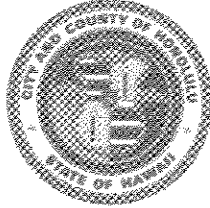


DEPARTMENT OF GENERAL PLANNING
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813



FRANK F. FASI
MAYOR

DONALD A. CLEGG
CHIEF PLANNING OFFICER

GENE CONNELL
DEPUTY CHIEF PLANNING OFFICER

WM/DGP 2/87-I-163(413)

February 23, 1987

Dr. John Lewin
Office of Environmental
Quality Control
State of Hawaii
465 South King Street
Room 104
Honolulu, Hawaii 96813

Dear Dr. Lewin:

Final Environmental Impact Statement
(FEIS) for the Mililani Mauka
Residential Community, Mililani, Oahu

We are notifying you of our acceptance of the above as an adequate fulfillment of Chapter 343, HRS.

An unresolved issue which will require approval prior to a recommendation on the applicant's development plan amendment request is a proposed General Plan amendment which would resolve inconsistency between the applicant's proposal and population distribution policies for Central Oahu in the present General Plan.

Other unresolved issues to be addressed prior to the subsequent zoning process are:

1. Approval of a State Land Use District Boundary Amendment to redesignate the project site from the existing Agricultural District to an Urban District.
2. Approval of a new water source system from the State Department of Health, increased water allocation within the Pearl Harbor Groundwater Control Area from the Board of Land and Natural Resources and Board of Water Supply approval of a water master plan.

Dr. John Lewin
February 23, 1987
Page 2

3. A sewer master plan for on and off-site system improvements approved by the Department of Public Works.
4. Highway improvement plans and programs as required by the City Department of Transportation Services and the State Department of Transportation.
5. A noise (military activities) mitigation plan reviewed and approved by the Department of Land Utilization.

These issues are discussed in the attached acceptance report. If there are any questions, please contact Bill Mederios of our staff at 523-4485.

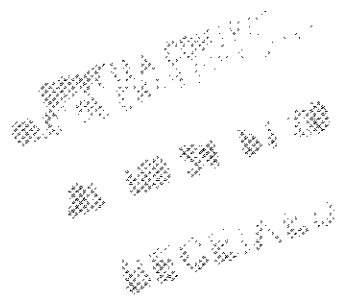
Sincerely,



DONALD A. CLEGG
Chief Planning Officer

cc: Thomas Fee, HHVH&K

Attachment



ACCEPTANCE REPORT: CHAPTER 343, HRS
 FINAL ENVIRONMENTAL IMPACT STATEMENT
 MILILANI MAUKA DEVELOPMENT PLAN AMENDMENT
 MILILANI TOWN, INC.
 MILILANI, CENTRAL OAHU, HAWAII
 TAX MPA KEYS: 9-5-01: portion of 1
 9-5-02: portion of 1

A. BACKGROUND

Mililani Town, Inc. is proposing to develop a self-contained residential community including 5,630 residential units, 1,010 low-density apartment units, a commercial area, school and church sites, and parks and recreation centers on approximately 1,200 acres of agricultural land mauka of the existing Mililani residential community in Central Oahu. The following is a breakdown of acreages allocated for each of the proposed uses:

<u>Use</u>	<u>Acreage</u>
Residential	770
Low-Density Apartment	60
Commercial	5
Park/Recreation	46
Community Facilities (churches, schools and transit parking)	211
Preservation	108
Total	1,200

The project site is designated Agriculture on the Central Oahu Development Plan Land Use Map. This Final Environmental Impact Statement (FEIS) has been prepared in conjunction with a current application for an amendment to change the designation on the Central Oahu Development Plan Land Use Map from Agriculture to Residential, Low Density Apartment, Commercial, Park and Recreation, Public and Quasi-Public, and Preservation.

The proposed project will include grading and filling, roadway and transportation system improvements, as well as drainage, sewer, and water system improvements. Underground electrical, cable T.V., and telephone lines will also be provided.

The project's demand for potable water is estimated at 3.8 million gallons per day (MGD) in average daily consumption. The maximum daily consumption is estimated at 5.7 MGD. The developer's water system improvements will include five new wells and three new storage reservoirs.

Mililani Mauka's sewer system will hook-up to the Mililani Wastewater Treatment Plant (WWTP) via the existing Mililani Town trunk sewer. Sewage from the entire Mililani area is then pumped to the Honouliuli WWTP located near Ewa. Flows for the proposed development are estimated at 2.8 MGD on the average, with a maximum design flow of 6.8 MGD and a peak design flow of 8.3 MGD.

Vehicular access to Mililani Mauka will be via an extension of Meheula Parkway. The developer will construct all internal roadways as well as improvements to the Mililani Interchange. In addition, a park and ride/transit station facility with parking for 500 cars has been proposed in conjunction with a transportation management plan in order to increase vehicle occupancy and thereby reduce traffic impacts along the H-2/H-1 corridor into urban Honolulu.

Storm runoff will be directed into Kipapa Gulch via underground drainage culverts.

The developer has set aside 25 acres for two elementary school sites and one intermediate school site. In addition, 75 acres has been proposed for a college site near the future Mililani high-tech park. This land will be offered to the University of Hawaii (or to private institutions, if U.H. is not interested) for some sort of post-secondary educational facility.

Also proposed are a 20-acre district park, a 12-acre neighborhood park and two smaller neighborhood parks (each covering about 4-acres). Three recreation center sites are included in the park plan.

B. PROCEDURES

1. On July 21, 1986, the applicant submitted an Environmental Assessment for the proposed development in order to comply with Section 343-5(a)(b) of the Hawaii Revised Statutes. The applicant was notified by letter dated July 24, 1986 that an EIS would be required.
2. Pursuant to this determination, an Environmental Impact Statement Preparation Notice (EISPN) was published in the "OEQC Bulletin" on August 8, 1986. A detailed version of the EISPN was mailed to 30 interested agencies and organizations and 21 responses were received in the ensuing 30-day comment period.
3. A Draft EIS (DEIS) was filed on December 20, 1986 and notice published in the "OEQC Bulletin." Sixty agencies or organizations received copies of the DEIS and 26 responses were received.

4. Comments and concerns which were raised were addressed in the DEIS and in the Final EIS (FEIS) which was submitted on February 3, 1987.

C. CONTENT

The Final EIS for the Mililani Mauka Development adequately addresses the content requirements specified in Sections 11-200-17 and 11-200-18 of the EIS rules.

D. RESPONSE

The applicant made adequate point-by-point responses to all comments, which were included in the Final EIS.

E. UNRESOLVED ISSUES

Several issues, while discussed by the applicant, remain unresolved at the present time.

The following issue shall be resolved prior to approval of the applicant's D.P. amendment request:

1. The applicant's request is at present inconsistent with the population distribution policies in the General Plan. An amendment to the General Plan is currently in process.

The following unresolved issues require approvals prior to the acceptance of an application for rezoning:

2. A State Land Use District Boundary Amendment to redesignate the project site from the existing Agricultural district to an Urban district.
3. The project will require new water source system approval from the State Department of Health, as well as increased water allocations within the Pearl Harbor Ground Water Control Area from the Board of Land and Natural Resources and approval of a water master plan by the Board of Water Supply.
4. A sewer master plan for on and off-site sewer system improvements approved by the Department of Public Works.
5. Highway Improvement Plans and Programs, as required by the City Department of Transportation Services and the State Department of Transportation.
6. A noise mitigation plan to be reviewed and approved by the Department of Land Utilization, to handle noises from military activities.

E. DETERMINATION

The Final EIS is determined to be acceptable under the procedures and requirements established in Chapter 343, HRS, and the State "EIS Rules." This determination does not imply a favorable recommendation on the applicant's request for any approvals or permits required by the Department of General Planning.

Approved: Donald Clegg
DONALD A. CLEGG
Chief Planning Officer
Department of General Planning

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MILILANI-MAUKA

Residential Community
Mililani, Oahu
Hawaii



Mililani Town, Inc.

FINAL

ENVIRONMENTAL IMPACT STATEMENT

FEBRUARY 1987

OA
367

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

DATE DUE

SEP 28 1997

JULY 29-2003

1 Sep 03 - Note

MILILANI-MAUKA

Residential Community
Mililani, Oahu
Hawaii



Mililani Town, Inc.

Prepared for:
Mililani Town, Inc.

Prepared and Submitted by:
Helber, Hastert, Van Horn and Kimura, Planners


Mark H. Hastert, Vice President

For Submittal to:
City and County of Honolulu, Department of General Planning

FINAL
ENVIRONMENTAL IMPACT STATEMENT

FEBRUARY 1987

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- A. Housing Market Analysis: A Supplemental Study for General Plan Amendment Application Relating to Implementation of Mililani Town Master Plan. Tyrone T. Kusao, Inc. May 1984, Revised December 1986
- B. Preliminary Market Study for a Proposed Retirement Community at Mililani Town, Oahu. Helber, Hastert, Van Horn & Kimura. March 1985
- C. Mililani-Mauka Electrical & Communications Study. M&E Pacific, Inc., August 1985
Mililani-Mauka Potable Water System Onsite/Offsite Evaluation:
Mililani-Mauka Groundwater/Surface Water:
Mililani-Mauka Wastewater System Onsite/Offsite Evaluation. M&E Pacific, Inc. October 1986
- D. Mililani Town Water Master Plan. M&E Pacific, Inc. December 1986
- E. Preliminary Drainage Report for Mililani-Mauka. EDP Hawaii, Inc. October 1986
- F. Central and Leeward Oahu Transportation Study. Parsons, Brinckerhoff, Quade and Douglas, Inc. May 1986
- G. Traffic Impact Study: Mililani Town Master Plan. Parsons, Brinckerhoff, Quade and Douglas, Inc. May 1984
- H. Loop Ramp Study, Mililani-Mauka, Mililani, Hawaii. Parsons, Brinckerhoff, Quade and Douglas, Inc. January 1985
- I. Hierarchy of Agricultural Lands Study: Central Oahu Lands. Diversified Agriculture Task Force, Castle and Cooke, Inc. March 1984
- J. Terrestrial Flora and Fauna Survey: Proposed Mililani-Mauka Project, Island of O'ahu. Winona P. Char, Char & Associates. August 1985

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- K. Archaeological Study. William Barrera, Jr., Chiniago, Inc. July 15, 1985
- L. Mililani-Mauka Planning Program Newsletter. Numbers 1-6. Mililani Town, Inc. October 1984- June 1985
- M. Air Quality Study. Barry D. Root. December 1986.

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=====**CHAPTER I**=====

INTRODUCTION AND SUMMARY

1.1 INTENDED USES OF THIS DOCUMENT

This environmental impact statement (EIS) has been prepared in support of a request to amend the Central Oahu Development Plan. On July 21, 1986, Mililani Town, Inc. (MTI), (hereinafter referred to as the Applicant), submitted an application to amend the Central Oahu Development Plan to the Department of General Planning (DGP), City and County of Honolulu. An environmental assessment was also submitted at that time pursuant to Section 343-5(a)(6), Hawaii Revised Statutes. Specifically, the amendment requested a change in the Central Oahu DP Land Use Map from the existing Agriculture designation to the following DP land use categories: Residential, Low-Density Apartment, Commercial, Park Public Facilities and Preservation. The purpose of the requested amendment is to permit the applicant to develop the proposed 6,600 unit Mililani-Mauka residential community.

By letter dated July 24, 1986, DGP notified both the applicant and the Office of Environmental Quality Control (OEQC) of their determination that an EIS would be required for the proposed residential development (Chapter XI). Pursuant to this determination, an environmental impact statement preparation notice (EISPN) was published in the August 8, 1986 issue of the OEQC Bulletin. At the same time, a more detailed version of the EISPN was sent directly to 30 agencies and organizations thought to have an interest in providing input into the preparation of the EIS (Chapter XI). A total of 21 responses were received during the initial thirty-day request-for-comments period. All concerns raised in these responses have been addressed in the relevant sections of this EIS (Chapter XI).

The Draft EIS was filed with the accepting agency (DGP) and with OEQC for public distribution on December 20, 1986. Notice of the Draft was published in the OEQC Bulletin. Of the sixty reports distributed to interested agencies and organizations, a total of 26 comments were received. These comments and our responses are reproduced in Chapter XIII.

