.

Our studies cover a variety of real estate interests including fee simple, leasehold, leased fee and other partial interest or rights. Our extensive experience includes a variety of properties such as:

- Mixed-use developments
- Office buildings
- Shopping centers and retail facilities
- Hotels and resort facilities
- Industrial properties
- Residential rental apartments
- Residential condominium apartments
- Single-family subdivisions
- Special-purpose properties.

SELECTED CLIENTS

Our clients represent a variety of private and public interests. Selected clients include:

Amfac, Inc.
Amfac Property Development Co.
Ashford & Wriston
Bank of America
Bank of Hawaii
B.P. Bishop Estate
Estate of James Campbell
Cades, Schutte, Fleming & Wright
Case & Lynch
Castle & Cooke, Inc.
- Mililani Town, Inc.
- Oceanic Properties

Chaminade College
Citibank, N.A.
City & County of Honolulu
- Department of Housing & Community Development

The Equitable Life Assurance Society of the United States of America
Federal Home Loan Bank Board
Finance Realty
First Federal Savings and Loan Association
First Hawaiian Bank
GECC Financial
Goodsill, Anderson, Quinn & Stifel
Hawaiian Electric
Hawaiian Telephone
Honolulu Federal Savings and Loan Association
Kaiser Development Company
Kokusai-Motorcars Co., Ltd.
Loyalty Development, Loyalty Enterprises, Loyalty Finance Co.
Mitsui Trust & Banking Co., Ltd.
Nature Conservancy
Pacific Construction Co., Ltd.
Peat Marwick Main & Co.
Realty Mortgage Investors of the Pacific (RAMPAC)
Security Pacific Mortgage Corp.
Servco Pacific Inc.
Stark Development Company, Ltd.
State of Hawaii
- Department of Land & Natural Resources

Department of Transportation
U.S. Army
U.S. Navy
U.S. Department of the Interior

KAREN CHAR, MAI, ASA
Executive Vice President

Education

M.B.A., University of Hawaii, 1972.
B.B.A., University of Hawaii, 1970.
Punahou School, 1967.
Various courses sponsored by the American Institute of Real Estate Appraisers.

Professional Associations

Member, American Institute of Real Estate Appraisers (MAI designation).
- Governing Councillor (1986-1988).
- Vice Chairman, National ByLaws Committee (1986-1987).
- Member, National ByLaws Committee (1985); National Admissions Committee (1982-1984).
- Chairman, National Evaluation Report Subcommittee (1982)- Responsible for establishing grading criteria for business reports submitted for demonstration report credit and reviewing failing business reports.
- President (1986), Vice President (1985), Secretary (1984), Honolulu Chapter No. 15.
- Grader, National Board of Examiners (1982-1983) - Responsible for grading business reports and demonstration appraisal reports submitted for credit towards MAI designation.
- Admissions Chairman, Southwest Region (1983).
- Vice Chairman, Thirteenth Pan Pacific Congress of Real Estate Appraisers, Valuers and Counselors (1985-1986).

Senior Member, American Society of Appraisers, (ASA designation, specializing in business valuation).

Member, Panel of Arbitrators of the American Arbitration Association.

Professional Experience

Executive Vice President, John Child & Company, Inc. (1984 to present).
Senior Manager, Peat, Marwick, Mitchell & Co. (1979-1984).
Appraiser, John Child & Company, Inc. (1972-1978).

Court Testimony

Qualified as an expert witness in the valuation of real property and businesses in the Courts of the State of Hawaii.

Certification

The American Institute of Real Estate Appraisers conducts a voluntary program of continuing education for its designated members. MAIs and RMs who meet the minimum standards of this program are awarded periodic educational certification. Karen Char, MAI is certified under this program.

USON Y. EWART, ASA
Appraiser

Education

Bachelor of Architecture, Cornell University, 1972

Punahou School, 1967

Certificate in Advanced Real Estate, University of Hawaii Small Business Management Program.

Courses, workshops, seminars, and examinations including:

- AIREA, Exam 1A-1 Real Estate Appraisal Principles
- AIREA, Exam 1A-2 Basic Valuation Procedures
- AIREA, Standards of Professional Practice
- AIREA, Capitalization Update Seminar
- AIREA, Techniques and Solutions for Contemporary Problems
- AIREA, Capitalization Theory and Techniques, Parts A and B
- AIREA, Case Studies in Real Estate Valuation
- AIREA, Review of R41c and the Recordkeeping Requirements of the FHLBB, 1987
- SREA, Investment Analysis Workshop
- SREA, Construction Costs Estimating Workshop

Professional Associations

Senior Member, American Society of Appraisers in the Real Property Discipline (ASA designation).
- Vice President, Honolulu Chapter No. 16
- Past Secretary, Honolulu Chapter No. 16

Candidate, American Institute of Real Estate Appraisers (candidate for MAI designation).

Professional Experience

Appraiser, John Child & Company, Inc. (1977 to present).

Court Testimony

Qualified as an expert witness in the valuation of real property in the Courts of the State of Hawaii and the Federal District Court in Massachusetts.

APPENDIX I

Preliminary Geotechnical Engineering
Reconnaissance
West Loch Estates Development
Honouliuli, Oahu, Hawaii

by

C.W. ASSOCIATES, INC.
dba GEOLABS-HAWAII

August 1987

PRELIMINARY GEOTECHNICAL ENGINEERING
RECONNAISSANCE
WEST LOCH ESTATES DEVELOPMENT
HONOULIULI, OAHU, HAWAII

W.O. 1889-00 AUGUST 3, 1987

PREPARED FOR

R.M. TOWILL CORPORATION

C.W. ASSOCIATES INC.
dba GEOLABS-HAWAII
2006 KALIHI STREET
OAHU, HAWAII 96819

CW ASSOCIATES. INC. dba
GEOLABS-HAWAII
Geology Soils and Foundation Engineering

August 3, 1987
W.O. 1889-00
(Dk. No. 35)

R.M. Towill Corporation
677 Ala Moana Blvd., Suite 1016
Honolulu, Hawaii 96813

Attention: Mr. Bruce Tsuchida

Gentlemen:

Submitted herewith is our report entitled "Preliminary Geotechnical Engineering Reconnaissance, West Loch Estates Development, Honouliuli, Oahu, Hawaii".

Our work was performed in general accordance with the scope of services outlined in our proposal of July 9, 1987.

Detailed discussions and recommendations are contained in the body of the report. If there is any point that is not clear, please feel free to contact us.

Very truly yours,

C.W. ASSOCIATES INC.
dba GEOLABS-HAWAII

Clayton S. Mimura

Clayton S. Mimura, P.E.
Vice-President

CSM:lf

2006 Kalihi Street • Honolulu, Hawaii 96819
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PRELIMINARY GEOTECHNICAL ENGINEERING RECONNAISSANCE

WEST LOCH ESTATES DEVELOPMENT

HONOLULU, OAHU, HAWAII

W.O. 1889-00 AUGUST 3, 1987

SUMMARY OF RECOMMENDATIONS

Based on our boring, probing and laboratory test data, the preliminary findings indicate that the proposed golf course areas and the lower northwestern portion of the Increment 2 housing area consist primarily of medium stiff to very soft clayey silt. Artesian groundwater conditions may also exist in the lower flood plain areas.

Most of the Increment 1 and 2 housing areas consist primarily of low to moderately expansive silty clay to clay. Coralline deposits were encountered at shallow depths in the southeastern quarter of the Increment 2 housing area and may provide a good source of low-expansive structural fill.

A more detailed geotechnical engineering evaluation should be conducted at the site to provide design criteria for house foundation and pavement, and pertinent subsurface soil data for site grading, drainage channel design and utility excavation considerations.

The text of this report should be referred to for detailed and special design recommendations.

INTRODUCTION

This report presents the results of a preliminary geotechnical engineering reconnaissance performed for the subject project.

The purpose of the preliminary geotechnical exploration was to provide general soil data in the area to aid in the master planning of the development. Of particular concern would be:

a. to identify the general occurrence of expansive soils, if any, the thickness and characteristics of soft compressible deposits, and hard material that may be difficult to excavate as these would affect the development costs;

b. to evaluate the potential of subsurface capillary rise of brackish water to aid in golf course landscape design; and

c. to provide soil data for golf course irrigation and water percolation considerations.

The scope of our reconnaissance included:

1. Review of available soil data from previous investigations in other adjacent developments.

2. Compilation of general information from soil and geologic maps in the general project area.

3. Field reconnaissance including sampling by 15 hand-auger probes to depths of approximately 0.5 to 5 feet below the existing ground surface, and the observation of exposed geologic materials in the project area.

4. Drilling and sampling of 14 borings to depths of 10.0 to 47 feet below the existing ground surface. Continuous penetration test in lieu of drilling was utilized for the lower portion of the deep borings in soft formation.

5. Laboratory testing of selected samples obtained.

6. Engineering evaluation of the field and laboratory data.

7. Development of a general engineering geologic soil map and general anticipated geotechnical properties of the geologic materials at the proposed residential, golf course and park areas.

PROJECT DESCRIPTION

The proposed project site is located south of Waipahu, northeast of Ewa, and on the western flank of West Loch (Plate 1).

The proposed West Loch Estates may consist of 157 acres of golf course, 32 acres of park area and 231 acres of residential development (Plate 2).

It is our understanding that the residential development will be carried out in two increments. Increment 1 (northern portion) consists of 65.8 acres of land, and Increment 2 (southern portion) consists of 165.8 acres of land.

Preliminary grading plans were not available at the time of our study.

SITE DESCRIPTION

The project area is located in the Honouliuli District of Oahu, and is located between Waipahu and the Ewa Community (Plate 1).

Increment 1 of the proposed residential development occupies the northern portion of the site, and is bounded by Fort Weaver Road on the west, Waipahu and part of the proposed park development and West Loch on the east. In this area, the topography is gently sloping down to the southeast towards the ocean (West Loch). The ground elevations generally vary from about 65 feet near the Farrington Highway/Fort Weaver Road intersection to about 25 feet near the southwestern edge of the project site. In general, most of the area is an abandoned cane field with unmaintained dirt roads and drainage ditches.

Increment 2 of the proposed residential development occupies the southwestern portion of the site, and is bounded by Fort Weaver Road on the west, the old Oahu Railway easement on the southeast and the

Honouliuli Stream flood plain on the north. In general, the topography in this area is undulating, sloping eastward towards the ocean. West-east and north-south trenching remnants of old sea bluffs (approximately 30 feet high) separate the northern lower (elevations 14 to 26 feet) one-third of the site from the remaining Increment 2 project area. Most of the area is used for growing sugarcane with many haul roads, drainage ditches and irrigation trenches extending through out the site.

The proposed golf course area is mainly located in the Honouliuli Stream flood plain, and separates the proposed Increment 1 and 2 project sites. Fort Weaver Road subdivides the proposed golf course into mauka and makai portions. The Honouliuli Stream meanders approximately along the center of the flood plain, which is mainly occupied by single family residences, grass land, swamps and water ponds. Presently, uncontrolled placement of fill and rubble is in progress on the mauka side of Fort Weaver Road, approximately 400 to 500 feet northeast of the Honouliuli Stream bridge crossing and the stream. The ground elevations generally vary from about 35 feet near the northern end of the mauka golf course area to 2 feet near the mouth of the Honouliuli stream.

RESULTS OF GEOTECHNICAL RECONNAISSANCE

Field Reconnaissance

The preliminary field reconnaissance consisted of surface geologic observation, logging of existing slope cuts and trench exposures, fifteen (15) auger probes to depths of 0.5 to 5 feet below the existing ground surface and drilling of fourteen (14) borings to 10.0- to 47.0-foot depths at the approximate locations shown on the Site Plan, Plate 2.

Detailed descriptions of the soils encountered in the probings and borings are shown on the Boring and Probing Logs in Appendix A.

Soil Conditions

Based on the preliminary field reconnaissance, the geologic soil types in the project site may be generalized into three distinct groups as follows and as shown on Plate 2.

Recent Alluvium

Recent alluvial deposits were encountered mainly in lower areas at the Honouliuli Stream flood plain and near the coast, generally in the golf course, park, and the lower northern portion of the Increment 2 housing area. The recent alluvium encountered consisted primarily of medium stiff to very soft, brown to dark gray clayey silt. At higher elevations (approximately 40 feet, at B-13 location) dense silty sand and bouldery deposits were encountered at shallow depths (approximately 6 feet below existing ground surface).

Older Alluvium

Older alluvial deposits were encountered mainly in the Increment 1 and 2 housing areas and a small central portion of the mauka golf course area. The alluvium sampled primarily consisted of medium stiff to hard, brown silty clay to clay.

In general, most of the clays can be classified as low to moderately expansive. In some boring locations (eg. B-5 and B-10), clays with higher shrink-swell potential were encountered near the ground surface, and at 10 to 15 feet depth. Localized soft zones in the clayey deposit were encountered beneath drainage ditches and in areas where water leaked from irrigation hoses.

Coral Formation

Cemented to uncemented coralline sand and gravel were exposed along portions of the haul road cut slope and drainage trench excavation at the southern portion of the Increment 2 housing area. In the same general area, Boring B-7 encountered dense to hard coralline deposit at about 12 feet below existing ground surface. Therefore, it appears that coralline deposits may occur at relatively shallow depths (5 to over 12 feet) in the southeastern portion of the Increment 2 housing area.