This EIS is intended to comply with Chapter 343, HRS and the EIS regulations promulgated by Chapter 200 of Title 11, Department of Health. The purpose of this EIS is to provide information to public agencies and members of the community about the nature of the subject action; to assess the existing environmental conditions of the property and surrounding areas; to evaluate potential impacts of the proposed Mililani-Mauka residential community; and to consider alternatives to the proposed action.

1.2 DESCRIPTION OF PROPOSED ACTION

The applicant proposes to develop the approximately 1,200 acre site into a planned residential community consisting of a range of residential and related land uses. The proposed action constitutes the final development phase of the 3,500 acre Mililani Town master plan originally conceived in 1968.

The residential development will ultimately provide housing for approximately 6,600 households with a build-out population of approximately 21,000 residents.

Development Summary

Applicant: Mililani Town, Inc.
130 Merchant Street
Honolulu, Hawaii 96803

**Consultant for
Environmental
Impact:
Statement** Helber, Hastert, Van Horn & Kimura, Planners
Grosvenor Center, PRI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

**Property
Location:** Directly north and mauka of Mililani Town.
Approximately 2-miles south of Wahiawa and
5-miles north of Waipahu/Pearl City.

Tax Map Keys: 9-5-01: por. 1
9-5-02: por. 1

Parcel Size: Approximately 1,200 Acres

Action: Applicant action. This Environmental Impact
Statement has been prepared pursuant to Chapter
343, HRS as an integral part of an application for a
Development Plan amendment to change the Central
Oahu Development Plan from the present
Agricultural designation to the following land use
categories: Residential, Low-Density Apartment,
Commercial, Parks and Recreation, Public and
Preservation.

**Accepting
Agency:** Department of General Planning,
City & County of Honolulu.

**Existing Land
Use Regulations:** State Land Use District: Agriculture
County Development Plan
Land Use Map: Agriculture
County Zoning: Ag-1

**Existing
Land Uses:** Site is presently under pineapple cultivation and
contains no permanent structures. Existing
improvements are related to agricultural operations,
such as dirt roads. Located on the site but under
separate ownership are several water tanks and a
water distribution facility owned by the Honolulu
Board of Water Supply.

**Proposed
Land Uses:** Development of a self-contained residential commu-
nity including 5,630 residential units and 1,010 low-
density apartment units, convenience commercial
area, school and church sites, and a number of parks
and recreation centers.

1.3 RATIONALE FOR ACTION

The housing market study prepared in conjunction with the DP amendment application (Appendix A) indicates a significant unmet demand for residential housing of the type proposed herein. Moreover, the applicant has had extensive experience in Central Oahu housing production and has established a sound track record of developing a high-quality housing product and adapting to changing housing market demands.

1.4 SUMMARY OF PROBABLE IMPACTS

- o Land Use. The development of the 1,200 acre project will irretrievably commit the site to urban uses (Chapter VIII).
- o Flora and Fauna. No endangered flora or fauna was found to inhabit the site or the adjacent areas of the Ewa Forest Reserve (Chapter 4.8).
- o Historic and Archaeological Resources. The State Historic Sites Office has concurred with the archaeological consultant that "if any structural remains of an archaeological or historical nature ever existed on the subject property, pineapple cultivation has long since erased any such evidence" (Chiniago, 1985:2) (Chapter 4.12).
- o Agricultural Potential. The project area is presently under Pineapple cultivation by the Dole Company. The State Department of Agriculture has indicated that the project site "has generally good agronomic conditions," thus the urbanization of the site would result in the loss of productive agricultural lands. However, studies prepared by Castle & Cooke, Inc. have indicated that the project site is inferior for the production of pineapple for the fresh-fruit market and has therefore shifted production to more productive lands in the Whitmore/Helemano area (Chapter 4.6).
- o Noise. Noise from adjacent military activities (Wheeler Air Force Base aircraft operations and Army East Range maneuvers) and vehicular movements along the H-2 Freeway fronting the subject site will continue to impact portions of the site (Chapter 4.9).
- o Transportation Facilities. Traffic studies prepared for the project indicate that vehicular traffic generated by the development will have a significant impact on vehicular movements at the Mililani Interchange. Traffic generated by the development will also adversely affect downstream traffic movements along the H-2/H-1 corridors. Traffic study findings indicate that traffic conditions in the Halawa/Waiawa corridor will be better than existing conditions by 1995. This condition is likely to revert to current levels by 2005, unless travel demand is reduced (Chapter 6.1).
- o Air Quality. Under "worst-case" meteorological conditions, the State's ambient air quality standards for carbon monoxide will be exceeded at the Mililani Interchange. It should be noted that CO levels are currently in excess of State standards and are expected to decrease at the Interchange even with the proposed project (Chapter 4.10).

1.5 SUMMARY OF MITIGATING MEASURES

- o Construction-related impacts such as soil erosion and fugitive dust will be minimized by utilizing recognized construction techniques such as construction phasing, sprinkling, and early grassing (Chapter 4.10).
- o Productive pineapple acreage displaced by the residential development has been replaced in more agronomically desirable locations near the Whitmore/Helemano area (Chapter 4.6).
- o All structures within the proposed residential community will be designed and constructed to conform to County building standards. Highway noise and noise from military activities will be mitigated by placing compatible land uses in impacted areas (Chapter 4.9).
- o Loop ramps will be constructed at the Mililani Interchange to accommodate increased traffic flows generated by the proposed development. A regional transportation study prepared in conjunction with this EIS indicates that highway improvements planned for the H-1/H-2 corridors will generally improve traffic conditions over the next 10-year period (Chapter 6.1).
- o Air quality at the Mililani Interchange will be improved by the construction of loop ramps and the influence of federal pollution abatement controls (Chapter 4.10).

1.6 SUMMARY OF UNRESOLVED ISSUES

The existing General Plan population distribution policies should be amended before these proposed amendments are made to the Central Oahu DP. This amendment process is underway and is expected to be completed by July 1, 1987.

1.7 RELATIONSHIP TO LAND USE PLANS AND POLICIES

Chapter III contains a detailed discussion of the relationship between government plans and policies and the proposed action. The Mililani-Mauka land use plan is consistent with all relevant public objectives except for portions of the City and County of Honolulu's General Plan and Central Oahu Development Plan and the State Land Use District Boundary.

1.8 ALTERNATIVES CONSIDERED

Chapter VIII presents an examination of two alternative actions: (1) "no action" (no amendment to the existing Central Oahu Development Plan); (2) Alternative urban land use configurations (a total of five alternative configurations are examined).

The alternative scenario analysis indicates that: (1) the site is no longer considered desirable for pineapple production; (2) no alternative economically productive agricultural crop exists to replace pineapple; (3) the site is ideally suited for urban

development; and, (4) after exploring a range of land use plans for the site with community organizations, the proposed plan makes the highest and best use of the site.

1.9 LIST OF NECESSARY PERMITS AND APPROVALS

A number of permits and approvals must be secured by the applicant before development of the site can begin. Major permits and approvals still outstanding are listed in Table 1.

Table 1: NECESSARY PERMITS AND APPROVALS

<i>Authority</i>	<i>Approval Required</i>
<u>State of Hawaii</u>	
Land Use Commission Department of Health Board of Land and Natural Resources	Land Use District Boundary Amendment New Water Source System Approval Increased water allocations within Pearl Harbor Ground Water Control area
<u>City and County of Honolulu</u>	
Department of General Planning	General Plan Amendment
Department of Land Utilization	Central Oahu DP Amendments
Department of Public Works	Change of Zone Application
	Subdivision Approvals
	Building Permits
	Grading Permits

=====**CHAPTER II**=====

PROJECT DESCRIPTION

This Chapter presents descriptive information on the proposed Mililani-Mauka development. The project site is first located and then briefly described. A brief history of the development of Mililani Town is then presented followed by an overview of the main features of the proposed development. A discussion of master plan objectives, planned land uses and associated infrastructure systems is then presented. A synopsis of the housing market study (forming the basic rationale for the proposed residential development) is then discussed. Finally, a description of project phasing is presented.

2.1 LOCATION

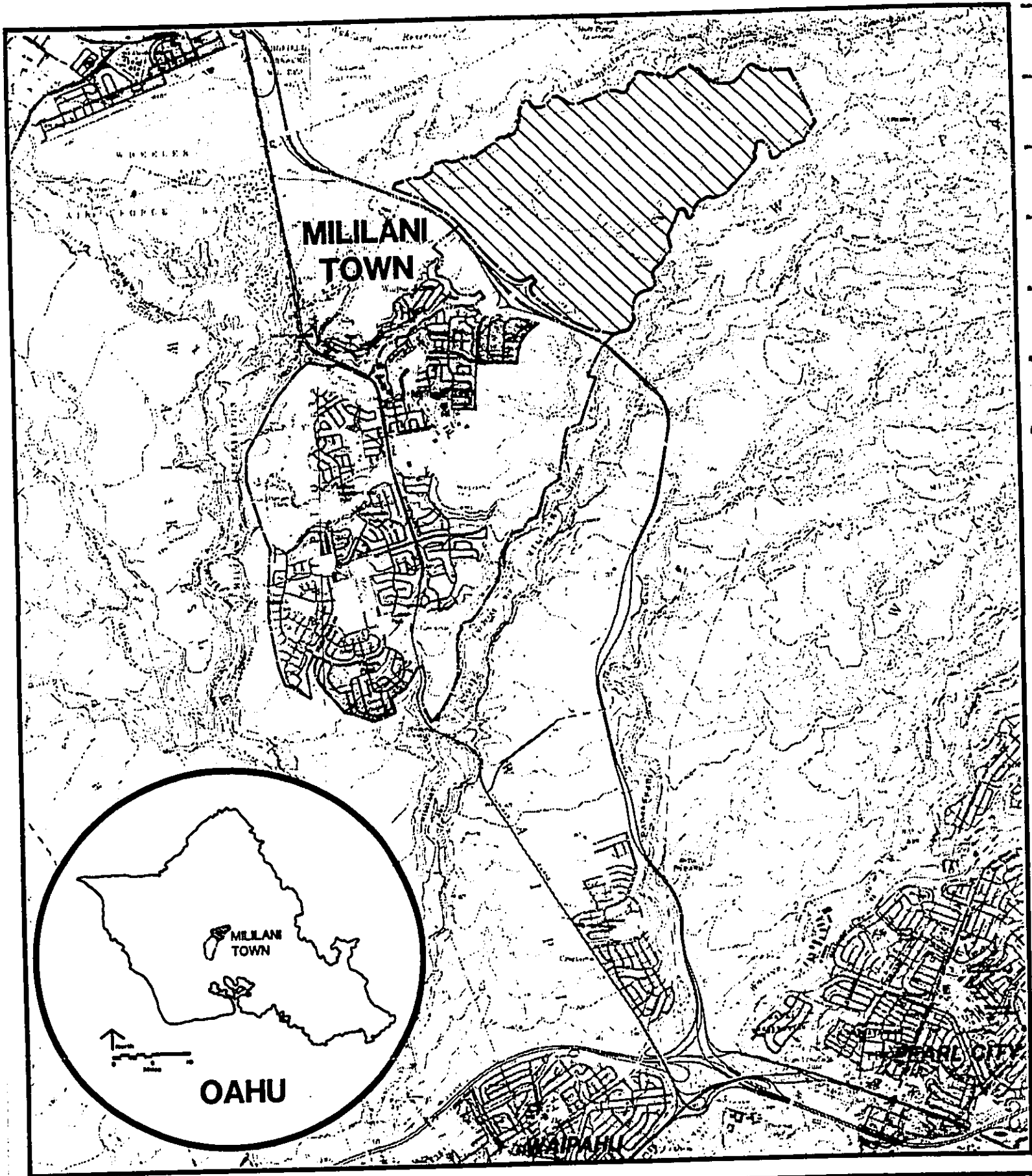
The applicant, Mililani Town, Inc., is requesting a Development Plan amendment for a 1,200-acre parcel of land located northeast or "mauka" of the existing Mililani community and the H-2 Freeway (hence the name, "Mililani-Mauka"). The site is located in the Ewa Judicial District which encompasses south-central Oahu. For County planning purposes, the site is part of the Central Oahu Development Plan area, which extends from the Waipio Peninsula to Whitmore Village, north of Wahiawa. The central Oahu region generally refers to a broad plateau between the Waianae mountain range on the west and the Koolau mountain range on the east. This corridor connects the southern portion of the island with the north shore (Figure 1).

The project site consists of two parcels identified for taxation purposes as TMKs 9-5-01: por. 1 and 9-5-02: por. 1 (Figure 2). The subject area is owned in fee by Castle and Cooke, Inc. The applicant, Mililani Town, Inc. is a wholly owned subsidiary of Oceanic Properties, Inc., which is a wholly owned subsidiary of Castle & Cooke, Inc. The subject property is currently designated as Agriculture on the Central Oahu Development Plan Land Use Map.

The property has three distinct edges bounded on the north and south by the Waikakalaua and Kipapa Gulches, respectively, and to the east by the H-2 Freeway. The mauka boundary extends to a privately owned orchard and the edge of the Ewa Forest Reserve. A more detailed description of surrounding land uses is found in Chapter 4.2.

2.2 HISTORY OF MILILANI TOWN DEVELOPMENT

The idea for Mililani Town originated in the late 1950's, when the Hawaiian Pineapple Company, subsequently merged into Castle and Cooke, Inc., began exploring ways of diversifying the use of their large land holdings in Central Oahu. It was also becoming clear that Oahu would soon have to accommodate a rapidly growing population as the principal island of the newly admitted fiftieth state.



Location of Project Area

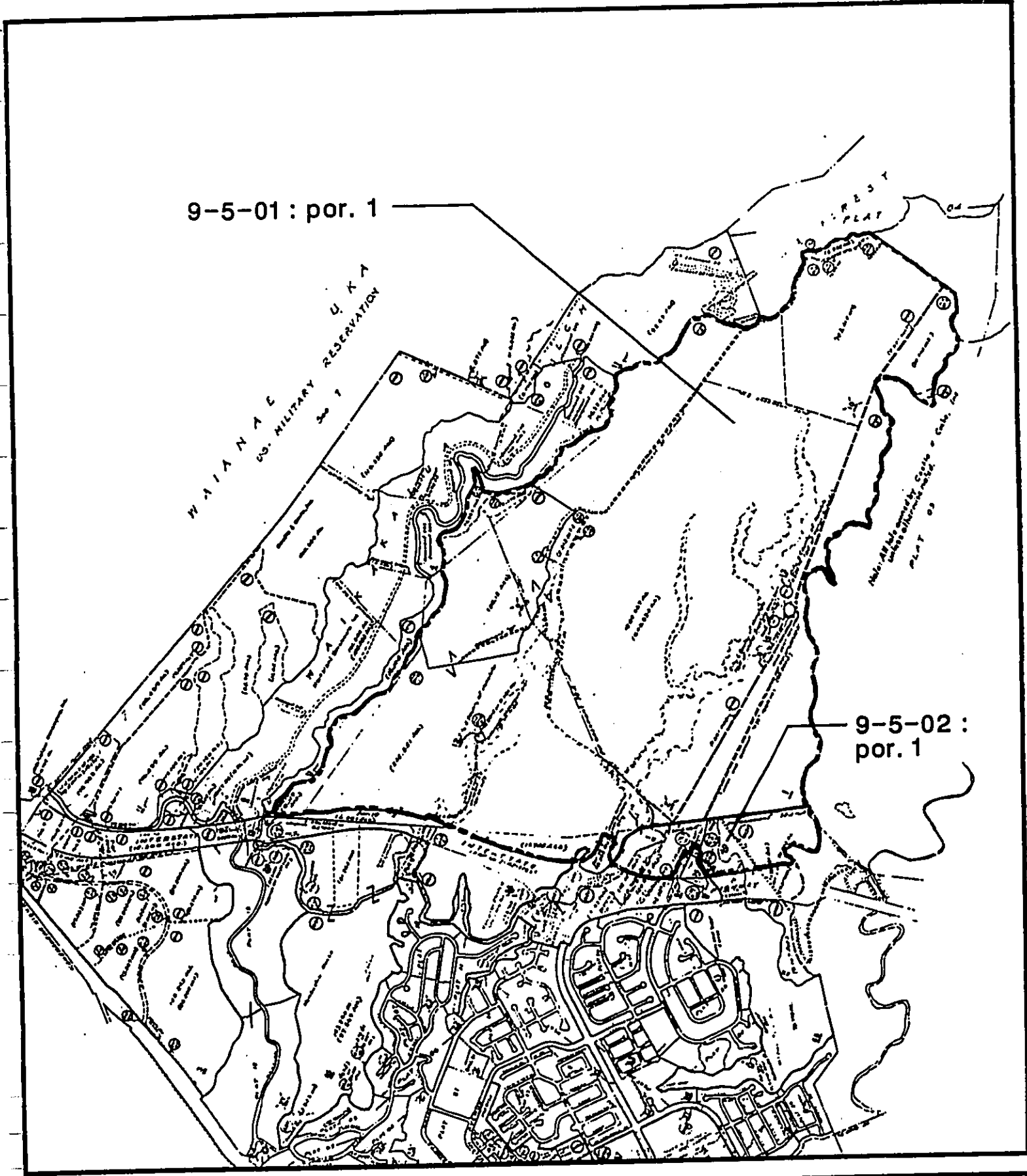
0 4000'



Figure: 1

MILILANI-MAUKA

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Tax Map



Figure: 2

MILILANI-MAUKA

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An inter-disciplinary team of planners, economists, engineers, and designers prepared a twenty-year development plan for the new community named Mililani Town. On the basis of the "3,500-Acre Master Plan," as it came to be known (Figure 3), Castle and Cooke's development arm, Oceanic Properties, Inc., created Mililani Town, Inc., as the corporate entity charged with implementation of the plan. Mililani Town, Inc. began sales in 1968. The 1,200-acre Mililani-Mauka site is the final phase of the original planned residential community of Mililani Town. The initial phases of Mililani (makai of the H-2 Freeway) cover approximately 2,300 acres of land and houses approximately 26,500 residents in 7,861 homes.

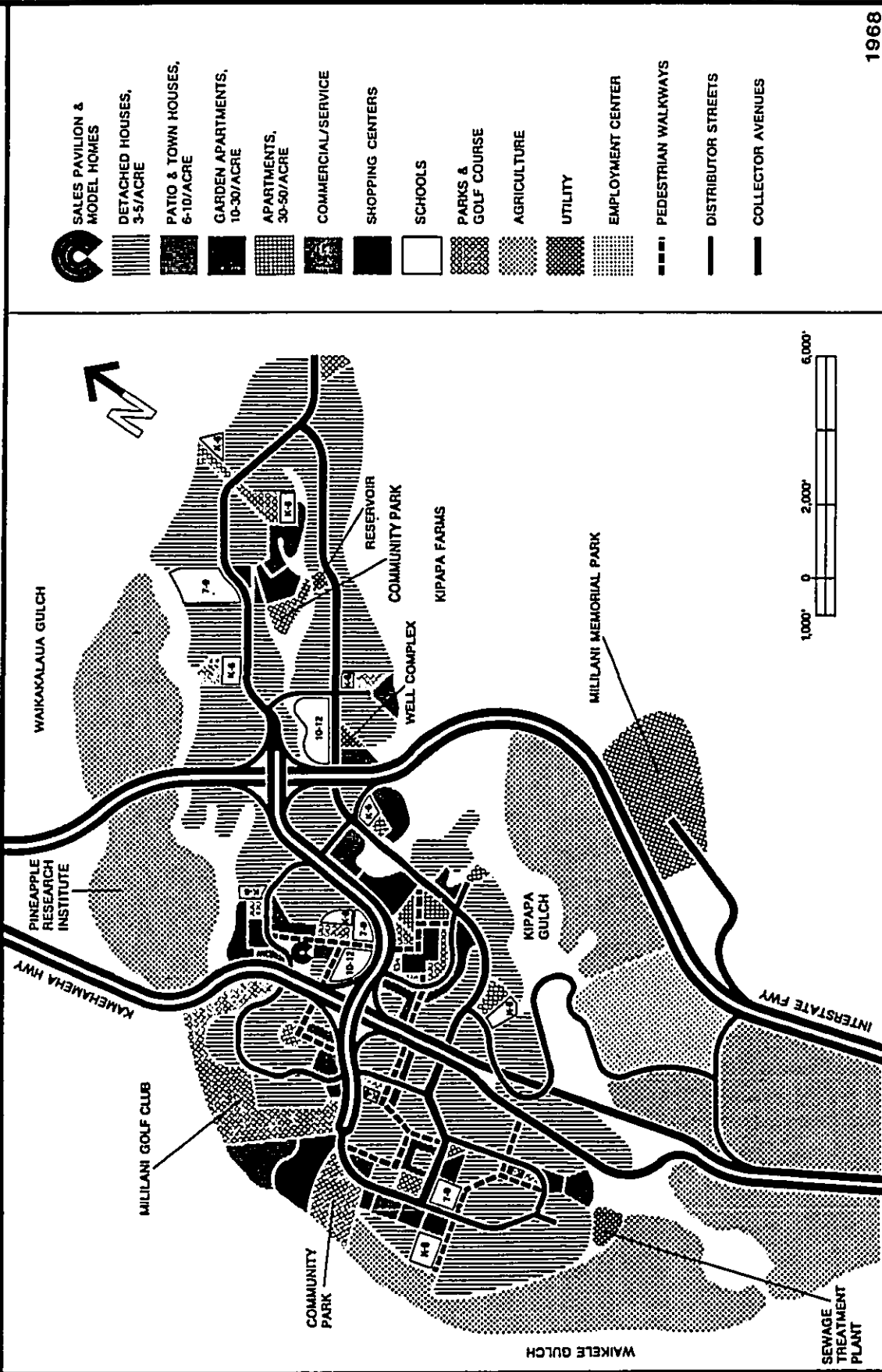
Since 1973, the demand for detached single family homes at Mililani has outpaced supply, except during brief periods of high interest rates. As a result of this demand, it is estimated that the area makai of the freeway will be fully developed by 1990 under the current construction timetable.

2.3 MAIN FEATURES OF THE PROPOSED DEVELOPMENT

The conceptual land use plan for Mililani-Mauka includes approximately 1,010 low-density apartment and townhouse units and 5,630 single-family dwellings, which may range in type from luxury homes to conventional subdivisions to zero-lot-line and cluster developments. At least 10 percent of the total number of units to be built in Mililani-Mauka will be targeted for households in the low-mod to gap group categories and may be located on-site. The residential population of Mililani-Mauka is projected to be approximately 21,000 persons. In addition, sites are reserved for a neighborhood commercial center, two elementary schools and one intermediate school, a district park, three neighborhood parks, three recreation centers, and several churches.

Several other unique facilities are proposed for the Mililani-Mauka area which are not present in the existing Mililani development but are intended to serve or complement the entire community. These include:

- o A college or university site which is large enough to accommodate the University of Hawaii's West Oahu College, should the University choose to locate a campus in this area. (Preliminary discussions have taken place with the University administration, but no commitments have been made.) If the University does not choose to utilize the site, efforts will be made to find another college, vocational school, or private educational institution to occupy the site which is located across the gulch from the Hawaii Technology Park and could be the basis of a beneficial symbiotic relationship.
- o The Mililani-Mauka Advisory Committee identified a retirement community as a desirable element of the Mililani-Mauka land use plan. Should market conditions warrant, the community could consist of a full range of housing from full-service care facilities to detached single-family dwellings. It could also contain a senior citizens' center as a social and recreational gathering place for the community's residents. (Discussions with retirement community operators have indicated that projected market conditions may ultimately support the development of a 20-30 acre site.)



**3,500 Acre
General Plan**



Mililani Town

Mililani Town 3,500 Acre General Plan : 1968

Figure: 3

MILILANI-MAUKA

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- o A park-and-ride transit facility where commuters can leave their cars and take the express bus to work. (It could also serve as a station location in the event that a fixed-rail transit system is built out to Mililani.) It is located so that it can also serve as parking for the district park, the adjacent recreation center, and churches on weekends and evenings.