Groundwater was encountered in Boring Nos. 3, 9, 10, 11, 12 and 14 at about 1.5 to 8.2 feet below the existing ground level. Artesian conditions may exist at the lower areas at and near the flood plain. Rises in groundwater levels are anticipated during and after periods of heavy rainfall.

DISCUSSION AND RECOMMENDATION

Based on the preliminary borings, probings and laboratory tests performed, and from a soil engineering point of view, the site is, in general, suitable for the proposed residential and golf course development. However, because of the presence of soft ground, high groundwater levels and low to moderately expansive soils in various parts of the project site, special design criteria for house foundation, golf course, drainage channel and utility excavation may be required.

In the general vicinity of the flood plain, some very soft soils and high water levels (1.5 to 8.2 feet below existing ground) were noted in the golf course and the lower portion of the Increment 2 housing areas. Generally, site filling could cause settlement due to compression of the soft subsoils, therefore, special considerations and design procedures could be required for golf course site grading, drainage channel location, and single family housing foundation.

The preliminary borings encountered variable soil and groundwater conditions at the proposed golf course areas. Additional subsurface data is required in order to provide soil data for golf course irrigation considerations and to evaluate the potential of subsurface capillary rise of brackish water in the proposed golf course areas.

The near surface soils over most of the proposed Increment 1 and 2 housing areas mainly consist of hard silty clay to clay having low to moderate swelling potential. Easy excavation and conventional site grading procedures are anticipated for earthwork in these areas. Some of these soils may be moderately to highly expansive and could require special procedures for the house foundation design, such as deep footings, subgrade saturation or capping with non-expansive soil.

Coralline deposit was encountered at shallow depths (4 to over 12 feet) in the southeastern quarter of the Increment 2 housing area. The coral may be hard and may require moderately hard ripping for excavation. The excavated coral material can provide a good source of low-expansive structural fill. Cavities of varying sizes are often found in coral formation. If encountered, backfilling of the cavities with grout or compacted fill may be required.

A more detailed geotechnical engineering evaluation should be conducted at the development site to:

a. better delineate areas of highly expansive clays;

b. better delineate the extent of soft ground at and near the Honouliuli Stream flood plain and the shoreline, particularly in the northern quarter of the Increment 2 housing area;

c. provide recommendations for single family foundation design and utility excavations in the proposed housing areas;

d. provide design recommendations for site mass grading and slope stability evaluation of future slope cut, and/or embankment fill, if required, for both the proposed golf course and housing developments;

e. provide fill placement and surcharge recommendations in soft ground areas within the project site;

f. evaluate the feasibility and provide preliminary design recommendations for drainage channels and utility excavations in the golf course areas. Location of the channels is not known at this time, and will be dependent upon the encountered ground condition; and

g. carry out visual observation of the existing uncontrolled filling area near Fort Weaver Road and Honouliuli Stream Bridge, and to provide comments on disposal of existing fill and rubble materials, or evaluation of their re-use potential.

LIMITATIONS

Our services consist of professional opinions and recommendations made in accordance with generally accepted soil and foundation engineering principles and practices. This warranty is in lieu of all other warranties either expressed or implied.

The analysis and recommendations submitted in this report are based on our site reconnaissance, soil information from the test pits and laboratory test data obtained for this study.

Unanticipated soil conditions are commonly encountered and cannot be fully determined by taking soils samples. Unforeseen conditions, such as expansive soil and soft spots, may occur in localized areas and require additional probing or corrections in the field. Therefore, additional expenditures may be needed during construction to attain a properly constructed project. Some contingency fund is thus recommended to accommodate these possible costs.

This report has been prepared in order to assist the engineer and architect in the preparation of the master plans of this project.

The following plates are attached and complete this report:

Appendix A	-	Field Exploration
Plates A-1.1 thru A-17	-	Boring and Probing Logs
Appendix B	-	Laboratory Testing
Plates B-1 thru B-7	-	Laboratory Test Data

Plate 1 - Project Location Map

Plate 2 - Site Plan

-oOoOoOoOoOo-

Respectfully submitted,

C.W. ASSOCIATES, INC.
dba GEOLABS-HAWAII

By Clayton S. Mimura
Clayton S. Mimura, P.E.

CSM:JK:lf

CLAYTON S. MIMURA
REGISTERED PROFESSIONAL ENGINEER
No. 4176
HAWAII, U.S.A.

APPENDIX A

Field Exploration

The subsurface conditions at the site were explored by drilling fourteen (14) borings to depths of 10 to 47 feet below the existing ground surface at the approximate locations shown on the Site Plan, Plate 2. Two truck-mounted rigs were used to drill the borings.

Fifteen (15) auger probes were hand-driven to depths of 0.5 to 5 feet below the existing ground surface at the approximate locations shown on the Site Plan, Plate 2.

The soils encountered in the borings and probings were classified by visual and textural examination in the field by our engineer who continuously monitored the drilling operations. The classifications were further reviewed by visual observation and testing in the laboratory. All soils were classified in general conformance with the Unified Soil Classification System. A summary of the materials encountered are presented on the Boring and Probing Logs, Plates A-1.1 through A-17.

Soil samples were obtained from the borings by driving a 2-inch standard split-spoon sampler or a 2.5-inch I.D. split barrel sampler with a 140-pound hammer free falling 30 inches. The blow counts to drive the sampler the last 12 inches are shown on the Boring Logs at the appropriate sample depths.

Three (3) standpipe piezometers were installed in 3 boreholes (B-3, B-9 and B-10) to allow monitoring of groundwater levels. The piezometer generally consisted of a three-fourths of an inch PVC pipe with a slotted section of 10 to 15 feet from the bottom of the pipe. Backfill around and below the slotted section consisted of manufactured sand (#20). Above the slotted section, a one-foot thick bentonite seal was placed and then grout backfill were applied.

BORING 1

Surface elevation 32'±*

● Moisture content
▼ Blows per foot

Sample — Dry density (pcf) — Depth (feet) — Graph

50 40 30 20 10 0

Sample	Depth (feet)	SOIL DESCRIPTION	U S C
		BROWN SILTY CLAY, SOFT, DRY	CL
		BROWN SILTY CLAY WITH TRACES OF SAND, VERY HARD, DRY	CL
106	5	BROWN SILTY CLAY WITH TRACES OF SAND, HARD, DRY	CL
83	10	GRADES TO MOIST	
84	15		

BORING TERMINATED AT 16.0 FEET ON JULY 17, 1987

GROUNDWATER NOT ENCOUNTERED

*ELEVATIONS ESTIMATED FROM TOPOGRAPHIC SURVEY MAP (UNDATED) BY R.M. TOWILL CORPORATION RECEIVED ON AUGUST 5, 1987

LEGEND

- I 2.0" O.D. split-spoon sample
- II Undisturbed ring sample
- III Disturbed ring sample
- IV Core sample
- Ts Shelby tube sample
- P Sampler pushed

Plastic limit
Liquid limit
Natural water content
Water level
T Torvane Shear (psf)
FV Field Vane Shear (psf)
Driving energy: 140 lb. wt., 30" drop

LOG OF BORING

GEOLABS—HAWAII
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W.O. 1889-00 JULY 1987

PLATE A-1.1

BORING 2

Surface elevation 46'±*

● Moisture content
▼ Blows per foot

Sample — Dry density (pcf) — Depth (feet) — Graph

50 40 30 20 10 0

Sample	Depth (feet)	SOIL DESCRIPTION	U S C
		CORAL GRAVEL AND SAND, MEDIUM DENSE, DRY (ROAD FILL)	GP
		BROWN CLAY WITH TRACES OF SAND, HARD, MOIST	CH
65	5		
	10		
37/.5' HAMMER BOUNCE	15		

BORING TERMINATED AT 15.5 FEET ON JULY 17, 1987

GROUNDWATER NOT ENCOUNTERED

LEGEND

- I 2.0" O.D. split-spoon sample
- II Undisturbed ring sample
- III Disturbed ring sample
- IV Core sample
- Ts Shelby tube sample
- P Sampler pushed

Plastic limit
Liquid limit
Natural water content
Water level
T Torvane Shear (psf)
FV Field Vane Shear (psf)
Driving energy: 140 lb. wt., 30" drop

LOG OF BORING

GEOLABS—HAWAII
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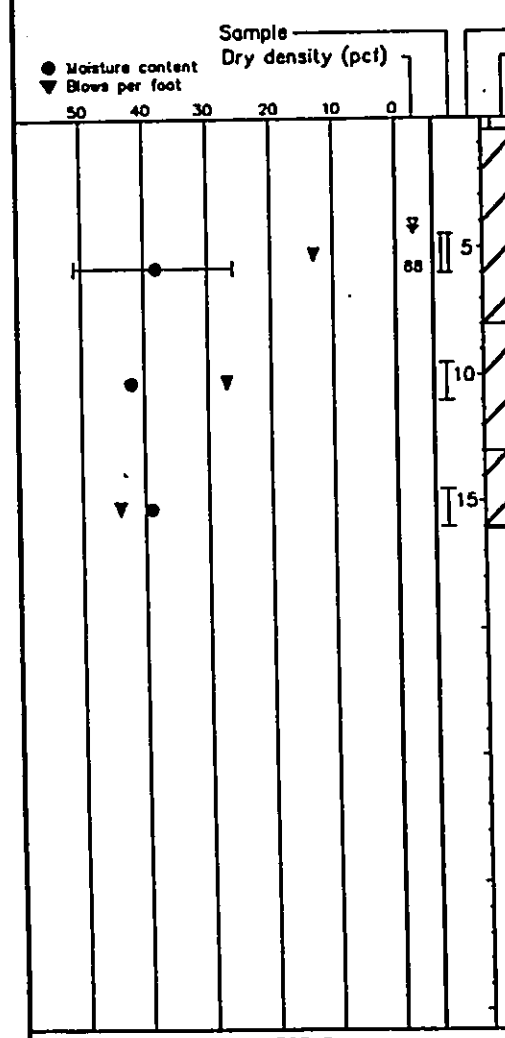
PLATE A-2.1

BORING 3

Surface elevation 20'±•



SOIL DESCRIPTION	USC
BROWN SILTY CLAY, SOFT, MOIST	CL/CH
BROWN CLAY, STIFF, MOIST	CH
MOTTLED BROWN CLAY, VERY STIFF, MOIST	CH
MOTTLED GRAYISH BROWN CLAY, HARD, MOIST	CH

BORING TERMINATED AT 16.0 FEET ON JULY 17, 1987

GROUNDWATER LEVEL AT:

DEPTH	HOURS	DATE
4.2 FT	1432	07/17/87

LEGEND

- I 2.0" O.D. split-spoon sample
- II Undisturbed ring sample
- III Disturbed ring sample
- IV Core sample
- Ts Shelby tube sample
- P Sampler pushed

Plastic limit
Liquid limit
Natural water content
Water level
T Torvane Shear (psf)
FV Field Vane Shear (psf)
Driving energy: 140 lb. wt., 30" drop

LOG OF BORING

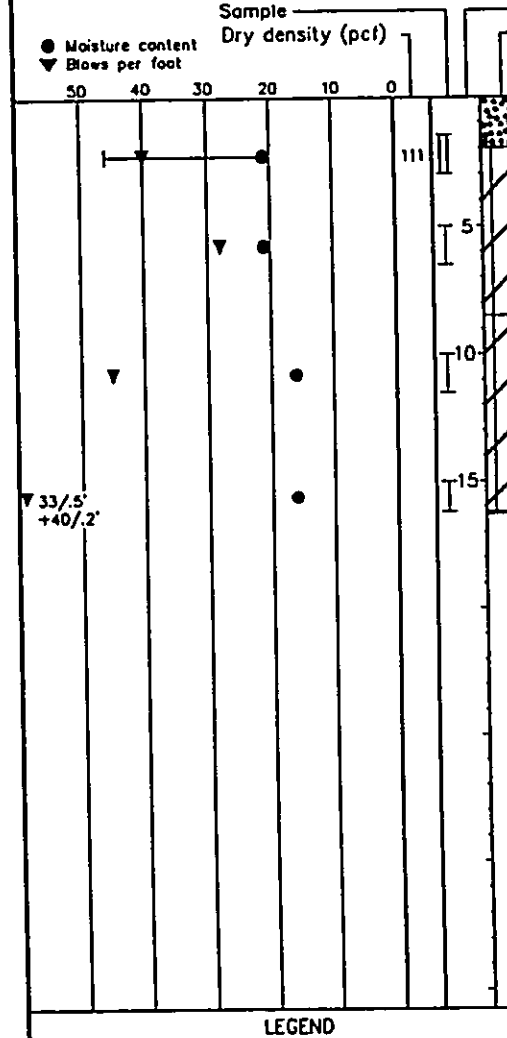
GEOLABS—HAWAII
Foundation Engineering • Soil Engineering • Geology

W.O. 1889-00 JULY 1987

PLATE A-3.1

BORING 4

Surface elevation 52'±•



SOIL DESCRIPTION	USC
WHITE SANDY CORAL GRAVEL, DENSE, DRY (FILL)	GP/GM
BROWN SILTY CLAY, HARD, MOIST	CL
GRADES TO VERY STIFF	
BROWN SILTY CLAY WITH FINE SAND, HARD, MOIST TO DRY	CL/CH

BORING TERMINATED AT 16.2 FEET ON JULY 20, 1987

GROUNDWATER NOT ENCOUNTERED

LEGEND

- I 2.0" O.D. split-spoon sample
- II Undisturbed ring sample
- III Disturbed ring sample
- IV Core sample
- Ts Shelby tube sample
- P Sampler pushed

Plastic limit
Liquid limit
Natural water content
Water level
T Torvane Shear (psf)
FV Field Vane Shear (psf)
Driving energy: 140 lb. wt., 30" drop

LOG OF BORING

GEOLABS—HAWAII
Foundation Engineering • Soil Engineering • Geology

W.O. 1889-00 JULY 1987

PLATE A-4.1

BORING 5

Surface elevation 52'±.