2.4 THE MASTER PLAN

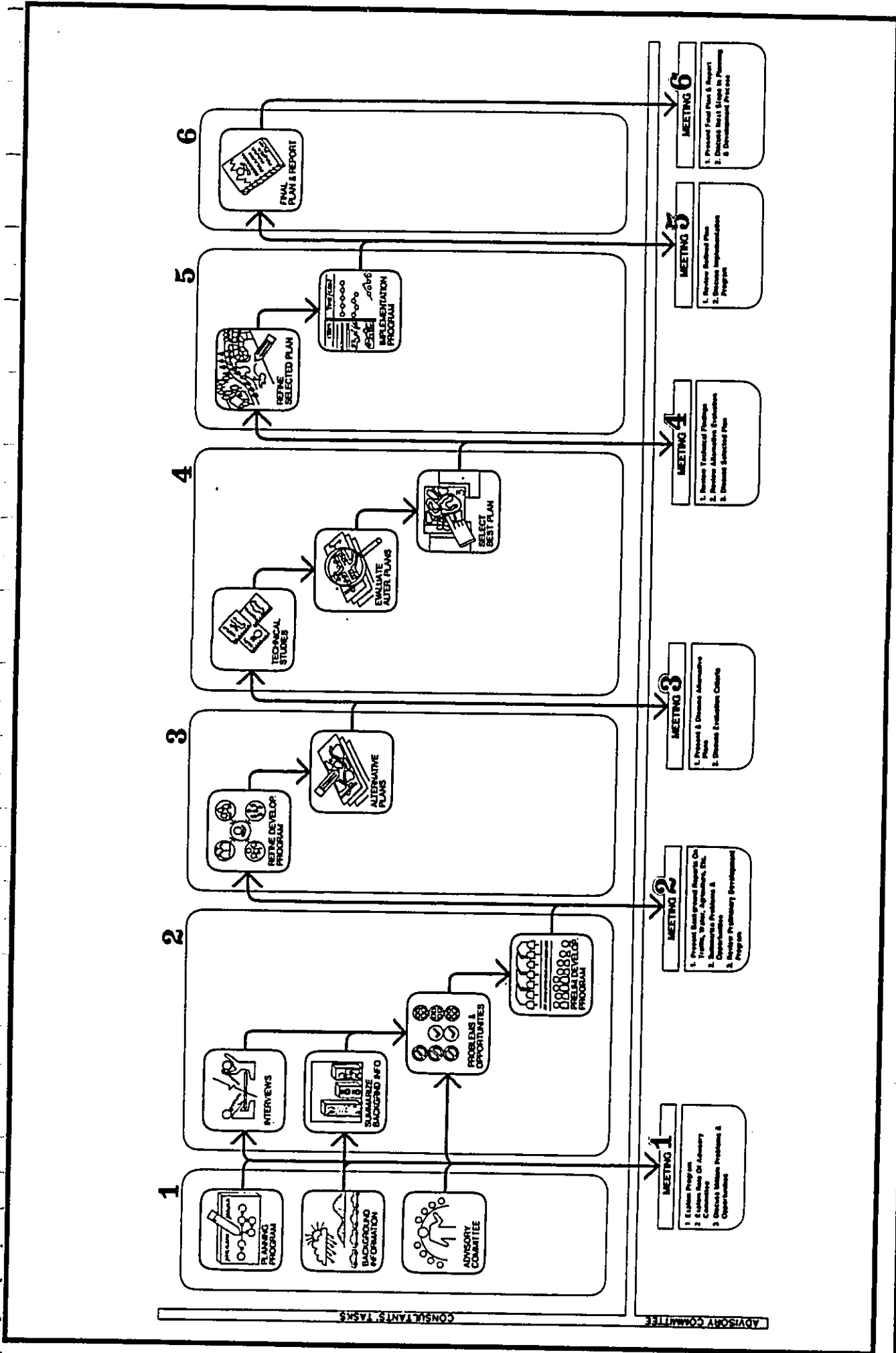
The Mililani-Mauka master plan is based on development concepts that continue the planned-community tradition of Mililani Town. The developed areas offer not only residential uses, but also small-scale commercial uses and substantial areas of open and recreation space to create stable, congenial neighborhoods.

The master plan identifies land uses that can be designed to maintain and enhance the environmental qualities of the site while minimizing adverse effects on the surrounding areas. Several gulches which dissect the site form the principal physiographic elements. The gulches will not be developed, but will form major open spaces and visual amenities for home sites alongside them. Otherwise, the project site is generally amenable to development. Soils have low to moderate shrink-swell potential with gradients usually less than 10 percent. The parcel is currently cultivated in pineapple and extensive disturbance of the surface has eliminated the possibility of remaining historic sites or rare or endangered plant or animal life.

2.4.1 Mililani-Mauka Advisory Committee

Coordination with adjacent land uses and existing developments has been an important part of the planning process. From October 1984 to June 1985, planners and developers held a series of six meetings with an advisory committee comprised of representatives from 26 community organizations in Mililani. Figure 4 shows the steps in the planning process. The advisory committee's involvement centered around the meetings. Members were encouraged to inform their organizations about their activities so that questions and concerns could be raised at subsequent meetings. Newsletters prepared in conjunction with the planning meetings are contained in Appendix L.

The final plan also draws on the the experience of existing residents who were surveyed by the developer through the neighborhood newspaper and again by the Mililani Neighborhood Board. Residents' preferences for various types of land uses and community facilities have been incorporated into the plan to maintain the high quality and market appeal of the area.



Planning Process

Figure: 4

MILILANI-MAUKA

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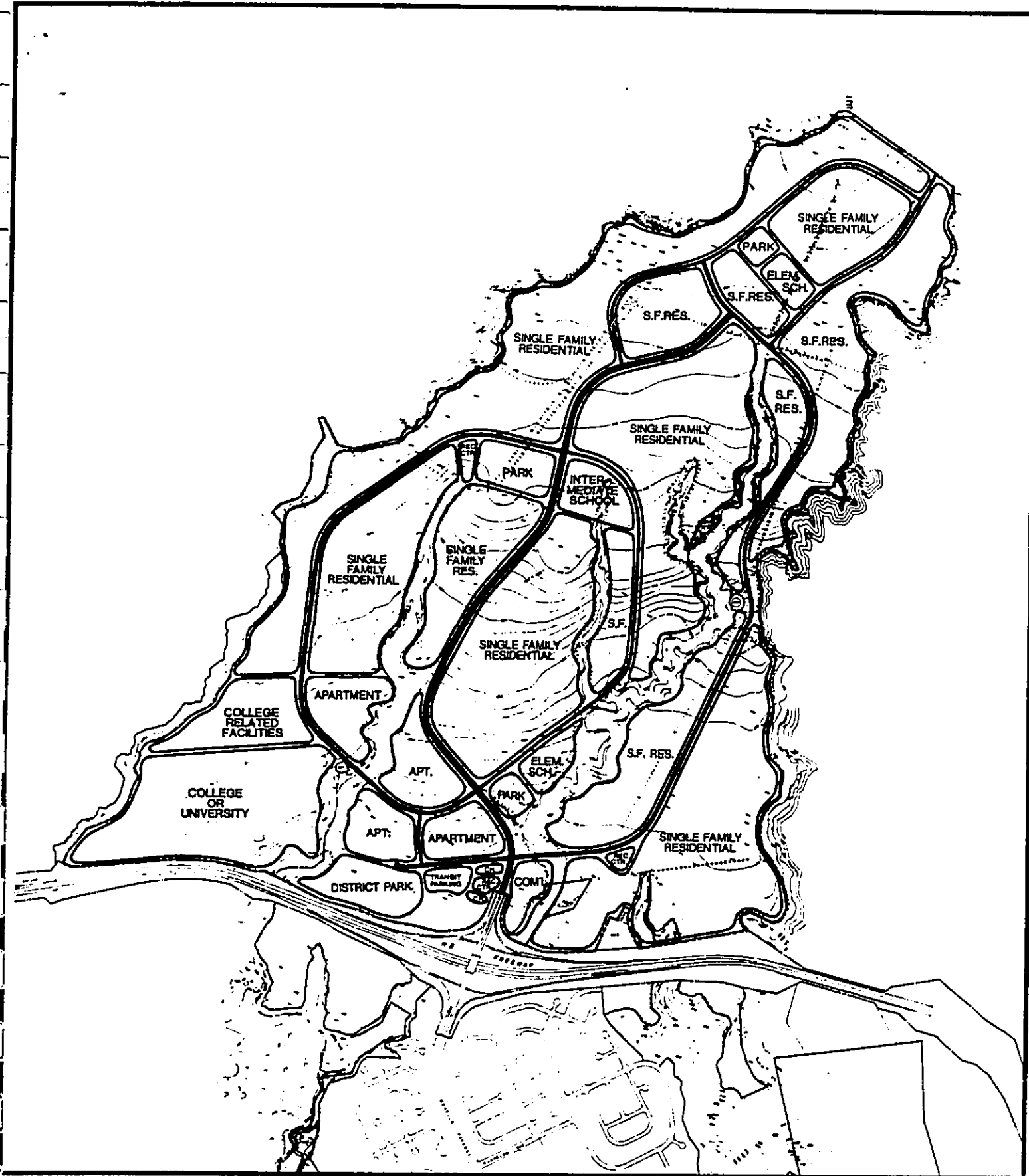
2.4.2 Master Plan Objectives

The Mililani-Mauka master plan includes the following objectives:

- a. Increase Oahu's housing inventory and expand housing choices for Hawaii residents in a range of income groups, thereby promoting greater mobility. The building program will be coordinated with demand level, notably employment growth in central and west Oahu and the availability of water resources.
- b. Design a well-planned and safe living environment to promote a greater sense of "community well-being" and increase people's stake in their community by promoting homeownership.
- c. Ensure that future generations have a residential base to support adequate standards of living.
- d. Coordinate residential development with the plans of Castle and Cooke/Dole for pineapple production. Agricultural operations should be rationalized to achieve economic profitability and thereby maintain the long-term viability of the industry.
- e. Support development in areas reasonably free of natural hazards, such as flooding, steep slopes, and soils with high shrink-swell potential.
- f. Arrange land uses within the project area and in the region to allow efficient provision of public services.
- g. Design a development which minimizes adverse effects on the community, such as noise, degradation of air and water quality, and disruption of major view planes.

2.4.3 Land Use

The master land use plan, shown in Figure 5, incorporates several types of housing units, recreation centers and parks, a commercial area, churches, and schools. This type of development is essentially a continuation of existing land uses in Mililani Town. In addition, the mauka portion introduces specialized land uses that may be supported by a larger market, such as a university campus, retirement community, and park-and-ride facility. Table 2 presents a summary of the proposed land uses planned for development. Each of the land uses is described in greater detail on the following pages.



Master Plan



Figure: 5

MILILANI-MAUKA

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Table 2: LAND USE SUMMARY

<u>Use</u>	<u>Acreage</u>	<u>Percent</u>
Residential	770	64
Low-Density Apartment	60	5
Commercial	5	*
Park/Recreation	46	4
Community Facilities	211	18
Preservation	108	9
TOTAL	1,200	100

* Less than 1 percent

2.4.3.1 Residential (770 acres)

The applicant plans to develop approximately 5,630 single-family residential units, including a full range of dwelling types, such as luxury homes, zero-lot-line developments, cluster homes, and conventional subdivisions. Table 3 shows the type and number of dwelling units planned for Mililani-Mauka.

Table 3: PROPOSED HOUSING TYPES

<u>Type</u>	<u>Acres</u>	<u>Units</u>	<u>Density</u>
S. F. Residential	770	5,630	7/ac.
Apartment	60	1,010	17/ac.
TOTAL	830	6,640	8/ac.

2.4.3.2 Low-density Apartments (60 acres)

Approximately 1,010 low-density apartment and townhouse units will also be developed, many of which would probably tie in with the college or university campus.

2.4.3.3 Commercial (5 acres)

Retail facilities will be provided in a 5-acre convenience shopping area, similar to the Mililani Marketplace. This area will be adjacent to the Mililani interchange so as to be convenient to commuters.

2.4.3.4 Recreation/Parks (46 acres)

In all, four park sites are proposed for Mililani-Mauka: one district park comprising 20 acres near the entrance to the site, one large neighborhood park covering 12 acres near the center of the development, and two 4-acre neighborhood parks adjacent to the elementary schools. In addition, three sites for recreation centers are included in the plan. The recreation center closest to the freeway may be developed as a large, entertainment hall-type facility due to its convenient location near the transit parking area which would be able to accommodate a large number of patron vehicles. The 20-acre district park is located near the freeway because of the higher tolerance to potential highway noise impacts and the flatter topography of the site for playing fields. The drier climate of the lower elevation will also permit greater park usage.

2.4.3.5 Community Facilities (211 acres)

Sites have been reserved for three lower education facilities and one institution of higher learning. Two elementary schools of 6 acres each and one intermediate school on 12 acres will be located in Mililani-Mauka. The intermediate school is sited relatively far into the development area so the reserved parcel can be held open until the State Department of Education makes a final determination on the need for an intermediate school in Mililani.

Approximately 75 acres have been allocated for a college or university campus. Because this site is a self-contained portion of the Mililani-Mauka parcel, it can be developed as the need arises. The space allowance has been sized for a university campus; however, the site may also be appropriate for some other type of institution, such as a community college, private college, vocational/technical school, and/or a private school. A possible roadway connection with the proposed Hawaii Technology Park is being explored.

Several individual church sites are provided near the Mililani interchange. These sites have good accessibility and visibility, and are set away from major residential areas. Locations adjacent to commercial and transit facilities allow for shared parking.

A transit parking facility is proposed for a 6-acre site located just mauka of the Mililani interchange. The parking area will be provided initially for express bus riders with the potential for future development of a transit station. Transit parking will be able to accommodate approximately 500 cars.

2.4.3.6 Preservation (108 acres)

Approximately 108 acres, primarily the interior gulches, will be kept in their natural state.

2.4.4 Infrastructure

The project site is presently used for the cultivation of pineapple, and therefore is not served by infrastructural systems associated with urban development. The following section provides summarized information on proposed onsite infrastructure including roadways, water, sewer, power/communications and drainage systems. Information for this section has been obtained from engineering reports prepared in conjunction with this EIS and found in Appendix E. Existing offsite and regional infrastructural systems and related impacts are discussed in Chapter VI.

2.4.4.1 Water Facilities

In order to meet the water demands of the proposed project, onsite and offsite facilities must be developed.

Water demand for the proposed development is estimated as follows:

Table 4: POTABLE WATER DEMAND

Average Day Consumption	3.8 MGD
Maximum Day Consumption	5.7 MGD
Peak Hour Consumption	11.4 MGD

Source: M&E Pacific, Inc, 1986

The Mililani Town Water Master Plan (Appendix D) subdivides Mililani Town into three zones. Zones 2 and 3 represent the existing makai development while zone 1 encompasses the entire 1,200 acre mauka site. The site has been divided into two subzones as shown on Figure 6: Zone 1a (elevation 890 to 1,065 feet) and zone 1b (elevation 765 to 890 feet).

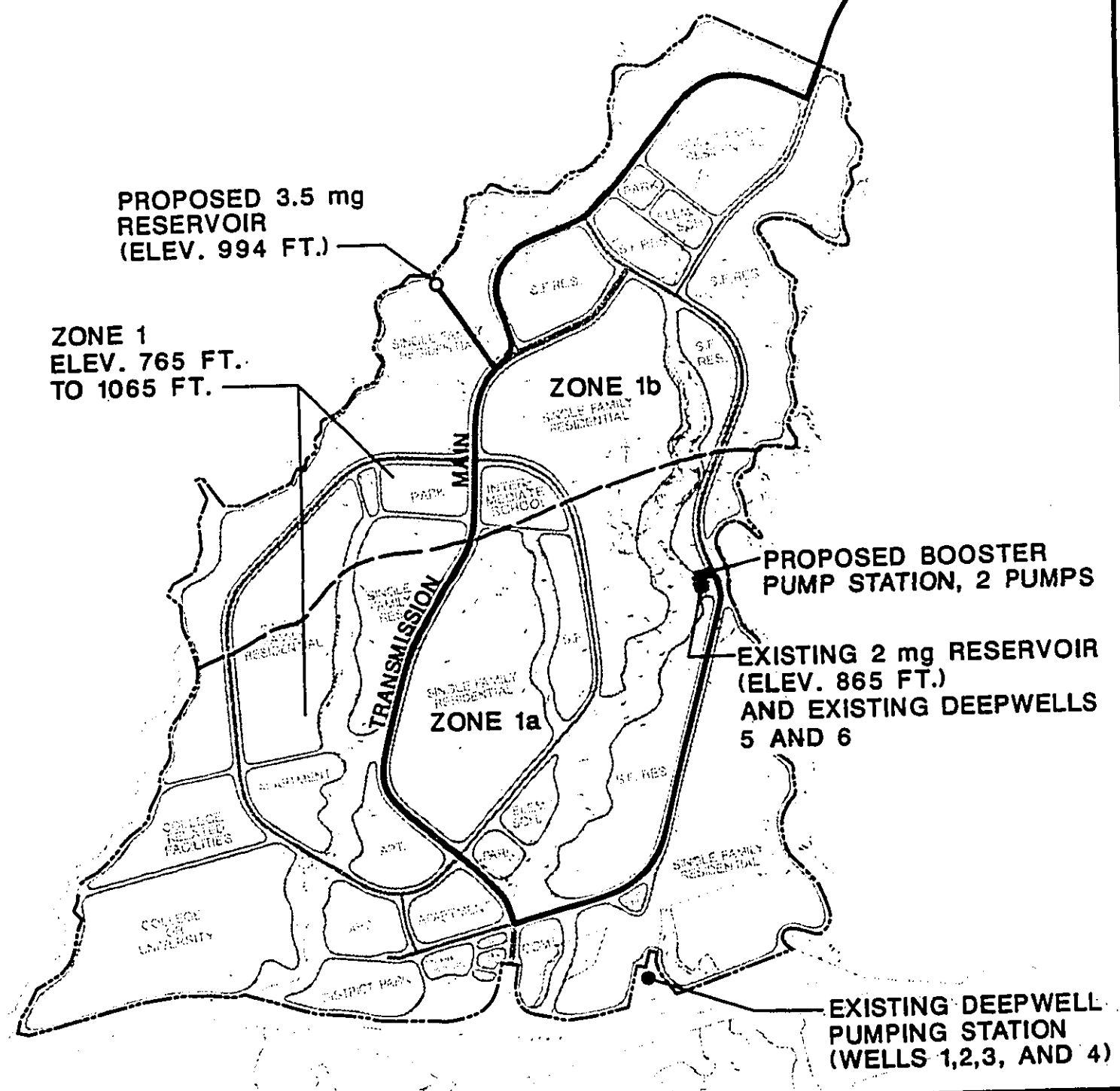
Source and storage facilities. Five wells (1,500 GPM each) with pumps and motors and three storage reservoirs will be required to service the proposed development.

The reservoir system will consist of one 3.5 MG reservoir located at the 994-foot elevation to serve the lower Mililani-Mauka area and 1.0 MG and 1.5 MG reservoirs at the 1,180-foot elevation to serve the upper Mililani-Mauka area. The deep well facility will be located at the 1,180-foot reservoir site.

**PROPOSED MAUKA RESERVOIR
AND DEEPWELL SITE**
1.5 mg AND 1.0 mg RESERVOIRS
DEEPWELLS 9-13, 1500 gpm EACH

**PROPOSED 3.5 mg
RESERVOIR
(ELEV. 994 FT.)**

**ZONE 1
ELEV. 765 FT.
TO 1065 FT.**



Water System

MILILANI-MAUKA



Figure: 6

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Transmission Lines. The transmission lines will be designed to supply the maximum day demand flow plus the fire flow with residual pressure of 20 PSI at the critical fire hydrant, the peak hour flow with a minimum pressure of 40 PSI and a maximum velocity of 6 FPS in accordance with the standards set forth in the Water Systems Standards. The transmission system will be located in roadways. It is estimated that there will be approximately 35,000 linear feet of transmission lines.

2.4.3.2 Wastewater

In order to meet the wastewater needs of Mililani-Mauka, construction of on-site facilities and off-site improvements will be necessary (Figure 7).

Flow assessment. The wastewater quantities generated by the Mililani-Mauka area are shown in Table 5 below.

Table 5: WASTEWATER FLOW ASSESSMENT

Design Average Flow	2.8 MGD
Design Maximum Flow	6.8 MGD
Design Peak Flow	8.3 MGD

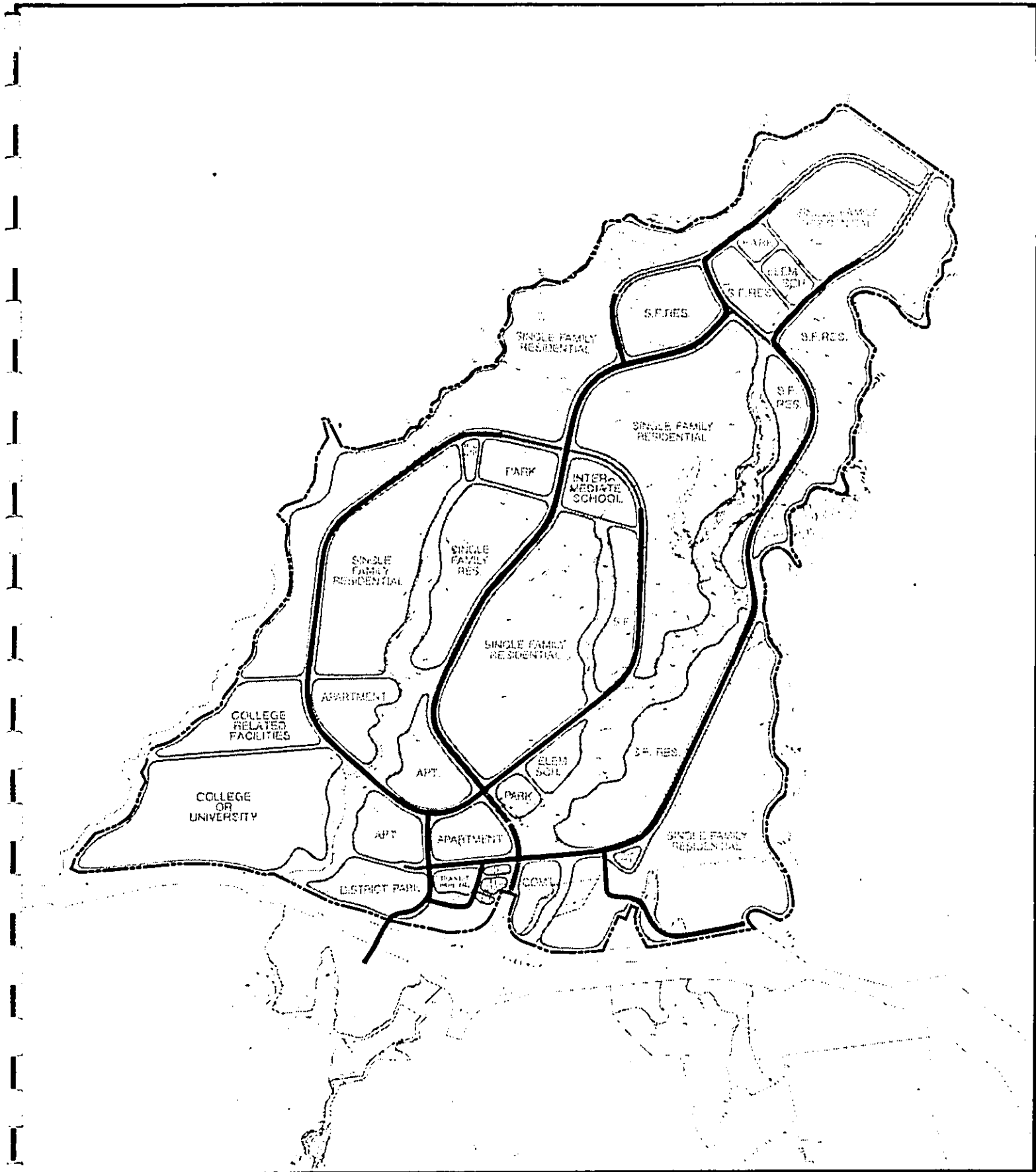
Source: M&E Pacific, Inc, 1986

The proposed onsite facility required for the proposed development is a wastewater collection system consisting of 8- to 21-inch diameter gravity sewer lines located in roadways and/or adjacent to rear lot lines. It is estimated that there will be approximately 35,000 linear feet of sewer lines. The mauka area wastewater collection system will be connected to the existing 21-inch diameter sewer line (inactive) under the H-2 Freeway and conveyed via the existing Mililani Town trunk sewer to the Mililani WWTP.

2.4.3.3 Power/Communications

Electrical Power. Two overhead 46 KV power lines cross the site in easements granted to the Hawaiian Electric Company which permit them to operate 46 KV transmission circuits. A 138 KV power line crosses the northeastern boundary of the site.