● Moisture content
▼ Blows per foot
Sample — Dry density (pcf) — 50 40 30 20 10 0
Depth (feet) — Graph

SOIL DESCRIPTION	U S C
BROWN SILTY CLAY WITH TRACE OF ROOTLETS, HARD, DRY	CH/CL
BROWN TO MOTTLED LIGHT BROWN SILTY CLAY, HARD, DRY	CH/CL
BROWN SILTY CLAY WITH GRAVEL AND COBBLES, HARD, DRY	CH/CL
BORING TERMINATED AT 15.4 FEET ON JULY 20, 1987 GROUNDWATER NOT ENCOUNTERED	

96 pcf
▼ 35/.5' +50/.2'
▼ 50/.3' ▼ 20/.1'
▼ 70/.4'
Depth: 5, 10, 15

LEGEND
I 2.0" O.D. split-spoon sample
II Undisturbed ring sample
III Disturbed ring sample
I Core sample
Ts Shelby tube sample
P Sampler pushed

Plastic limit
Liquid limit
Natural water content
Water level
T Torvane Shear (psf)
FV Field Vane Shear (psf)
Driving energy: 140 lb. wt., 30" drop

LOG OF BORING

GEOLABS—HAWAII
Foundation Engineering • Soil Engineering • Geology

W.O. 1889-00 JULY 1987

PLATE A-5.1

BORING 6

Surface elevation 28'±.

● Moisture content
▼ Blows per foot
Sample — Dry density (pcf) — 50 40 30 20 10 0
Depth (feet) — Graph

SOIL DESCRIPTION	U S C
MOTTLED BROWN SILTY CLAY WITH DECOMPOSED GRAVEL, HARD, DRY	CH/CL
BROWN SILTY CLAY WITH BASALT GRAVEL, VERY STIFF TO HARD, MOIST BOULDER AT 7.0 TO 8.0 FT.	CL/CH
CONTAINS BOULDERS FROM 14.5 FT. GRADES TO GRAYISH BROWN	
BORING TERMINATED AT 17.2 FEET ON JULY 20, 1987 GROUNDWATER NOT ENCOUNTERED	

107 pcf
▼ 27/.5' +35/.2'
▼ 35/.2'
Depth: 5, 10, 15

LEGEND
I 2.0" O.D. split-spoon sample
II Undisturbed ring sample
III Disturbed ring sample
I Core sample
Ts Shelby tube sample
P Sampler pushed

Plastic limit
Liquid limit
Natural water content
Water level
T Torvane Shear (psf)
FV Field Vane Shear (psf)
Driving energy: 140 lb. wt., 30" drop

LOG OF BORING

GEOLABS—HAWAII
Foundation Engineering • Soil Engineering • Geology

W.O. 1889-00 JULY 1987

PLATE A-6.1

BORING 7

Moisture content
Blows per foot
50 40 30 20 10 0
Sample
Dry density (pcf)
Depth (feet)
Graph
Surface elevation 20'±.

SOIL DESCRIPTION	USC
BROWN SILTY CLAY WITH TRACES OF SAND, VERY STIFF, SLIGHTLY MOIST	CL/CH
BROWN SILTY CLAY WITH SOME SAND AND GRAVEL, MEDIUM STIFF, MOIST	CL/CH
TANNISH WHITE CORAL GRAVEL AND SAND, VERY DENSE	GW/GP
BORING TERMINATED AT 15.0 FEET ON JULY 20, 1987 GROUNDWATER NOT ENCOUNTERED	

84
41/.5" HAMMER BOUNCE
5
10
15

LEGEND
I 2.0" O.D. split-spoon sample
II Undisturbed ring sample
III Disturbed ring sample
IX Core sample
IS Shelby tube sample
P Sampler pushed

Plastic limit
Liquid limit
Natural water content
Water level
T Torvane Shear (psf)
FV Field Vane Shear (psf)
Driving energy: 140 lb. wt., 30" drop

LOG OF BORING

GEOLABS—HAWAII
Foundation Engineering • Soil Engineering • Geology

W.O. 1889-00 JULY 1987

PLATE A-7.1

BORING 8

Moisture content
Blows per foot
50 40 30 20 10 0
Sample
Dry density (pcf)
Depth (feet)
Graph
Surface elevation 62'±.

SOIL DESCRIPTION	USC
BROWN SILTY CLAY, DRY	CL/CH
BROWN SILTY CLAY WITH TRACES OF SAND, VERY HARD, DRY	CL/CH
BORING TERMINATED AT 14.8 FEET ON JULY 20,1987 GROUNDWATER NOT ENCOUNTERED	

67
102
37/.5" HAMMER BOUNCE
50/.3"
5
10
15

LEGEND
I 2.0" O.D. split-spoon sample
II Undisturbed ring sample
III Disturbed ring sample
IX Core sample
IS Shelby tube sample
P Sampler pushed

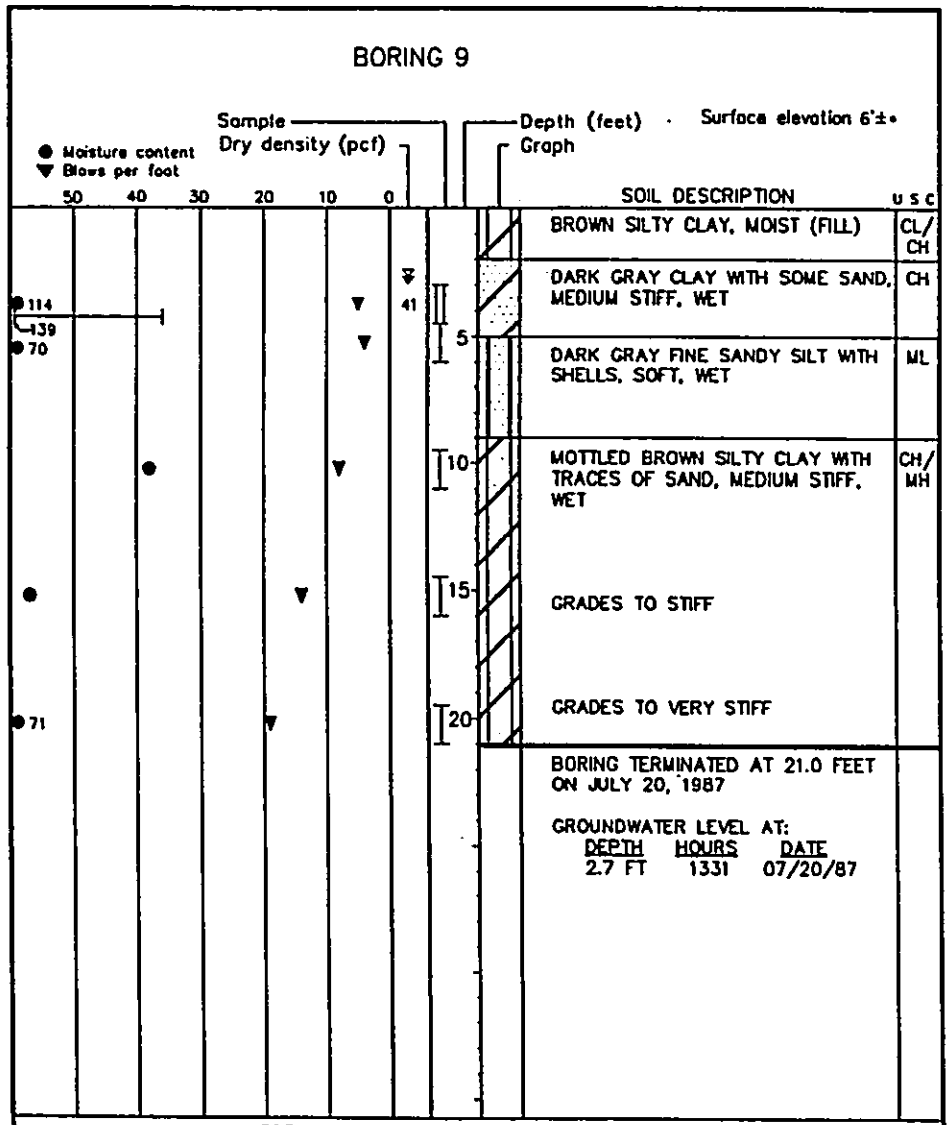
Plastic limit
Liquid limit
Natural water content
Water level
T Torvane Shear (psf)
FV Field Vane Shear (psf)
Driving energy: 140 lb. wt., 30" drop

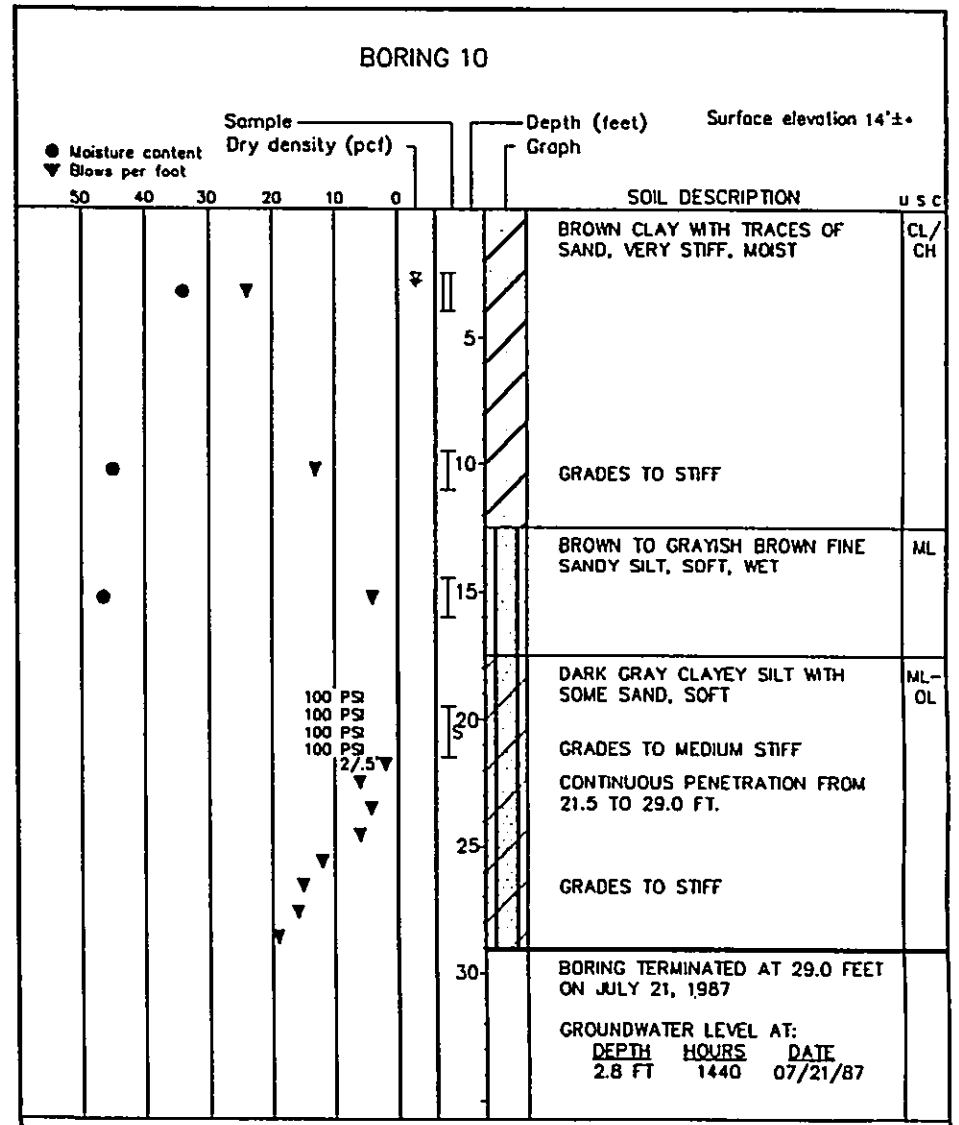
LOG OF BORING

GEOLABS—HAWAII
Foundation Engineering • Soil Engineering • Geology

W.O. 1889-00 JULY 1987

PLATE A-8.1


BORING 9
Sample
Dry density (pcf)
Depth (feet)
Graph
Surface elevation 6'±
Moisture content
Blows per foot
50 40 30 20 10 0
SOIL DESCRIPTION
USC
BROWN SILTY CLAY, MOIST (FILL)
CL/CH
DARK GRAY CLAY WITH SOME SAND, MEDIUM STIFF, WET
CH
DARK GRAY FINE SANDY SILT WITH SHELLS, SOFT, WET
ML
MOTTLED BROWN SILTY CLAY WITH TRACES OF SAND, MEDIUM STIFF, WET
CH/MH
GRADES TO STIFF
GRADES TO VERY STIFF
BORING TERMINATED AT 21.0 FEET ON JULY 20, 1987
GROUNDWATER LEVEL AT:
DEPTH HOURS DATE
2.7 FT 1331 07/20/87
114
139
70
41
71
5
10
15
20
LEGEND
2.0" O.D. split-spoon sample
Undisturbed ring sample
Disturbed ring sample
Core sample
Shelby tube sample
P Sampler pushed
Plastic limit
Liquid limit
Natural water content
Water level
T Torvane Shear (psf)
FV Field Vane Shear (psf)
Driving energy: 140 lb. wt., 30" drop
LOG OF BORING
GEOLABS-HAWAII
W.O. 1889-00
JULY 1987
PLATE A-9.1