Electric power will be distributed within the project area via an underground system connected to a new Mililani-Mauka electrical substation. Power is to be supplied from the Hawaiian Electric Company's (HECo) Waiiau power plant via the existing 46 KV transmission circuits. Electrical distribution equipment will be installed by Mililani Town, Inc. and dedicated to HECo. HECo anticipates that either one of their existing 46-KV circuits can absorb the estimated 22.5-MVA increase in load due to the proposed development; however, an additional substation will be required to service the new electrical users. HECo expects to



Wastewater Facilities



Figure: 7

MILILANI-MAUKA

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install a 40-MVA substation on a lot size of 12,000 square feet. The proposed substation site is to be in the vicinity of the existing HECO 46-KV transmission lines in order to minimize the cost of extending 46-KV circuits to the substation. The entire system will be an underground facility with only the substation, switching vaults, 46-KV lines, and individual service transformers visible above ground.

Telephone. The Hawaiian Telephone Company does not have any facilities within the site; its nearest telephone facility is the duct bank stubout mauka of the Mililani interchange. This duct bank will be adequate to serve the development. Hawaiian Telephone will need a parcel of land, approximately 5,000 square feet in area near the Mililani interchange for a switching facility. The applicant will provide the required site.

Cable TV. Cable television facilities do not exist on the site but can be obtained from the trunking cable facilities located at the intersection of Meheula Parkway and Kuahelani Avenue.

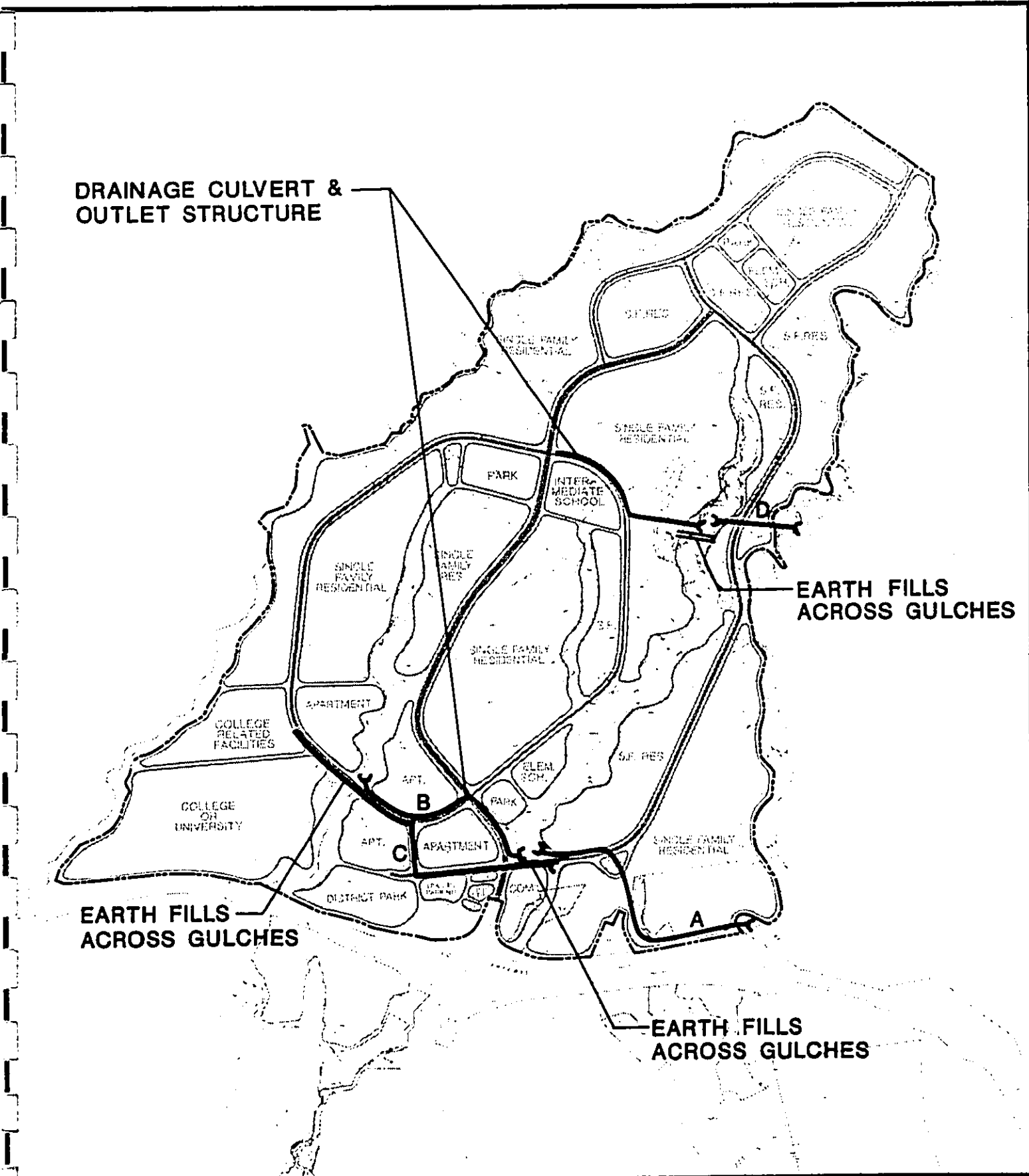
Street Lighting. Street lighting will consist of high pressure sodium lamps mounted on 30-foot steel or aluminum poles with bracket arms in accordance with the City and County of Honolulu's Department of Transportation Services' requirements.

2.4.3.4 Drainage

Increased paving in the mauka area is expected to reduce the volume of storm water absorption as well as the rate of absorption, thereby increasing surface runoff. No development is proposed for the two interior gullies which act as natural storm drainage channels. To avoid potential flooding of the makai area, earth-filled dikes will be installed in both gullies to cut off storm water originating in the upper two-thirds of the property (Figure 8). An underground drainage culvert and outlet structure will then transport the runoff to Kipapa Gulch. All drainage improvements will conform to the requirements and drainage design standards of the City and County of Honolulu Department of Public Works' Drainage Standards (see Appendix E).

2.4.3.5 Internal Roadways

Entrance to Mililani-Mauka will be via an extension of Meheula Parkway. Meheula Parkway also serves as the major arterial through the central portion of the proposed development. This main spine roadway provides access to the other primary roadways which will loop through the east and west sides of Mililani-Mauka. Collector streets will provide access to the entire development. Local streets and driveways to serve individual units and clusters will be constructed as necessary (Figure 9). Offsite improvements, such as signalization and ramp improvements at the Mililani Interchange are discussed in Chapter VI.



Drainage System

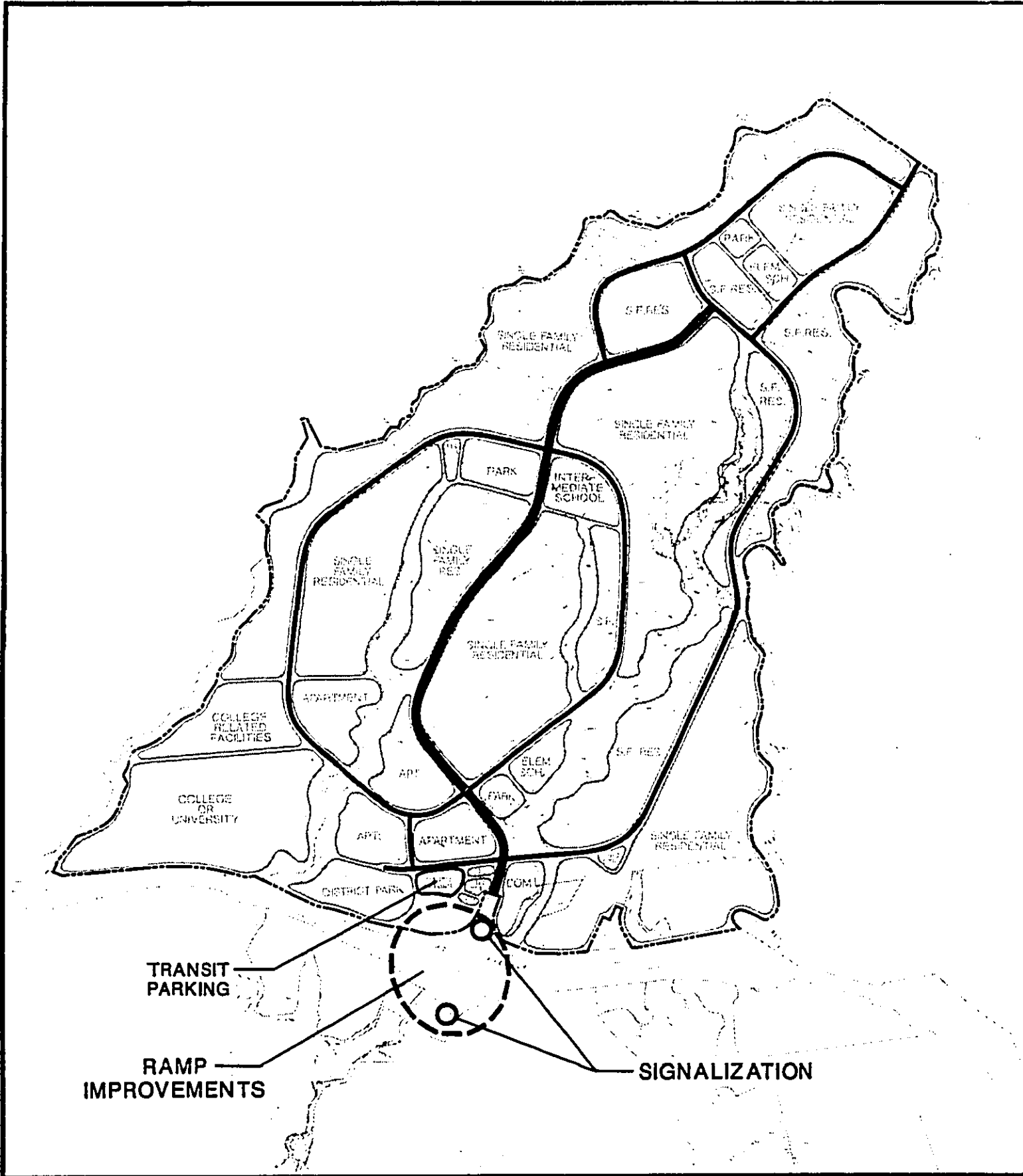
0 1500'



Figure: 8

MILILANI-MAUKA

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Roadways

0 ——— 1500'

MILILANI-MAUKA **Figure: 9**

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2.5 PROJECT RATIONALE

A housing market analysis for Mililani-Mauka was conducted in 1984 and updated in December 1986. Major findings are summarized below; the entire report is contained in Appendix A. A preliminary market study was also conducted to determine the feasibility of developing a retirement community at Mililani-Mauka. This study is presented as Appendix B and is also summarized below.

2.5.1 Housing Market

2.5.1.1 Oahu-wide Analysis

According to population projections made by the State Department of Planning and Economic Development (DPED) Series M-F, the average increase in Oahu's population to the year 2005 will be 6,995 persons annually. This is a decline from the 1970-1982 period during which the County's population increased at a rate of 11,700 persons annually. Oahu has also experienced a steady decline in household size, from an average of 3.93 persons per unit in 1960 to 3.62 in 1970, and 3.16 in 1980. It is estimated that by the year 2005, the average household size will consist of 3.0 persons.

The U.S. Department of Housing and Urban Development (HUD) has established a minimum vacancy rate of 5 percent to assure normal market choice, mobility, and turnover. For comparison, the average Oahu residential vacancy rate was 1.7 percent during the period 1977-1985. The projected housing requirement for the 1985-2005 period should respond to the projected number of new households, the anticipated loss of dilapidated units through demolition, and the normal 5 percent vacancy rate.

Based on the above factors between 1985 and 2005, the estimated need for housing is 80,028 units. Annual residential production over this 20-year period must average about 4,000 units annually in order to meet the projected demand. Between 1980 and 1985 housing production averaged only 2,818 units per year. At this rate there would be an annual shortage in production of 1,184 units. The distribution of units among single- and multi-family dwellings is almost equally divided according to the 1980 census. However, the rate of growth between 1970 and 1980 was greater for multi-family units than for single-family units.

2.5.1.2 Central Oahu Analysis

The 1984 population for the Central Oahu area was estimated by the Department of General Planning at 114,400 persons. By the year 2005 the population of Central Oahu is projected to reach 139,800, according to the City and County of Honolulu's General Plan population growth guidelines. The estimated number of housing units required to meet this projection equals 14,631 units or a production rate of 697 units annually.

Several housing projects are expected to add to the supply of dwellings in Central Oahu by the year 2005. These projects were classified in two categories by the housing study: Projects with Development Plan approvals; and, Projects currently requesting Development Plan approvals. Projects with Development Plan approvals will provide a total of 6,756 units (both single- and multi-family) at build-out. Projects currently seeking Development Plan approvals (including Mililani-Mauka) could provide an additional 15,270 units for a grand build-out total of 22,026 units.

The market study projected that only approximately 60 percent of the total units proposed for Central Oahu (or 13,216) would be completed by year 2005, leaving a short fall of 1,415 units (14,631 less 13,216). This shortfall was attributed to: uncertainties inherent in the development process which tend to reduce unit counts or delay project completions; the fact that a large proportion of the potential housing supply originate in entirely new undertakings requiring considerable start-up time for planning and infrastructure installations; and, potential for economic downturns and related impacts to housing affordability and absorption.

2.5.1.3 Mililani Town

Mililani Town is a continuing project with almost two decades of housing construction experience in Central Oahu. It has a major start-up advantage over future competitors who are just beginning to consider entering Central Oahu's housing market. To date, a total of 7,861 housing units have been sold at Mililani Town (1969-1986), averaging 437 units per year. For the most active 9-year period, 1971-1979, a total of 5,514 units were produced averaging 613 units per year. A total of 421 units are projected for completion during 1986.

The distribution of housing units that have been completed in the lower portion of Mililani Town is approximately two-thirds detached single-family units and one-third multi-family units. To lower the selling price of the detached units, the developer has designed smaller residences on scaled-down lots. These smaller single-family units have been well received by potential homebuyers.

Market conditions will decide the final mix of housing types and densities. While the existing community is a good indicator of residential development on the Mililani-Mauka parcel, general trends in the future of the housing industry will also influence the actual outcome of the project. For example, continued interest in detached, single-family homes and the need to keep prices down point to construction of smaller units on smaller lots, with a concomitant increase in densities from the present average of 5.5 units per acre to approximately 7.5 units per acre.

Consistent with the applicant's basic approach of continuing its present policies with respect to future developments, the bulk of the proposed housing units will continue to be priced to attract those in the middle of the homebuying market. Notwithstanding this, the applicant intends to provide at least 10 percent of the total number of units planned for Mililani-Mauka at prices affordable to households in the low-mod to gap group categories. These units will be constructed within the project area. More detailed arrangements for the provision of affordable housing will be determined in consultation with appropriate City agencies prior to rezoning.

2.5.2 Retirement Community

Based on input from the Mililani-Mauka Advisory Committee, an exploratory market study was conducted to assess the demand for a retirement community at Mililani-Mauka (Appendix C). The particular market assessed was comprised of Oahu householders 55 years of age and older who owned and occupied homes valued in excess of \$100,000 (1980 dollars). Population and household projections for the year 1995 identified a total of 27,800 eligible householders. Potential demand was then adjusted to reflect varying levels of attraction to the product; market appeal is assumed to be higher among persons presently living closer to Mililani. The study concluded that sufficient market demand would be available to support the development of a retirement community. A subsequent inquiry with a developer/operator of retirement communities on the mainland indicates that the preliminary market study findings tend to overstate existing market demand.

As presently envisioned, the retirement area could contain a full spectrum of residential unit types aimed at the 50-year old and greater age group. This sub-area of Mililani-Mauka will contain facilities catering specifically to the needs of the "retirement villagers," but would also be dependent on the greater Mililani community for other services.

2.5.3 College/University

Public policy makers have long recognized the need to provide post-secondary educational opportunities to residents of the growing Leeward and Central Oahu areas. To serve this need, a 75 acre site at the northwest corner of the project area has been reserved for a college/university campus. Directly above this site, another area (approximately 25 acres) has been reserved for "college-related activities." The appeal of the campus will be enhanced by the development of the Hawaii Technology Park in an area across Waikakalaua Gulch from the project site. The Hawaii Technology Park will be the major regional employer and its development could have a synergetic effect on university research activities. The applicant would provide the land to the interested operator who would then develop and operate the necessary facilities. At the present time, no operator has been identified but discussions are ongoing and the applicant is hopeful that one will be identified in the near future. Presented below is a brief discussion on potential users of the site.

Dr. Ralph Miwa, then Chancellor for both West Oahu College and the U.H. Hilo Campus [now Assistant to the President], was interviewed in August 1985 (Community Resources, Inc., November 1985) regarding the proposed College/University site. Dr. Miwa said that there had been little recent discussion of a possible move [to the proposed Mililani campus], but the University remains "definitely interested" in the offer of land. He felt there was "no question" that a second college was needed in Leeward/Central Oahu in light of the extensive planned growth there, and the establishment of a separate campus would permit rapid growth of West Oahu College, including provision of freshman and sophomore year classes. Such a full-service institution would also help alleviate crowded conditions at the U.H. Manoa Campus. At the same time, he noted there have been questions raised at the State Legislature about the true need for a

second campus in light of the significant capital expenditures which would be required, as well as questions about the propriety of the University accepting free land from developers.

Dr. Miwa estimated that the expansion opportunities afforded by a Mililani campus could result in 125 faculty members and 75 support staff within five years (which would represent the approximate initial construction period). By 2005, he believes, enrollment could be as high as 7,000 students, and the combined faculty/staff payroll would number about 450.

Other alternative users include private post secondary institutions, vocational/technical schools and, the Military. At the present time, the military provides extensive services through contracting institutions such as Central Michigan University, University of Southern California, Wayland Baptist University, etc. The various military branches with Oahu bases are beginning to centralize administration of these programs. Conceivably, a Mililani Campus could provide a fixed physical plant for higher education military contractors serving Pearl Harbor and other U.S. Navy facilities to the south and the various Army and Air Force bases to the north in Central Oahu.

2.6 PROJECT PHASING

Ultimate build-out of the site is projected to occur approximately ten to fifteen years after construction begins. Assuming an expeditious regulatory review process, current plans call for site-work to begin in 1989 with the first house deliveries to occur in late 1990.

The Mililani-Mauka parcel will be developed in phases generally beginning near the H-2 Freeway boundary and working in the mauka direction. Similar to the existing makai development, a production and market absorption rate of 400 to 500 units per year is being targeted.

CHAPTER III

**RELATIONSHIP OF THE PROPOSED PROJECT TO EXISTING
PUBLIC PLANS, POLICIES AND CONTROLS**

This Chapter presents a discussion on relevant State and County plans, policies and controls which affect the proposed developments. No Federal controls were found to be relevant to the proposed action. Objectives and policies of the Hawaii State Plan are discussed first, followed by a discussion of relevant State Functional Plans. This is then followed by a review of applicable provisions of the State Land Use Law. The relevant sections of the County General Plan and the Central Oahu Development Plan are then discussed. Finally, the applicability of the Coastal Zone Management Act and Chapter 343 HRS (Environmental Impact Statements) are examined.

3.1 HAWAII STATE PLAN

The Hawaii State Plan serves as a guide for the future long-term development of the State, including identification of goals, objectives, policies, and priorities for the State; a basis for determining priorities and allocating limited resources; and coordination of State and County Plans. In addition to the State Plan, twelve functional plans have been developed which set forth the policies, statewide guidelines, and priorities within specific fields of activities. In this section State Plan objectives and policies relevant to the subject application are presented and commented upon. Policies that are also included in the functional plans are reserved for discussion under the appropriate heading in the next section.

(226-5) Objectives and Policies for Population.

- (b) (3) "Ensure that adequate support services and facilities are provided to accommodate the desired distribution of future growth throughout the State."

Comment: The incremental expansion of Mililani Town's existing infrastructure necessary to accommodate population growth will be provided by the applicant. Installation of facilities and services to support population growth associated with the developments will require minimal use of public funds. Public funds required for operation and maintenance should be offset by increases in property and State income tax revenues. All capital improvement projects planned for future dedication to a public agency will be designed to City and County standards.

(226-6) Objectives and Policies for the Economy in General.

- (b) (6) "Strive to achieve a sustained level of construction activity responsive to and consistent with, State growth objectives."

Comment: Construction at Mililani Town has been continuous for almost 20 years, resulting in more than 6,700 units. Island-wide, approximately 6,000 new units are required each year to fulfill the housing needs of the population. This rate has been relatively steady for the last 10 years. An average annual production rate for both projects equal to its historical average of 453 units would represent 7.55% of the yearly demand for new housing. This pace of construction is consistent with the State's growth objectives.

(226-13) Objectives and Policies for the Physical Environment (Land, Air and Water Quality).

- (b) (7) "Encourage urban developments in close proximity to existing services and facilities."

Comment: The proposed Mililani-Mauka project is the final increment of the Mililani master plan. The earlier increments currently receive all necessary public services and contain the full array of utilities. In addition, some facilities, such as transmission lines, have been sized to accommodate the full development, which includes the 1,200-acre mauka area.

(226-24) Objectives and Policies for Facility Systems in General.

- (b) (1) "Accommodate the needs of Hawaii's people through improvement priorities established through the planning process."

Comment: A cost-effective means of satisfying immediate housing needs is by expanding the capacity of existing facilities, rather than constructing new facilities where none currently exist. The developments will provide a supply of marketable housing and are suitably located to fulfill the intent of this policy.

(226-104) Population Growth and Distribution Priority Guidelines.

- (a) (4) "Seek to provide for adequate housing to meet the needs of Hawaii's people without encouraging an additional influx of people."

Comment: The 1983 Mililani Purchaser's Profile Report shows that 99% of 1983 purchasers previously lived on Oahu. Mililani-Mauka will increase the housing alternatives available to Oahu residents.

- (c) (2) "Encourage urban growth primarily to existing urban areas where adequate public facilities are already available or can be provided with reasonable public expenditures."

Comment: The proposed project is currently classified in the Agricultural District. However, the subject parcel is inadequate for agricultural production because of deficiencies in environmental conditions. The project area is located adjacent to an existing urban development and would require only incremental expansion of

infrastructure and services to satisfy the requirements of the new users. All major utilities will be provided by the petitioner at his cost.

- (c) (7) "Seek participation from the private sector for the cost of building infrastructure, utilities and open space."

Comment: Mililani Town, Inc. will provide the necessary infrastructure to serve Mililani-Mauka. Sites for public facilities will be reserved in designated areas. Adequate park and open space has been an important component of the existing Mililani development. Overall, the acreage of parks dedicated in Mililani Town exceeds the requirement of the City's park dedication ordinance.

3.2 STATE FUNCTIONAL PLANS

Twelve Functional Plans have been established to act in coordination with the County General Plans and Development Plans toward implementing the Hawaii State Plan. The Functional Plans work as the primary guide posts for implementation of the Hawaii State Plan. At times, competing policy interests are found among Functional Plans. For example, areas designated for agricultural use may also be considered for housing. The Functional Plans pertinent to Mililani-Mauka are the Housing Plan, Agricultural Plan, Recreation Plan, and Water Resources Plan.

3.2.1 State Housing Plan

Objective A: Develop greater opportunities for Hawaii's people to secure reasonably priced, safe, sanitary, livable homes located in suitable environments that satisfactorily accommodate the needs and desires of families and individuals."

Comment: As of 1986, Mililani Town had provided homes for more than 26,500 Oahu residents, over 7,861 fee simple residential units. Mililani-Mauka will offer a variety of fee simple units in separate planned communities which, when combined, will include schools, churches, community centers, shopping facilities, and an 18-hole golf course. Community and market acceptance of Mililani Town indicates that Mililani-Mauka will be viable development programs, representing the highest and best use of the land and appropriate solutions to the housing needs of Honolulu. The present housing program at Mililani Town has reached a broad segment of the population. A limited number of custom lots and semi-luxury apartments have been developed to suit the needs of higher income categories. In recent years, homes aimed at the first-time home buyer have been developed with the New Design line of residential units.

Policy (A) (3): "Increase homeownership and rental opportunities and choices in terms of quality, location, cost, densities, style, and size of housing."

Comment: Since 1968, Mililani Town has provided a steady supply of quality homes to fulfill the range of housing needs for Oahu residents. These have included fee simple, detached single-family dwellings, low-density patio homes, townhouses, condominiums and apartments. Recently, four-plex units have been offered in leasehold to make these units affordable to households earning 80% of medium income.