BORING 10
Sample
Dry density (pcf)
Depth (feet)
Graph
Surface elevation 14'±
Moisture content
Blows per foot
50 40 30 20 10 0
SOIL DESCRIPTION
USC
BROWN CLAY WITH TRACES OF SAND, VERY STIFF, MOIST
CL/CH
GRADES TO STIFF
BROWN TO GRAYISH BROWN FINE SANDY SILT, SOFT, WET
ML
DARK GRAY CLAYEY SILT WITH SOME SAND, SOFT
ML-OL
GRADES TO MEDIUM STIFF
CONTINUOUS PENETRATION FROM 21.5 TO 29.0 FT.
GRADES TO STIFF
BORING TERMINATED AT 29.0 FEET ON JULY 21, 1987
GROUNDWATER LEVEL AT:
DEPTH HOURS DATE
2.8 FT 1440 07/21/87
100 PSI
100 PSI
100 PSI
100 PSI
2/.5
5
10
15
20
25
30
LEGEND
2.0" O.D. split-spoon sample
Undisturbed ring sample
Disturbed ring sample
Core sample
Shelby tube sample
P Sampler pushed
Plastic limit
Liquid limit
Natural water content
Water level
T Torvane Shear (psf)
FV Field Vane Shear (psf)
Driving energy: 140 lb. wt., 30" drop
LOG OF BORING
GEOLABS-HAWAII
W.O. 1889-00
JULY 1987
PLATE A-10.1

BORING 11

Surface elevation 24'±

● Moisture content
▼ Blows per foot

Sample — Dry density (pcf) — 50 40 30 20 10 0

Depth (feet) — Graph

SOIL DESCRIPTION	U S C
BROWN SILTY CLAY, MEDIUM STIFF TO SOFT, MOIST	CL/CH
BROWN CLAY WITH TRACES OF SAND, HARD TO VERY HARD, MOIST	CL/CH
GRADES TO VERY STIFF	
GRADES TO VERY HARD	
BORING TERMINATED AT 16.0 FEET ON JULY 21, 1987	

GROUNDWATER LEVEL AT:

DEPTH	HOURS	DATE
8.2 FT	1051	07/21/87

79 59

5 10 15

LEGEND

I 2.0" O.D. split-spoon sample
II Undisturbed ring sample
Disturbed ring sample
Core sample
Shelby tube sample
P Sampler pushed

Plastic limit
Liquid limit
Natural water content
Water level
T Torvane Shear (psf)
FV Field Vane Shear (psf)
Driving energy: 140 lb. wt., 30" drop

LOG OF BORING

GEOLABS—HAWAII
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W.O. 1889-00 JULY 1987

PLATE A-11.1

BORING 12

Surface elevation 5'±

● Moisture content
▼ Blows per foot

Sample — Dry density (pcf) — 50 40 30 20 10 0

Depth (feet) — Graph

SOIL DESCRIPTION	U S C
BROWN CLAY, STIFF, WET	CH
DARK BROWN SANDY SILT TO SILTY SAND, VERY LOOSE, WET	SM/ML
DARK BROWN CLAYEY SILT, VERY SOFT, WET	MH/OH
DARK GRAY CLAYEY SILT, VERY SOFT, WET	MH/OH
SAMPLER AND HAMMER DROPPED FROM 27.0 TO 37.0 FT.	

84 64 59 65 1/4.0'

5 10 15 20 25 30 35

WT. OF HAMMER

LEGEND

I 2.0" O.D. split-spoon sample
II Undisturbed ring sample
Disturbed ring sample
Core sample
Shelby tube sample
P Sampler pushed

Plastic limit
Liquid limit
Natural water content
Water level
T Torvane Shear (psf)
FV Field Vane Shear (psf)
Driving energy: 140 lb. wt., 30" drop

LOG OF BORING

GEOLABS—HAWAII
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W.O. 1889-00 JULY 1987

PLATE A-12.1

BORING 12 (CONTINUED)

Surface elevation

● Moisture content
▼ Blows per foot

Sample
Dry density (pcf)
50 40 30 20 10 0

Depth (feet)
Graph

SOIL DESCRIPTION	U S C
DARK GRAY CLAYEY SILT, VERY SOFT, WET	MH/OH

40
45

BORING TERMINATED AT 47.0 FEET ON JULY 21, 1987

GROUNDWATER LEVEL AT:

DEPTH	HOURS	DATE
1.5 FT	1130	07/21/87

LEGEND

I 2.0" O.D. split-spoon sample
II Undisturbed ring sample
III Disturbed ring sample
IV Core sample
V Shelby tube sample
P Sampler pushed

Plastic limit
Liquid limit
Natural water content
Water level
T Torvane Shear (psf)
FV Field Vane Shear (psf)
Driving energy: 140 lb. wt., 30" drop

LOG OF BORING

GEOLABS—HAWAII
Foundation Engineering • Soil Engineering • Geology

W.O. 1889-00 JULY 1987

PLATE A-12.2

BORING 13

Surface elevation 42'±•

● Moisture content
▼ Blows per foot

Sample
Dry density (pcf)
50 40 30 20 10 0

Depth (feet)
Graph

SOIL DESCRIPTION	U S C
BROWN SILT WITH SAND AND SOME CLAY, SOFT TO MEDIUM STIFF, MOIST	ML
BOULDERS AND COBBLES	
BROWN SILTY SAND WITH GRAVEL, DENSE, MOIST	SM

5
10

BORING TERMINATED AT 11.0 FEET ON JULY 21, 1987

GROUNDWATER NOT ENCOUNTERED

LEGEND

I 2.0" O.D. split-spoon sample
II Undisturbed ring sample
III Disturbed ring sample
IV Core sample
V Shelby tube sample
P Sampler pushed

Plastic limit
Liquid limit
Natural water content
Water level
T Torvane Shear (psf)
FV Field Vane Shear (psf)
Driving energy: 140 lb. wt., 30" drop

LOG OF BORING

GEOLABS—HAWAII
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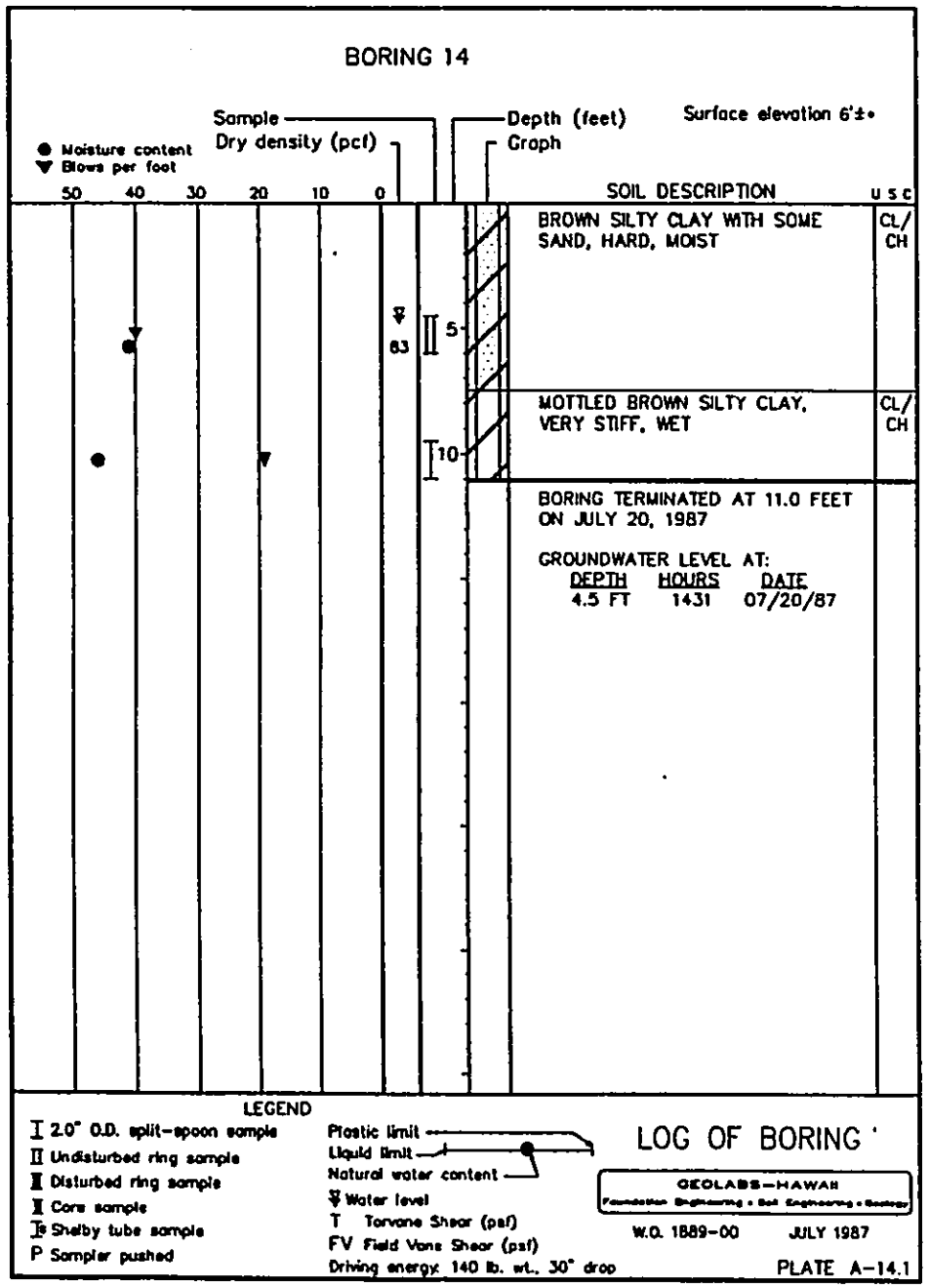
W.O. 1889-00 JULY 1987

PLATE A-13.1



PROBING LOGS

Proposed West Loch Estate
Honouliuli, Ewa, Oahu, Hawaii
W.O. 1889-00 August 1987

Probe No.	Depth (Feet)	Description
P-1	0-1.0	Brown Silty Clay, dry (Moisture Content = 25%)
	1.0-3.0	Dark Brown Silty Clay Medium Stiff to Stiff, moist (Moisture Content = 29%)
P-2 (cut slope exposure)	0-6.0	Brown Silty Clay, dry (Moisture Content = 16%)
	6.0-10.0	Brown Silty Clay with Gravel and Cobbles, Friable, dry (Moisture Content = 17%)
P-3	0.0-0.6	Brown Silty Clay, soft, wet (Moisture Content = 24%)
	0.6-1.0	White Weathered Coral, medium hard (road fill)
P-4	0.0-1.0	Dark Brown Silty Clay with some Coral Fragments, soft, wet (Moisture Content = 31%)
	1.0	Coral Gravel, dense, refusal to hand-auger penetration
P-5	0.0-1.0	Dark Brown Clay, medium stiff, moist (Moisture Content = 27%)
	1.0-2.0	Dark Brown Clay, stiff, moist (Moisture Content = 28%)
	2.0	Very stiff, refusal to hand-auger penetration

PLATE A-15

(dk/no/37)

GEOLABS-HAWAII

Probing Logs (Continued)

Probe No.	Depth (Feet)	Description
P-6	0.0-0.5	Brown Silty Clay, medium stiff, dry
	0.5-3.0	Dark Brown Silty Clay, medium stiff, moist (Moisture Content = 28%)
P-7	0.0-3.0	Dark Brown Silty Clay, soft, wet (Moisture Content = 38%)
P-8	0.0-0.5	Brown Organic Clayey Silt, very soft, wet
	0.5-3.0	Dark Gray Clayey Silt, very soft, wet (Moisture Content = 117%)
	3.0-5.0	Dark Gray Clayey Silt with some organics, soft, wet (Moisture Content = 48%)
P-9	0.0-0.5	Brown Sandy Clayey Silt, dry
	0.5-1.0	Brown Sandy Clayey Silt, hard, difficult to penetrate with hand-auger (Moisture Content = 13%)
P-10	0.0-1.5	Brown Clayey Silt with Shells, dry (Moisture Content = 13%)
P-11 (cut slope exposure)	0.0-10.0	Brown Silty Clay to Clayey Silt, hard (Moisture Content = 24%)
P-12	0.0-1.5	Brown to Dark Brown Silty Clay, stiff, moist (Moisture Content = 32%)

PLATE A-16

(dk/no/37)

Probing Logs (Continued)

Probe No.	Depth (Feet)	Description
P-13	0.0-0.5	Brown Clayey Silt, dry (Moisture Content = 13%)
	0.5	Brown Clayey Silt, hard, dry, refusal to hand-auger penetration
P-14	0.0-0.5	Dark Brown Silty Clay, dry
	0.5-1.5	Dark Brown Silty Clay, hard, dry (Moisture Content = 17%)
P-15	0.0-6.0	Brown Silty Clay, hard (Moisture Content = 10%)

PLATE A-17

(dk/no/37)

APPENDIX B

Laboratory Testing

Moisture content and unit weight determinations were performed on selected samples as an aid in the classification and evaluation of soil properties. The results of these tests are presented on the Boring Logs at the appropriate sample depths.

Five (5) Atterberg Limit tests were performed to aid in the classification of the soils. The test results are summarized on Plate B-1.

Four (4) California Bearing Ratio (CBR) tests were performed on samples of the near surface soils to evaluate their suitability for road subgrade support. The test results are summarized on Plates B-2 and B-3.

Five (5) Proctor tests were performed to determine the moisture content verses dry density relationship of the compacted soil. The test results are summarized on Plates B-2 and B-3.

Three (3) sieve analysis tests were performed on selected samples of the soils to evaluate their grain size distribution. The test results are presented on Plate B-2.

Thirty-eight (38) one-inch ring swell tests were performed on undisturbed and remolded samples to evaluate the swelling potential of the soils in both natural and compacted conditions. The test results are summarized on Plates B-4 through B-7.

GEOLABS-HAWAII

TABLE 1 - SUMMARY OF LABORATORY TEST RESULTS

LOCATION	B-1	B-2	B-3	B-4	B-9
SAMPLE NO.	SS-2	SS-1	RS-1	RS-1	RS-1
DEPTH BELOW SURFACE (FEET)	4.5-6.0	4.5-6.0	5.5-6.0	1.5-3.0	4.0-4.5
DESCRIPTION	Brown Silty Clay	Brown Clay	Brown Clay	Brown Silty Clay	Dark Gray Clay
GRADING ANALYSIS (% Passing)					
Sieve					
2½"					
2"					
1½"					
1"					
3/4"					
#4					
#10					
#20					
#40					
#100					
#200					
ATTERBERG LIMITS					
Air Dried or Natural	Natural	Natural	Natural	Natural	Natural
Liquid Limit	41	65	51	46	139
Plastic Limit	19	24	26	20	36
Plasticity Index	22	41	25	26	103
UNIFIED SOIL CLASSIFICATION	CL	CH	CH	CL	CH
SPECIFIC GRAVITY					
EXPANSION AND CBR TESTS (Surcharge - 51 P.S.F.)					
Molding Moisture Content %					
Molding Dry Density, P.C.F.					
Swell Upon Saturation, %					
CBR at 0.1" Penetration					
COMPACTION TEST (Test Designation)					
Dry to Wet or Wet to Dry					
Max. Dry Density (P.C.F.)					
Optimum Moisture (%)					

REMARKS

W.O. # 1889-00 DATE AUGUST 1987 PLATE B-1

GEOLABS-HAWAII

TABLE 2 - SUMMARY OF LABORATORY TEST RESULTS

LOCATION	B-9	B-10	B-12	S-1	S-2
SAMPLE NO. .	SS-2	SS-3	SS-2	A	A
DEPTH BELOW SURFACE	4.5-6.0	14.5-16.0	5.0-6.5	0.5-1.5	0.5-1.5
DESCRIPTION	Dark Gray Clay With Some Sand	Brown Sandy Silt	Brown Silty Sand	Dark Brown Silty Clay	Dark Brown Silty Clay
GRADING ANALYSIS (% Passing)					
Sieve					
2½"					
2"					
1½"					
1"					
3/4"		100			
#4		97.4	100		
#10	99.8	97.4	98.7		
#20	99.4	97.1	93.8		
#40	98.8	96.5	79.2		
#100	96.4	84.7	54.8		
#200	91.2	68.6	46.7		
ATTERBERG LIMITS					
Air Dried or Natural					
Liquid Limit					
Plastic Limit					
Plasticity Index					
UNIFIED SOIL CLASSIFICATION			SM-ML		
SPECIFIC GRAVITY					
EXPANSION AND CBR TESTS (Surcharge - 51 P.S.F.)					
Molding Moisture Content %				25.9	21.6
Molding Dry Density, P.C.F.				100.6	103.8
Swell Upon Saturation, %				1.8	3.6
CBR at 0.1" Penetration				10.0	6.8
COMPACTION TEST (Test Designation) ASTM D-1557					
Dry to Wet or Wet to Dry				Dry to Wet	Dry to Wet
Max. Dry Density (P.C.F.)				102.5	104.5
Optimum Moisture (%)				25	22.5

REMARKS

W.O. # 1889-00 DATE AUGUST 1987 PLATE B-2

GEOLABS-HAWAII

TABLE 3 - SUMMARY OF LABORATORY TEST RESULTS

LOCATION	S-3	S-3A	S-4		
SAMPLE NO.	A	B	A		
DEPTH BELOW SURFACE	0.5-1.5	4.0-5.0	0.5-1.5		
DESCRIPTION	Brown Silty Clay	Yellowish Gray Coralline Sandy Gravel	Dark Brown Clayey Silt		
GRADING ANALYSIS (% Passing)					
Sieve					
2½"					
2"					
1½"					
1"					
3/4"					
#4					
#10					
#20					
#40					
#100					
#200					
ATTERBERG LIMITS					
Air Dried or Natural					
Liquid Limit					
Plastic Limit					
Plasticity Index					
UNIFIED SOIL CLASSIFICATION					
SPECIFIC GRAVITY					
EXPANSION AND CBR TESTS (Surcharge - 51 P.S.F.)					
Molding Moisture Content %	23.2	12.5			
Molding Dry Density, P.C.F.	105.3	117.2			
Swell Upon Saturation, %	2.2	0.1			
CBR at 0.1" Penetration	10	14			
COMPACTION TEST (Test Designation) ASTM D-1557					
Dry to Wet or Wet to Dry	Dry to Wet	Dry to Wet	Dry to Wet		
Max. Dry Density (P.C.F.)	105.0	119.5	106.0		
Optimum Moisture (%)	22.0	12.0	23.5		

REMARKS

W.O. # 1889-00 DATE AUGUST 1987 PLATE B-3

SUMMARY OF ONE-INCH RING SWELL TESTS

Proposed West Loch Estate
Honouliuli, Ewa, Oahu, Hawaii

Location	Depth (Feet)	Soil Description	Dry Density (pcf)	Moisture Content Initial (%)	Air-Dried (%)	Final (%)	Ring Swell (%)
P-1	2.5-3.0	Dark Brown Silty Clay (Remolded)	100.0	29	25	30	2.0
P-2	9.0-10.0	Brown Silty Clay (Remolded)	92	33	29	34	2.9
P-4	0.5-1.0	Dark Brown Silty Clay (Remolded)	102	27	24	28	1.7
P-5	1.5-2.0	Dark Brown Clay (Remolded)	108	26.0	20.0	26	2.2
P-6	2.5-3.0	Brown Silty Clay (Remolded)	101	28	24.0	29	2.1
P-7	1.0-1.5	Dark Brown Silty Clay (Remolded)	102	28	24	29	2.6
P-8	4.0-4.5	Dark Gray Clayey Silt (Remolded)	96	30.1	28	29	0.6
P-9	0.5-1.0	Brown Sandy Clayey Silt (Remolded)	107	25	21	25	1.5
P-10	1.0-1.5	Brown Clayey Silt (Remolded)	107	25.0	21	25	0.9
P-11	8-9.0	Brown Clayey Silt (Remolded)	86	37.0	31	36	0.7

W.O. 1889-00 AUGUST 1987

PLATE B-4

GEOLABS-HAWAII

Summary of One-Inch Ring Swell Tests (Cont'd)

Location	Depth (Feet)	Soil Description	Dry Density (pcf)	Moisture Content Initial (%)	Air-Dried (%)	Final (%)	Ring Swell (%)
P-12	1.0-1.5	Brown Silty Clay (Remolded)	89	34	29	34	1.8
P-14	1.0-1.5	Dark Brown Silty Clayey (Remolded)	106	24	19	24	2.6
P-15	5.0-6.0	Brown Silty Clay (Remolded)	113	21	18	23	2.7
B-1	0.0-0.5	Brown Silty Clay (Remolded)	100	28.0	21	28	2.6
B-1	4.0-4.9	Brown Silty Clay With Traces of Sand (Natural)	89	22	19.0	39	1.3
B-1	9.5-11.0	Brown Clay With Traces of Sand (Remolded)	94	26	24	34	4.7
B-2	4.5-6.0	Brown Clay With Traces of Sand (Remolded)	96	25	24	31	2.9
B-2	9.5-11.0	Brown Silty Clay (Remolded)	86	36	34.0	37	0.8
B-2	14.5-15.0	Brown Clay With Traces of Sand (Natural)	90	33	26	36	4.1

W.O. 1889-00 AUGUST 1987

PLATE B-5

GEOLABS-HAWAII

Summary of One-Inch Ring Swell Tests (Cont'd)

Location	Depth (Feet)	Soil Description	Dry Density (pcf)	Moisture Content Initial (%)	Air-Dried (%)	Final (%)	Ring Swell (%)
B-3	0.0-0.5	Brown Silty Clay (Remolded)	96	31	26	32	3.2
B-3	5.5-6.0	Mottled Brown Clay (Natural)	92	35	27	34	1.2
B-3	9.5-11.0	Mottled Brown Clay (Remolded)	85	42	34	41	2.1
B-4	0.0-0.5	Brown Silty Clay (Remolded)	106	25	19	25	1.9
B-4	1.5-3.0	Brown Silty Clay (Natural)	110	21	18	24	1.9
B-4	5.0-6.5	Brown Silty Clay (Remolded)	107	24.0	17	24	2.8
B-5	1.0-2.5	Brown Clay (Natural)	98	19	14	31	9.1
B-5	5.0-6.5	Brown to Mottled Light Brown Silty Clay (Remolded)	110	24	21.0	25	2.8
B-6	1.5-3.0	Mottled Brown Silty Clay W/ Decomposed Gravel (Natural)	110	21	14	23	1.6
B-6	5.0-6.5	Brown Clay With Gravel (Remolded)	118	20	13	20	2.9
B-7	4.0-4.5	Brown Clay With Traces of Sand (Natural)	85	36	27	38	3.4

W.O. 1889-00 AUGUST 1987

PLATE B-6

GEOLABS-HAWAII

Summary of One-Inch Ring Swell Tests (Cont'd)

Location	Depth (Feet)	Soil Description	Dry Density (pcf)	Moisture Content Initial (%)	Air-Dried (%)	Final (%)	Ring Swell (%)
B-9	0.0-0.5	Brown Silty Clay (Remolded)	92	35	30	35	2.5
B-9	3.5-4.0	Dark Gray Clay With Some Sand (Natural)	40.6	115	102	115	1.7
B-10	3.5-3.9	Brown Clay With Traces of Sand (Remolded)	94	35	28	35	2.1
B-10	9.5-11.0	Brown Clay (Remolded)	71	55	42	60	7.1
B-11	4.0-4.5	Brown Clay With Traces of Sand (Natural)	80	44	36	44	1.9
B-11	4.5-6.0	Mottled Brown Clay (Remolded)	85	41	30.0	40	3.1
B-11	9.5-11.0	Mottled Brown Silty Clay (Remolded)	91	35	32	36	0.5
B-12	1.5-3.0	Brown Clay (Natural)	85	40	36	40	0.5

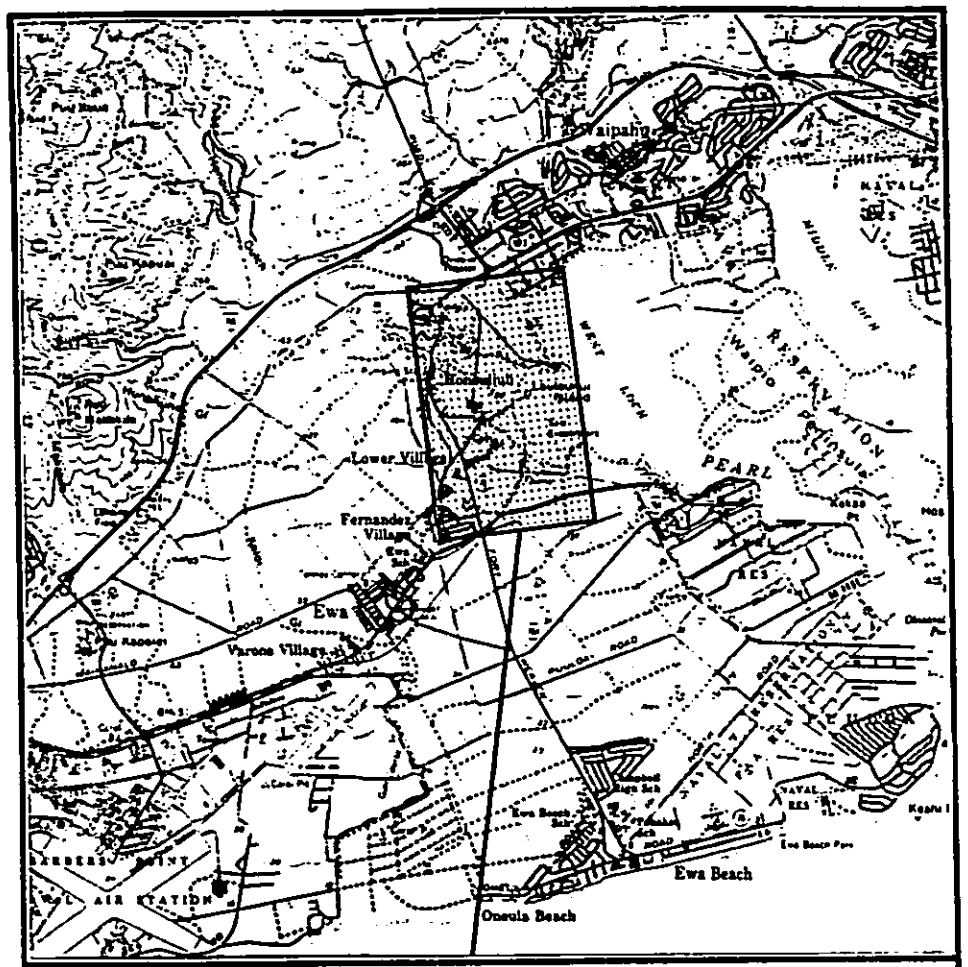
Note: Samples tested were either undisturbed or remolded in 2.4-inch diameter by one-inch high rings. They were air-dried overnight then saturated for 24 hours under a surcharge load of 55 P.S.F.

W.O. 1889-00 AUGUST 1987

PLATE B-7

(dk/no/37)

GEOLABS-HAWAII



GENERAL PROJECT LOCATION

N

REFERENCE: TOPOGRAPHIC MAP OF THE ISLAND OF OAHU BY U.S.G.S. (1970)

PROJECT LOCATION MAP

PROPOSED WEST LOCH ESTATES DEVELOPMENT
HONOULIULI, OAHU, HAWAII

PLATE 1

GEOLABS-HAWAII Foundation & Soil Engineering · Geology	
DATE AUGUST 1987	DRAWN BY KHN
SCALE 1 INCH = 4 MILES	W.O. 1889-00

APPENDIX J

Proposed West Loch Estates Impact on Agriculture

by

Decision Analysts Hawaii

September 1987

PROPOSED WEST LOCH ESTATES:
IMPACT ON AGRICULTURE

September 1987

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EXECUTIVE SUMMARY

The development of West Loch Estates would result in the urbanization of approximately 206 acres of sugarcane lands which are currently under cultivation by Oahu Sugar Company, Ltd. (OSCo). However, the West Loch Estates—individually or in combination with other major projects planned and proposed for Ewa and Central Oahu—would not adversely affect the economic viability of OSCo, nor would it require layoffs of sugar workers. This assumes the continuation of historic development rates for housing projects—rates which would allow sufficient time to increase yields and thereby partially or completely compensate for the reduced acreage with little or no loss in production. Reductions in employment would occur through retirement and voluntary movement to other jobs. Over the long term, OSCo could accommodate a major reduction in acreage and maintain economies of scale by operating just one mill, rather than two in parallel.

If OSCo were to cease operations for whatever reason (most likely because of low sugar prices), the loss of jobs would be less than 490 direct jobs and 550 indirect jobs. This would be the equivalent of the loss of a hotel about half the size of the Hyatt Regency in Waikiki. Immediately following the mill closing, significant economic loss and social disruption would occur. But over the long term, the economic loss would be absorbed easily by expanding economic opportunities in the Ewa/Central-Oahu area.

The development of West Loch Estates on sugarcane acreage would eliminate the possibility of using these lands for diversified agriculture (including aquaculture). However, it is extremely doubtful that this would adversely affect the growth of diversified agriculture in Hawaii. There are four reasons for this assessment: (1) an extensive amount of prime-agricultural land and water has been freed from sugar and pineapple production because of past mill closings and reductions in operations; (2) a very real possibility exists that additional land and water will be freed from sugar production given the outlook for low sugar prices; (3) some—if not most or even all—of the sugar operations will make their lands available for profitable replacement

crops to the extent that such crops are available; and (4) compared to the available supply, a very small amount of land and water is required to grow proven and promising crops to achieve a realistic level of food and animal-feed self-sufficiency, and to increase exports. The increasing availability of prime agricultural land in Hawaii is part of very long-term and accelerating trends occurring throughout most developed and developing market economies. Productivity and yields have been increasing faster than population growth, and genetic engineering and other advances, combined with slower popululion growth, indicate an acceleration of these trends. Rapid productivity and yield increases require that labor, land, and other resources be withdrawn from agriculture in order to restore balanced markets and to increase farm income for those who remain.

Since the West Loch Estates would not adversely affect the economic viability of OSCo, and would not limit the growth of diversified agriculture, the project is consistent with the major thrust of the agricultural portion of the Hawaii State Plan and the State Agriculture Functional Plan, which is to preserve the economic viability of plantation agriculture and to promote the growth of diversified agriculture. Also, the project would provide a public benefit (i.e., affordable housing) which would override the proposed "important agricultural lands" designation of the Land and Evaluation Site Assessment (LESA) Commission. Furthermore, the project would not adversely affect cultivation of adjacent sugarcane acreage and, therefore, complies with the Hawaii Right-to-Farm Act.

The project is also consistent with County policies of directing population growth to Ewa, which by definition must occur at the expense of sugarcane acreage.

PROPOSED WEST LOCH ESTATES: IMPACT ON AGRICULTURE

The proposed West Loch Estates will involve the urbanization of about 205 acres of sugarcane lands of Oahu Sugar Company, Ltd. (OSCo). The impact of this loss on OSCo operations, as well as on the potential growth of diversified agriculture (including aquaculture), is summarized in this report.

SOIL QUALITY OF AFFECTED SUGARCANE ACREAGE

The affected sugarcane acreage consists primarily of two soil types: Honouliuli clay, 0 to 2 percent slope (HxA), and Honouliuli clay, 2 to 6 percent slope (HxB) (USDA Soil Conservation Service). These soils can be used for sugarcane, truck crops, and pasture.

The soils within the petition area have been rated in terms of four classificaiton systems commonly used in Hawaii:

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

This classification rates soils according to eight levels, ranging from the highest classification level I to the lowest level VIII. If irrigated, HxA has a capability classification I, which indicates that the soil has few limitations which restrict its use. Soil type HxB is in Subclass IIe if irrigated, which indicates that the soil has a moderate limitation which reduces the choice of plants or which requires moderate conservation practices; the problem is that this soil is subject to moderate erosion if cultivated and not protected.

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

This system classifies lands into three categories: (1) prime agricultural land which is land that is best suited for the production of crops because of its ability to sustain high yields with relatively little input and with the least damage to the environment; (2) unique agricultural land

which is non-prime agricultural land that is currently used for the production of specific high-value crops; and (3) other prime agricultural land which is non-prime and non-unique agricultural land that is of importance to the production of crops. Most of the petition lands now planted in sugarcane are rated as "prime" agricultural lands.

—Overall Productivity Rating, by the Land Study Bureau (LSB) of the University of Hawaii.

This classification rates soils according to five levels, with "A" representing the class of highest productivity and "E" the lowest. Most of the petition lands now planted in sugarcane is rated B, although some lands are rated C, D or E.

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

Based on soil quality, locational attributes, improvements, nearby activities, and land-use plans, this proposed system would designate a sufficient amount of the better agricultural lands so as to meet projected agricultural goals. The designated lands would be termed important agricultural lands (IAL) and, based on the proposed maps, would include the lands in the petition area now under cultivation. However, the identification would be subject to change based on a change in nearby activities and a change in County land-use plans. Also, the designation could be changed if there is an overriding public benefit.

IMPACT ON OSCo[1]

Background Information

Amfac's OSCo first milled sugar in 1899, and is now the fourth largest sugar operation in the State. It cultivates about 13,540 acres of sugarcane land, and produces about 90,000 to 95,000 tons of raw sugar, or nearly 10 percent of Hawaii's total sugar production. Its lands cover portions of Central Oahu on each side of Kunia Road above Pearl Harbor, and portions of the Ewa Plain to the west of Pearl Harbor. The Ewa lands were taken over from Ewa Sugar Co. in 1970.

Another 4,860 acres of OSCo lands were in production in 1982, the bulk of which are now fallow, while a few hundred acres have been urbanized. These lands are mostly mauka lands with high pumping costs, and lands close to the seashore

[1]Unless otherwise noted, the material in this section is from OSCo, Amfac, and/or Section B, Chapter VI of Hawaii's Sugar Industry: Problems, Outlook, and Urban Growth Issues.

where soils tend to be inferior, yields low, and hauling costs high because of the distance to the mill.

Nearly all of the land which OSCo cultivates is leased, principally from Campbell Estate with a lease expiration date of 1995, and from Robinson Estate with a lease expiration date of 1996. The lease rents on these lands are amoung the highest in the State for sugarcane acreage, and are adjusted as a function of the revenues from sugar operations. Both leases allow partial withdrawal of lands for urbanization. The Campbell Estate lands above H-1 Freeway and west of Kunia Road have been dedicated to agricultural use in order to obtain special property tax assessments.

OSCo is one of the major water users on Oahu, pumping up to 92.5 million gallons per day (MGD) of groundwater, and diverting in normal-rainfall years 25 to 30 MGD from the Windward side via Waiahole Ditch. Per-acre usage by OSCo can exceed 9,000 gallons per day. For comparison, pumpage by the Board of Water Supply averages about 140 MGD, and per-acre useage for single-family homes at 5 units per acre averages about 2,130 gallons per day.

Field, mill, and management employment at OSCo is approximately 490 workers. Indirect employment dependent upon OSCo is estimated to be 550 jobs (multiplier of 1.13, based on the State Economic Model). For comparison, OSCo's economic contribution to Hawaii's economy is less than half that of the Hyatt Regency Hotel in Waikiki.

Because of favorable growing conditions, good farming practices, and drip irrigation, sugar yields at OSCo are very high, about 14.5 to 15.5 tons per acre, versus a 1986 Statewide average of 12.5 tons per acre (HSPA, "Hawaii Sugar News," March 30, 1987). In fact, OSCo holds the world record sugar yield at 21.63 tons per acre set in April 1985 (HSPA, "Hawaii Sugar News," June 26, 1985). The current average yield is about 33 percent higher than the 1979 yield of 11.3 tons per acre.

But even with high yields and very efficient operations, OSCo is only marginally profitable—the principal problem being low sugar prices. The marginal profitability is measured before accounting for new capital investment needed to replace equipment.

Outlook for Sugar Prices

In the long term, the survival of OSCo will depend primarily on the price of sugar, for which the outlook is pessimistic. In the world market, the average price of sugar is expected to remain well below the production costs for all countries. This is

because most sugar is traded in controlled and/or subsidized markets, with surplus sugar dumped onto the world market for sale at a loss. Dramatic price increases have occurred, however, following a 6- to 9-year cycle, with prices increasing whenever world production falls short of consumption. But, there have been a number of fundamental developments in sugar and related industries in the past 10 years which appear to have altered the pattern of sugar prices, reducing peak prices and extending the periods of low prices. These changes include: the decline or stagnation of sugar consumption in most developed countries; inroads made by the liquid sweetener high-fructose corn syrup (HFCS); the availability of substantial sugar reserves in the form of sugarcane now devoted to ethanol production; major gains in sugar beet productivity in several European countries which were traditionally cane sugar importers; and the appearance of the European Economic Community ECC as a major exporter of refined sugar (Brown).

In the United States, Federal legislation protects sugar from the low world prices by import quotas, tariffs, and import fees. However, U.S. sugar prices are managed so that they are fairly low in order to prevent accelerating the growth of competing sweeteners, and to maintain public support. Under the U.S. Farm Bill, which runs to 1991, the target price for sugar is 18 cents per pound, with no adjustments for inflation.

The competing sweetener of major concern has been HFCS. It is as sweet or sweeter than regular sugar, costs less to produce, sells for less, is more profitable, is very similar to liquid sugar, can be substituted readily in many applications, and is easier and cheaper to handle. It has experienced rapid growth in sales at the expense of regular sugar sales. However, HFCS has captured nearly all of the liquid-sweetener market so that continued growth will depend on the market acceptance of Crystar, the crystaline version of HFCS. In addition, the new low-calorie sweetener aspartame, sold under the brand name "Equal," is capturing market share and putting additional downward pressure on U.S. sugar prices.

Regarding the long-term outlook for sugar legislation, it should be noted that, because of HFCS, many corn states have joined the sugar and sweetener coalition, making it larger and stronger than in the past, even though a number of sugar companies have closed in recent years. Also, the Farm Act is generally supported by those countries which receive a sugar quota, since they benefit from a high price for a major portion of their sugar. The considered expectation among sugar experts and lobbyists is that sugar will continue to be included in the U.S. Farm Act, but that the price-support level may be relatively low and may increase at a rate that is somewhat slower than inflation. Even though this is expected, there is a risk that efforts by sugar users and consumer groups to exclude sugar from the Farm Act or to reduce the support price will be successful.

OSCo Plans

In 1982, Amfac developed a Master Agricultural Plan which included a Survival Plan for OSCo. This plan, which has been fully implemented, was developed in response to an operating loss of nearly $10 million in 1981 and an outlook for low sugar prices. In recognition of the fact that sugar plantations are in place with substantial improvements, but suitable replacement crops have yet to be identified, the plan amounts to a holding action to gain time to find as many replacement crops as possible before OSCo may be forced by outside economic factors to cease operations. Key components of the plan are:

- —continue to improve the economic efficiency of OSCo by increasing sugar yields and reducing production costs (both of which have been improved substantially in the last few years);
- —urbanize Waikele (the only OSCo land owned by Amfac) in order to derive revenues to help support and justify continued sugar operations; and
- —experiment with a variety of crops (papaya, sweet corn, potatoes, forage and feed crops, coffee, etc.) in order to find profitable replacements to sugar.

An important component of OSCo's cost reduction is a continued decline in the labor force; over the last year, employment decreased by about 50 jobs, or about 10 percent. The employment decrease is accomplished by attrition—that is, employees who retire or leave OSCo for other voluntary reasons generally are not replaced.

Continued success of the OSCo Survival Plan will depend on (1) continued Federal price supports for sugar sufficiently high to justify continued operations, (2) union support to reduce costs, (3) an adequate allocation of water from the Pearl Harbor aquifer, and (4) retaining fields which are economical to farm and which provide sufficient yields to operate the mill at an economical level. After the major leases expire with Campbell Estate and Robinson Estate in 1995 and 1996, respectively, continued sugar operations also will depend on success in negotiating favorable lease terms.

An additional option which has been under consideration by OSCo is to contract operations by running a single mill rather than two mills in parallel as is currently the case. With a single mill, OSCo could reduce production from its current level of

about 90,000 to 95,000 tons per year to about 60,000 to 75,000 tons without losing its economies of scale. Based on a yield of 15 tons per acre, land requirements could be as little as 8,000 acres, versus the current 13,540 acres. Of significance, Amfac's Kekaha Sugar Company, Inc., which has climatic conditions similar to those of OSCo and a similar yield potential, historically has been one of the most profitable sugar operations in the State. Yet this plantation has only about 8,000 acres under cultivation, and produces only about 55,000 tons of sugar per year.

Of interest, the combination of cost containment, contraction of operations, and a search for alternative crops is the strategy being pursued by nearly all sugarcane operations throughout the world (Brown).

Urbanization Pressures on OSCo

The gradual growth westward of urban Honolulu has consumed a large amount of former sugarcane land as evidenced by the fact that the eastern boundary of OSCo lands has moved westward by 9 miles from Moanalua Valley out past Waikele Stream. Since the 1960s, four ridges west of Halawa have been urbanized. But because of new plantings in the foothills of the Waianae mountains and on former pasture lands, sufficient acreage was cultivated to maintain economies of scale. The westward urbanization pressures of Honolulu continues, but plantings of new lands to compensate for lost fields is no longer feasible.

The economic forces which create urbanization pressures on OSCo include:

- —Returns from urban land uses far in excess of those for agricultural uses.
- —Proximity to the new or growing employment centers of West Beach, Barbers Point Harbor, Campbell Industrial Park, and downtown Honolulu.
- —Reasonable travel times to these employment centers because of the H-1 Freeway.
- —Availability of water if freed from sugar production.
- —Proximity to the Honouliuli waste-treatment facility.
- —Low construction costs compared to areas that require extensive grading or removal of structures.

In contrast, redevelopment of downtown suffers from the high expense and displacement problems required to remove existing structures, the high expense and inconvenience of redeveloping inadequate infrastructure, less desirable high-rise housing compared to single-family homes, and strong community opposition on occasion. Hawaii Kai suffers from a lack of employment growth centers, relatively little land available for further single-family housing, severe transportation problems, and

community opposition to further development. Similarly, the Windward side suffers from a lack of growing employment centers, transportation problems, and community opposition to further development.

In view of these factors, the City & County of Honolulu has designated the Ewa area as a "Secondary Urban Center" which will be developed to accommodate a major portion of Honolulu's future growth. Major developments approved and proposed for the Ewa/Central-Oahu area which would affect OSCo acreage include:

	Sugarcane Acreage
West Loch Estates	206
Ko Olina (approved)	280
Ewa by Gentry (670 acres approved)	1,073
Ewa Marina (approved)	410
Village Park (547.5 acres approved by the State)	980
Kapolei	735
Kapolei Town Center	700
Kunia Golf Course	190
Golf Course (J. Myers)	270
Total	4,840

Assuming a 20-year development period for the housing developments, Ko Olina, and Kapolei Town Center, and approval of all proposed developments, then the above translates into a loss of about 1,990 acres of sugarcane land by 1995 when the lease with Campbell Estate expires.

Long-Term Outlook for OSCo

Assuming sufficiently high sugar prices to justify continued sugar operations, an important question is whether the West Loch Estates, combined with the other projects, would eventually reduce sugarcane acreage and economies of scale sufficiently to force the closing of OSCo.

According to Amfac, over at least the next decade (to the end of the major leases), and assuming continuation of historic development rates for housing projects, then no combination of the major projects planned and proposed for the Ewa/Central-Oahu area, and resulting loss in sugarcane acreage, will require layoffs of sugar workers. This is because of the expectation for relatively gradual reduction in sugarcane acreage, partial or complete compensation of this acreage loss by increasing

yields, and rapid employment loss by attrition. Gradual yield increases are likely to be accomplished through the introduction of new varieties, improved farming practices, chemical ripeners, more efficient harvesters, genetic engineering, etc.

An average yield of about 16 tons per acre, which is slighly above the current average yield of 14.5 to 15.5 tons per acre, would allow production at the current level of about 92,500 tons per year with only 11,550 acres of land, or about 1,990 fewer acres than currently. Such an acreage reduction is likely to be sufficient to accommodate all approved and proposed projects to the year 1995 when the lease with Campbell Estate expires. Increasing yields by about 42 percent to 21.3 tons per year, which may be achieveable within the next two decades, would allow a reduction by 4,840 acres to 8,700 acres, while maintainaing the same level of production. Such an acreage reduction would be sufficient to accommodate all approved and proposed projects at full development.

If OSCo is changed from a two-mill to a single-mill operation and produces 67,500 tons per year, then all approved and proposed projects can be accommodated with a yield of 15.5 tons per acre, which is within the range of current average yields. A change to a single mill and an increase in yields would free sufficient land to accommodate even more projects than the approved and proposed ones.

In summary, West Loch Estates, in combination with other approved and proposed projects, will not threaten the economic health of OSCo, nor require layoffs of sugar workers. Reinforcing this finding is the fact that OSCo plans to fallow about 60 acres in the petition area because of its isolated location, regardless of whether or not the project proceeds.

Economic Impact of Closing OSCo

If OSCo were to cease operations for whatever reason (most likely because of low sugar prices), the loss of jobs would be less than 490 direct jobs and 550 indirect jobs, with the actual number dependent upon the reduced employment made possible by continuing productivity increases. This would be the equivalent of the loss of a hotel about half the size of the Hyatt Regency in Waikiki. Immediately following the mill closing, there would be a significant economic loss and social disruption. But over the long term, the economic loss would be absorbed easily by expanding economic opportunities in the Ewa/Central-Oahu area. For example, the new hotels at Ko Olina will be the equivalent of over eight OSCos in terms of direct plus indirect jobs and—when tip income and all indirect jobs are considered—will provide higher average wages (based on analysis with the State Economic Model). Other new jobs in

the Ewa area will be provided by Barbers Point Harbor, expansion of Campbell Industrial Park, development of Kopolei Town Center, growth of diversified agriculture made possible by lands freed from sugar (growth which is likely to be at the expense of Neighbor Island farmers), and other economic activities which may be attracted to the area or which may spontaneously occur because of the increased availability of land and water, and lower urban land costs than would otherwise be the case. Therefore, most if not all sugar employees can be expected to find other employment if this should be required. However, some unskilled sugar workers and those having non-transferable skills may receive reduced pay when and if they are forced to find non-sugar jobs.

Assuming a policy favoring rapid urbanization of lands freed by the closing of sugar operations—a policy which presumably would be designed to increase the supply of land for housing and various economic opportunities, and increase competition among landowners and developers, with the objective of decreasing housing costs and increasing economic opportunities—three to four decades, or even longer, would be required to absorb the land. During this period, a huge supply of land and water would remain available for diversified agriculture and other economic activities. Even at full urbanization, over 2,000 acres would remain available for agriculture in the blast zone surronding the Navy's magazine storage area located at West Loch, Pearl Harbor.

IMPACT ON DIVERSIFIED AGRICULTURE

The development of West Loch Estates is an irretrievable commitment of agricultural land to urban use. This commitment raises the question of whether the West Loch Estates will affect adversely the development of diversified agriculture (including aquaculture), either immediately or in the long term. Before addressing this question, the demand for and the supply of prime agricultural land for diversified agriculture is clarified. For the purposes of this discussion, prime agricultural land is loosely defined to mean any high-quality agricultural land capable of providing high yields for a variety of crops, and would include the lands currently cultivated in the petition area.

Demand for Prime Agricultural Land

As part of its analysis to identify IAL (see page 2), the LESA Commission adopted projections of the amount of agricultural land required to increase food and animal-feed self-sufficiency given resident plus visitor population growth, and

increase crop exports. The projections for the State and Oahu are shown in Tables 1 and 2, respectively. As indicated, an estimated 52,684 additional acres will be required Statewide to accommodate the the 1983-to-1995 increase in production. The corresponding figure for Oahu is 7,979 acres. As shown, the crops and acreage requirements are categorized according to those which generally do not require prime agricultural land (although some crops may be grown profitably on prime agricultural land), those crops which generally do require prime agricultural land, plus a contingency of 10 percent of all acreage other than for beef and cattle.

It should be noted that the LESA projections and the corresponding Illustrative Generalized IAL Maps contain, or appear to contain, a number of major flaws which have led to a gross overestimation of the amount of agricultural land required:

—Based on a thorough, in-depth, and widely reviewed analysis of the market potential for crops grown on Molokai (Plasch and Garrod), and analysis of previous projections distributed by the State of Hawaii Department of Agriculture, the LESA projection for diversified agriculture appears to be excessively optimitistic. Apparently, it is assumed that many unprofitable crops will become profitable, that Hawaii farmers will be able to undersell low-cost summer crops from California, and that each and every activity will experience rapid growth. Verification of the exent of these flaws is hampered by the fact that the assumptions and analysis which underlie the LESA projections have not been made available for public inspection.

—Some of the acreage estimates are for harvested acreage, which leads to an overestimate of the land requirements for those crops which are harvested more than once a year (e.g., a crop harvested twice a year should have its acreage requirement halved).

—The LESA contingency of 29,500 acres is excessive, especially since LESA projects a requirement for less than 9,000 additional acres of prime agricultural lands. The contingency is large primarily because the LESA methodology implicitly allows for expansion of sugar operations—a grossly unrealistic possibility. Furthermore, the contingency amounts to double counting since optimistic projections have a built-in contingency.

—The LESA methodolgy assumes that prime agricultural lands that were freed from sugar and pineapple production and placed in pasture or some other low-profit operation will stay in these uses. This is very unrealistic in that these are holding operations for land until profitable crops can be identified.

—The LESA methodolgy incorrectly assumes that sugar is a healthy industry, and that sugar lands would be unavailable for more profitable replacement crops.

—The Illustrative Generalized IAL Maps incorrectly allocates prime agricultural lands to certain activities which do not need such lands (e.g., aquaculture should be allocated the agriculturally low-quality coastal lands at Kahuku).

The relevant figures from Tables 1 and 2 are not the total figures, but the increase in the amount of prime agricultural land required to accommodate diversified agriculture: the increase is 8,858 for the State, and 2,314 acres for Oahu. As discussed above, these figures are excessive; a more realistic estimate for the State is probably closer to 1,200 acres (Plasch and Garrod). Nevertheless, even using the excessive LESA estimate, the amount of additional prime agricultural land that would be required to accommodate diversified agriculture, and provide the hope (but not the realistic expectation) of profitable operations, is surprisingly small.

If diversified agriculture is to require a large amount of prime agricultural land, then additional crops will have to be grown for the export market rather than the small Hawaii market. However, the extreme difficulty of developing large export markets should be noted. Numerous and extensive crop searches and experiments for over a century by many people and organizations has led to surprisingly few major long-term successes in Hawaii, thereby indicating the extreme difficulty of identifying new export crops and develop them into new and profitable industries. Furthermore, the difficulty in developing export markets is increasing because of increasing competition from other sugarcane-growing areas. As noted previously, low sugar prices have led nearly all sugarcane operators throughout the world to search for profitable replacement crops, particularly crops which can maintain export earnings.

Supply of Prime Agricultural Land

Regarding the supply of land, an enormous and growing supply of prime agricultural land is available for other uses. Since 1970, about 83,000 acres of Hawaii's prime agricultural land has been freed from sugar and pineapple production: about 43,000 acres of land freed from sugar production (about 9,000 acres on Oahu and 33,600 on the Neighbor Islands), and over 40,000 acres freed from pineapple production (about 12,000 acres on Oahu and over 28,000 on the Neighbor Islands) [Plasch, Hawaii's Sugar Industry, HSPA, Hawaii Agricultural Reporting Service]. Some of the land freed from sugar and pineapple production has or will be converted to urban,

Table 1.— LESA AGRICULTURAL ACREAGE REQUIREMENTS, STATE OF HAWAII: 1983 AND 1995

Crop or Activity	1983	1995	Increase
Crops and Activities which Generally Do Not Require Prime Agricultural Lands			
Beef/cattle[1,2]	765,450	365,090	---
Livestock:			
Dairy	1,000	1,182	182
Eggs/Poultry	281	515	234
Swine	600	1,050	450
Subtotal for Livestock	1,881	2,747	866
Unique Crops:			
Aquaculture	500	4,500	4,000
Coffee	2,000	5,700	3,700
Flowers/Nursery	1,786	3,040	1,254
Papaya	2,120	11,850	9,730
Taro/Watercress	400	527	127
Subtotal for Unique Crops	6,806	25,617	18,811
Macadamia Nuts	15,800	27,000	11,200
Crops and Activities which Generally Do Require Prime Agricultural Lands			
Plantation:			
Sugarcane[2,3]	194,300	177,700	-16,600
Pineapple	36,000	36,049	49
Subtotal for Plantation	230,300	213,749	-16,551
Other:			
Guava	965	1,400	435
Seed Corn	730	1,060	330
Bananas	1,100	2,200	1,100
Feed/Forage[2,4]	8,705	12,495	3,790
Fruits	635	1,156	521
Vegetables/Melons[5]	4,340	7,022	2,682
Subtotal for Other Crops	16,475	25,333	8,858
Contingency[6]	--	29,500	29,500
TOTAL	1,036,712	689,036	—
TOTAL, Excluding Beef/Cattle	271,262	323,946	52,684

Table 1.— LESA AGRICULTURAL ACREAGE REQUIREMENTS, STATE OF HAWAII: 1983 AND 1995 (continued)

[1]Includes marginal grazing and pasture lands. The 1983 figure includes arid zones and other areas having low carrying capacity, while the 1995 figure does not.

[2]Often includes land in a holding operation awaiting discovery of profitable uses.

[3]The decline in acreage primarily reflects the loss of Puna Sugar Co.

[4]Includes some pasture and 8,000 of guinea grass from Molokai.

[5]Overstated in that the acreage figures are for harvested acres, not the amount of land required.

[6]Based on 10% of all acreage other than that for beef/cattle. Adding a contingency amounts to double counting in that the projections are optimistic to begin with. Also, the contingency figure includes 17,770 acres for expansion of sugarcane, even though the sugar industry is expected to decline, not expand.

Table 2.— LESA AGRICULTURAL ACREAGE REQUIREMENTS, CITY AND COUNTY OF HONOLULU: 1983 AND 1995

Crop or Activity	1983	1995	Increase
Crops and Activities which Generally Do Not Require Prime Agricultural Lands			
Beef/cattle[1,2]	18,200	10,090	--
Livestock:			
Dairy	340	402	62
Eggs/Poultry	250	390	140
Swine	144	200	56
Subtotal for Livestock	734	992	258
Unique Crops:			
Aquaculture	300	2,400	2,100
Flowers/Nursery	495	850	355
Papaya	70	170	100
Taro/Watercress	60	85	25
Subtotal for Unique Crops	925	3,505	2,580
Crops and Activities which Generally Do Require Prime Agricultural Lands			
Plantation:			
Sugarcane[2]	27,200	25,300	-1,900
Pineapple	11,829	11,800	-29
Subtotal for Plantation	39,029	37,100	-1,929
Other:			
Guava	--	242	242
Seed Corn	125	180	55
Bananas	540	836	296
Feed/Forage[2,3]	1,741	2,912	1,171
Fruits	90	200	110
Vegetables/Melons[4]	1,155	1,595	440
Subtotal for Other Crops	3,651	5,965	2,314
Contingency[5]	--	4,756	4,756
TOTAL	62,539	62,408	--
TOTAL, Excluding Beef/Cattle	44,339	52,318	7,979

Table 1.— LESA AGRICULTURAL ACREAGE REQUIREMENTS, CITY AND COUNTY OF HONOLULU: 1983 AND 1995 (continued)

[1]Includes marginal grazing and pasture lands. The 1983 figure includes arid zones and other areas having low carrying capacity, while the 1995 figure does not.

[2]Often includes land in a holding operation awaiting discovery of profitable uses.

[3]Includes some pasture.

[4]Overstated in that the acreage figures are for harvested acres, not the amount of land required.

[5]Based on 10% of all acreage other than that for beef/cattle. Adding a contingency amounts to double counting in that the projections are optimistic to begin with. Also, the contingency figure includes 2,530 acres for expansion of sugarcane, even though the sugar industry is expected to decline, not expand.

diversified agriculture, and aquaculture uses. Also, some of the land freed from pineapple use on Oahu was converted to sugar production. Making allowances for the various conversions, uncommitted acreage which remains available to diversified agriculture and aquaculture amounts to many tens of thousands of acres, with a large share of this on Oahu. Much of this land is fallow, in pasture, or some other low-value land-holding operation.

This supply of prime agricultural land probably will increase given the very real possibility of future sugar-mill closings. As discussed above, the outlook for sugar prices is unfavorable, and some unprofitable mills are in operation today only because they have lease and/or energy contracts which make closing too expensive. However, these contracts eventually will end.

Furthermore, much of the sugarcane lands are in holding awaiting the discovery of profitable replacement activities, so is part of the supply of prime agricultural land available to profitable diversified agriculture crops. For example, one of the components of the OSCo Survival Plan is to experiment with a variety of crops in order to find profitable replacements to sugar.

Many of the lands freed, to be freed, or which can be freed from sugar and pineapple production have excellent agricultural qualities and climatic conditions, and are well-suited for a variety of crops. Also, water is available for most of these lands, especially lands freed from sugar production. However, some of the lands freed from sugar are at high elevations where pumping costs are relatively high.

Additional lands which have been made available for diversified agriculture are in government-sponsored agricultural parks throughout the State. Lands for agricultural activities which do not require prime agricultural land include pasture land, land for livestock operations, and unique lands. Unique lands are not prime agricultural lands, but are important lands for certain crops, the principal examples are the coffee lands in Kona, and certain lava lands in Puna that are well-suited for growing papaya. The supply of unique lands is quite large and distinct from the supply of prime agricultural lands.

Availability of Land to Small Farmers

Even though considerable agricultural land is available, it should be noted that in many areas of the State small agricultural parcels are not available to small-scale, farmers under long-term leases. The reason for the unavailability is that land-use regulations and the political environment make it unprofitable and too risky to lease small farm parcels. Unprofitable because agriculture is generally a low-value use of

land which can afford only relatively low lease rents, while County subdivision regulations designed for rural estates require expensive electrical power, paved rather than gravel roads, and buried rather than surface water lines. The combination of low rents and expensive subdivision requirements makes it unprofitable to subdivide land for small farms. For example, rather than develop the State agricultural park in Kahuku, it would have been cheaper for the State to give each farmer $100,000. In addition, there is the risk that when the lease expires, the farmer will turn to the legislature to try and prevent an escalation of the lease rent, or to prevent eviction by the landowner in favor of a higher and more profitable use—this is often the case for long-term leases for land on which the farmer has built a home. Such an economic environment favors leases to large-scale operators (including cooperatives consisting of many small farmers), short-term and illegal leases of unsubdivided land, subdivision of the land into rural estates for sale to buyers who can afford the costs of the subdivision requirements, or leaving the land fallow.

The unavailability of small parcels of land to farmers is a serious problem, but does not invalidate the fact that there is a vast supply of prime agricultural land available for profitable diversified agricultural activities. However, the activities must be large scale, or the subdivision requirements circumvented.

Outlook for Diversified Agriculture

Based on the above analysis, ample prime agricultural land will be available to easily accommodate prime-agricultural land requirements of diversified agriculture. This conclusion derives from the fact that there is a vast amount of prime agricultural land and water that has been freed from sugar and pineapple production in recent years, the very real possibility that additional sugarcane acreage and water will be freed given the outlook for low sugar prices, the fact that some if not most or even all of the sugar operations would make their lands available for profitable replacement crops, and the surprisingly modest land requirements for diversified agriculture. In other words, the limiting factor will be the market, not the land supply. West Loch Estates, combined with other major housing developments in the Ewa/Central-Oahu area and elsewhere, involves far too little land to affect this conclusion. Therefore, West Loch Estates will not affect adversely the growth of diversified agriculture.

Consistency with Overseas Long-Term Trends

Hawaii's increased availability of prime agricultural land compared to that of prior decades is part of some very long-term and accelerating trends occurring

throughout most developed and developing market economies. For example, an excess of about 45 million acres of agricultural land exists in the United States (Dvoskin). Productivity and yields have been increasing faster than population growth; and genetic engineering—which gives promise of developing crops having higher yields, increased resistance to diseases and pests, and increased tolerance to climatic variations—and other advances, combined with slower popolution growth, indicate an acceleration of these trends. Rapid productivity and yield increases lead to overproduction, market gluts, low agricultural prices, low farm income, bankruptcies, and a need to withdraw labor, land, and other resources from agriculture in order to restore balanced markets and increase farm income to those who remain. The major agricultural problem facing the United States and many other economies is how to made this withdrawal an orderly one so as to minimize social problems. This is a problem associated with tremendous success in agriculture, and contrasts sharpely with and invalidates the 200-year old prediction of Thomas Malthus that population will increase faster than the food supply, resulting in massive starvation.

CONSISTENCY WITH STATE AND COUNTY PLANS

The thrust of the Hawaii State Plan and the State Agriculture Functional Plan is to preserve the economic viability of plantation agriculture and to promote the growth of diversified agriculture. To accomplish this, an adequate supply of agriculturally suitable lands and water must be assured. The thrust of these two plans is <u>not</u> to preserve prime agricultural lands for the sake of preservation—preservation is to occur only if there is a potential agricultural need for these lands.

Regarding housing, the West Loch Estates is clearly in support of the Hawaii State Plan, particularly those policies, objectives, and priority directions which encourage development of reasonably priced, safe, sanitary, liveable homes in suitable environments. Nevertheless, certain priority guidelines (but not objectives or policies) dealing with population growth and distribution do call for encouraging urban growth primarily to existing urban areas and marginal agricultural lands, and away from important agricultural lands. While this is desirable, it is unrealistic in terms of the supply of lands suitable for building reasonably-priced housing, and unrealistic as to the agricultural market which could use the vast supply of prime agricultural lands profitably.

Since the West Loch Estates will not adversely affect the economic viability of OSCo, will not limit the growth of diversified agriculture, but will contribute to a healthier housing market, the project is consistent with the major thrust of the

Hawaii State Plan and the State Agriculture Functional Plan. Also, the project would provide a public benefit which would override the proposed IAL designation of the LESA Commission. Furthermore, the project would not adversely affect cultivation of adjacent sugarcane acreage and, therefore, complies with the Hawaii Right-to-Farm Act.

The project is also consistent with County policies of directing population growth to Ewa, which by definition must occur at the expense of sugarcane acreage.

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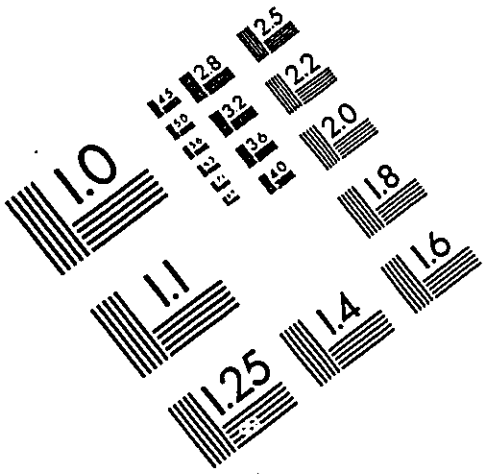

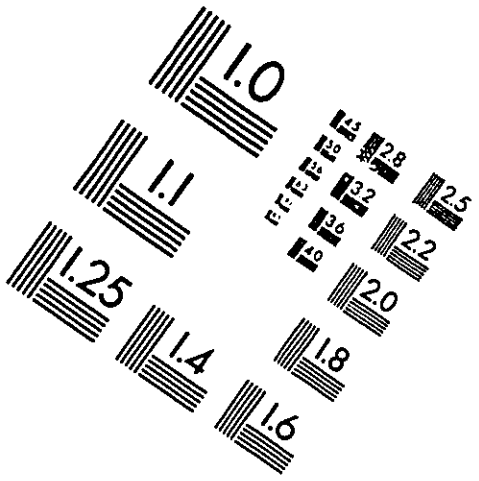

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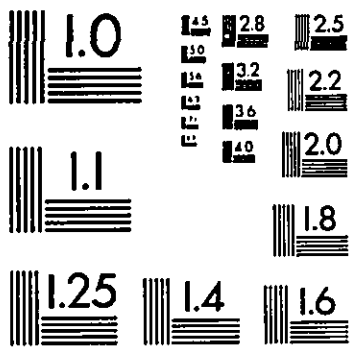

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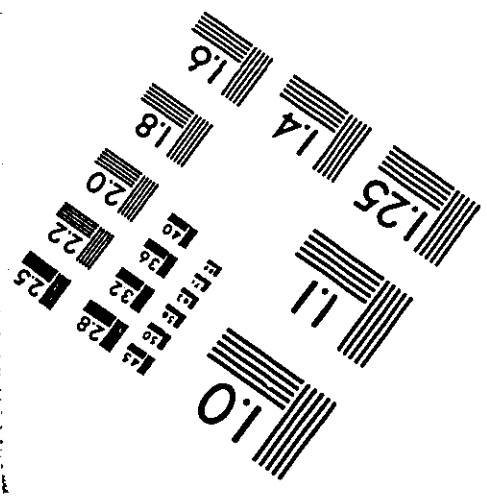

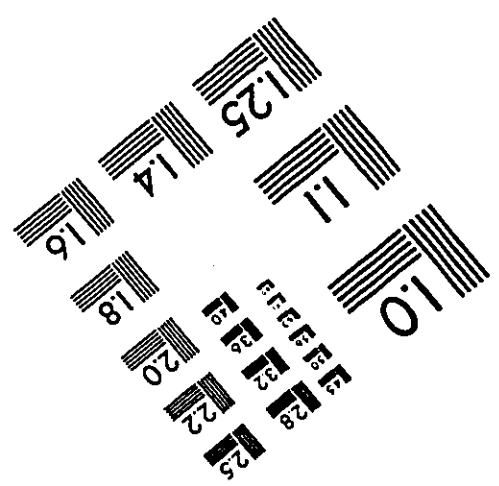

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