Objective B: "Assist the orderly development of residential areas sensitive to community needs and other land uses."

Comment: Mililani Town, an entirely planned community which will provide housing and recreation facilities, will offer well-planned environments sensitive to a broad range of community needs.

Policy (B) (1) "Promote design and location of housing developments taking into account the physical setting, accessibility to public facilities and services, employment, and other concerns of existing communities and surrounding areas."

Comment: Mililani Town provides housing within a planned community for those working in nearby areas and those stationed at Wheeler and Schofield Barracks. Public facilities, such as schools and parks, will serve not only Mililani-Mauka residents but also those from surrounding communities.

3.2.2 State Agricultural Plan

Objective B: Achievement of productive agricultural use of lands most suitable and needed for agriculture.

Policy (B) (4) Encourage productive use of the most suitable agricultural lands.

Policy (B) (5) Provide greater protection to agricultural lands in accordance with the Hawaii State Constitution.

Comment: In a 1983-84 study of all Castle and Cooke's sugar and pineapple lands, it was found that the best agricultural investment areas are the lower fields which receive large amounts of solar radiation and may be economically supplemented by a drip-irrigation system. The mauka, higher elevation fields, on the other hand, do not have irrigation capability. Average yields in these areas are much lower than in the irrigated areas for both sugar cane and pineapple. The cost to develop irrigation facilities in these areas would not be economically feasible. Consequently, the Mililani-Mauka proposal will not adversely affect the long-term prospects for Central Oahu agriculture.

3.2.3 State Recreational Plan

Objective A: Achieve a pattern of land and water resources usage which is compatible with community values, physical resources, recreation potential, and recreation uses which support comprehensive land use policies.

Comment: The Mililani-Mauka project seeks to integrate recreational opportunities with residential use. Parks of different sizes figure prominently in the Mililani-Mauka master plan and will be designed to meet the many recreational interests of the residents. Possible development of walking trails in the interior gulches remains under active consideration.

3.2.4 State Water Resources Plan

Objective A: Assure adequate municipal water supplies for planned urban growth.

Objective E: Assure availability of adequate water for agriculture.

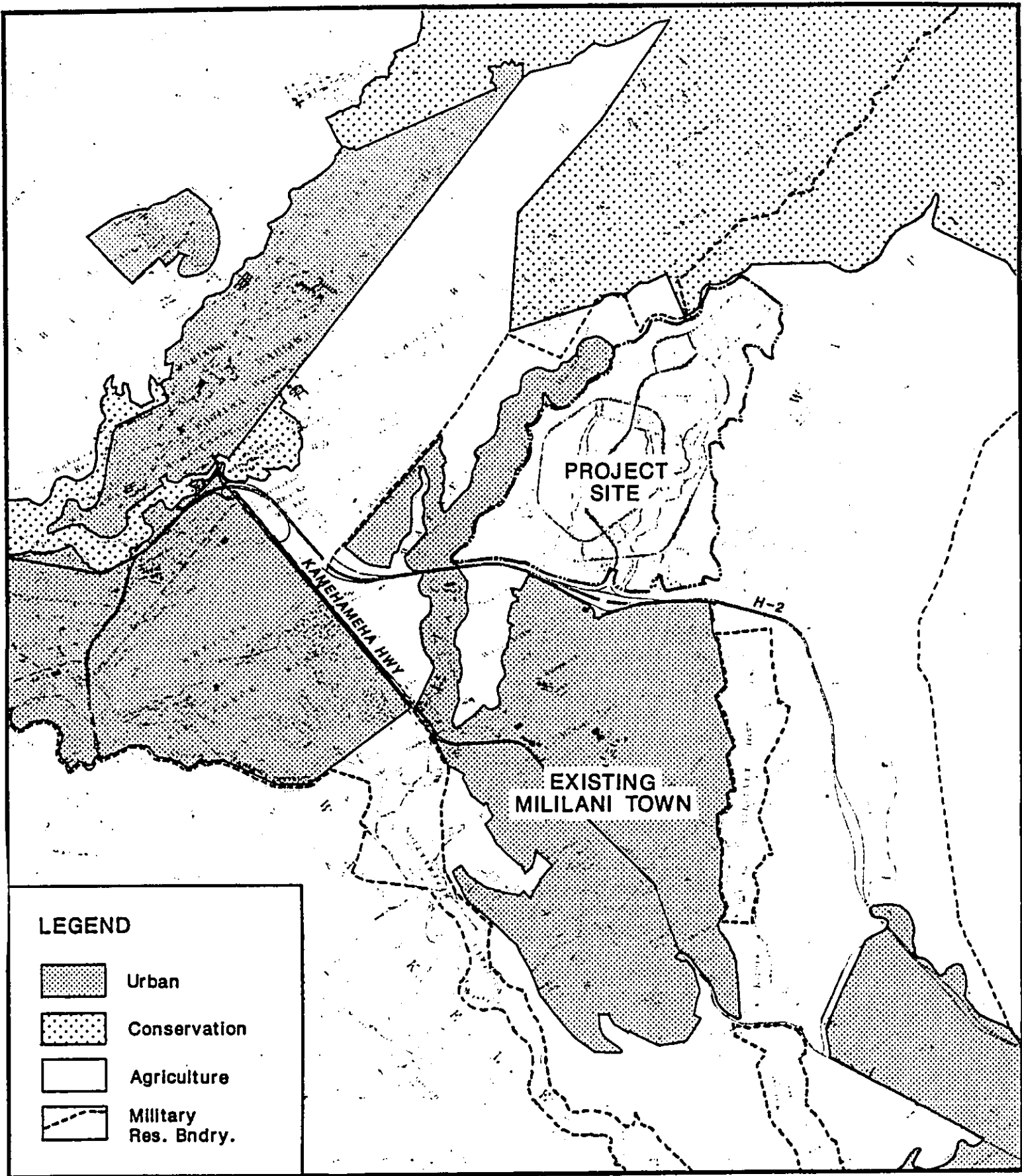
Comment: The petitioner recognizes the need to develop new water sources to supply the additional households and is working with State and County water agencies to meet these objectives.

3.3 STATE LAND USE LAW



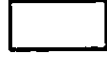

The 1,200 acre Mililani-Mauka residential community lies within the Agricultural District as established by the Hawaii State Land Use Law. Urban lands are located to the north (Wheeler AFB, Wahiawa, Hawaii Technology Park, Melemanu Woodlands Phase III), and to the west (Waipio Acres, Mililani Town). Conservation and Agriculture Districts lie to the west and south (Figure 10). The site is currently used for pineapple production by Dole Company. With the increasing emphasis on production for the fresh pineapple market, and the consequent need for irrigation, unirrigated land situated in the mauka areas is becoming less practical for cultivation. The exorbitant cost of installing irrigation in the mauka area seriously diminishes agriculture as a viable land use option.

The State Land Use Commission Rules, adopted October 1986, require that an application for a boundary amendment show that it is "reasonable, not violative of Section 205-2[HRS] and consistent with the policies and criteria established pursuant to Sections 205-16, 205-17 and 205A-2, HRS" (Hawaii Land Use Commission Rules, Section 15-15-77). In reviewing petitions for reclassification of district boundaries, the Commission must specifically consider four criteria. The criteria are presented below, in italics, followed by a brief discussion of each criterion.

- (1) *The extent to which the proposed reclassification conforms to the applicable goals, objectives, and policies of the Hawaii State Plan and relates to the applicable priority guidelines of the Hawaii State Plan and the adopted functional plans;*



LEGEND

-  Urban
-  Conservation
-  Agriculture
-  Military Res. Bndry.

State Land Use District

MILILANI-MAUKA

0 4000'



Figure: 10

HELBER, HASTERT, VAN HORN & KIMURA PLANNERS
 GROSVENOR CENTER • PFI TOWER • 733 BISHOP STREET SUITE 2500
 HONOLULU, HAWAII 96813 TELEPHONE: (808) 545-2066

Comment: As discussed in Sections 3.1 and 3.2 of this report, the proposed Mililani-Mauka community is consistent with the goals, objectives and policies of the Hawaii State Plan and the guidelines of the State Functional Plans.

- (2) *"The extent to which the proposed reclassification conforms to the applicable district standards."*

Comment: The applicable standards for the Urban District are found in Section 15-15-18 of the Land Use Commission Rules. These are reprinted and discussed below.

In determining the boundaries for the Urban District, the following standards will be used:

- (1) It shall include lands characterized by a "city-like" concentration of people, structures, streets, urban level of services and other related land uses;
- (2) It shall take into consideration the following specific factors:
 - A. Proximity to centers of trading and employment facilities except where the development would generate new centers of trading and employment;
 - B. Substantiation of economic feasibility by the petitioner;
 - C. Proximity to basic services such as sewers, water, sanitation, schools, parks, and police and fire protection; and
 - D. Sufficient reserve areas for urban growth in appropriate locations based on a ten year projection;
- (3) It shall include lands with satisfactory topography and drainage and reasonably free from the danger of floods, tsunami and unstable soil conditions and other adverse environmental effects;
- (4) In determining urban growth for the next ten years, or in amending the boundary, lands contiguous with existing urban areas shall be given more consideration than non-contiguous lands, and particularly when indicated for future urban use on State or County General Plans;
- (5) It may include lands in appropriate locations for new urban concentrations and shall give consideration to areas of urban growth as shown on the State and County General Plans;
- (6) It may include lands which do not conform to the standards in paragraphs (1) to (5):
 - A. When surrounded or adjacent to existing urban development; and
 - B. Only when such lands represent a minor portion of this District;

- (7) It shall not include lands, the urbanization of which will contribute towards scattered spot urban development, necessitating unreasonable investment in public infrastructure or support services;
- (8) It may include lands with a general slope of twenty percent or more which do not provide open space amenities or scenic values if the Commission finds that such lands are desirable and suitable for urban purposes and that official design and construction controls are adequate to protect the public's health, welfare and safety, and the public's interests in the aesthetic quality of the landscape.

Comment: The proposed Mililani-Mauka development is planned to become an integral part of Mililani Town - a major residential community which in 1986 contained a resident population of 26,500 persons. All basic services, such as sewers, water, sanitation, schools, parks, and police and fire protection are now being provided to residents of Mililani Town and will be provided to prospective residents of the "mauka" community. Mililani Town, Inc., the applicant and developer of Mililani Town, has a proven track record of providing housing to Oahu residents and has substantiated the economic feasibility of the proposed development.

The project site is free from natural hazards such as flooding, unstable soil conditions and other environmental effects and is well suited for residential development (Chapter IV). The site is adjacent to urban areas to the south (Mililani Town) and west (Melemanu Woodlands Phase III and the Hawaii Technology Park) and is close to the major urban areas of Wahiawa and the Wheeler Air Force Base.

The proposed development implements many of the objectives and policies of the County General Plan and Central Oahu Development Plan (Chapter 3.4 and 3.5). The General Plan population distribution policies which currently do not support the proposed development are expected to be amended in the near future.

(3) *"Impact on Areas of Statewide Concern."*

A. Preservation or maintenance of important natural systems or habitats.

There are no native or endangered species habitats within the vicinity of the proposed project site. (Chapter 4.8)

B. Maintenance of valued cultural, historical, or natural resources.

There are no valued cultural, historical, or scenic resources within the project site. (Chapter 4.12)

- C. Maintenance of other natural resources relevant to Hawaii's economy, including, but not limited to, agricultural resources.

Although prime agricultural land will be lost, this acreage is not essential to maintain the viability of the pineapple industry or diversified agriculture. (Chapter 4.6)

- D. Commitment of state funds and resources

As a private developer, the applicant expects to bear the costs of the development. No federal state or county is being sought. Major infrastructure improvements (Chapter 2.4.4) such as the water system (wells, storage transmission and distribution), internal roadways, wastewater facilities and improvements to the Mililani Interchange are examples of some of the improvements the applicant will be funding.

- E. Provision for employment opportunities and economic development.

The proposed development will not significantly contribute to direct employment growth except for the construction jobs and the limited employment opportunities at the commercial center and at the college/university site. Indirectly, the project will provide homes for a growing Central Oahu labor force. It will contribute to State and County tax bases which in turn may be reinvested in region-serving infrastructure improvements which will directly benefit the local economy.

- F. Provision for housing opportunities for all income groups, particularly the low, low-moderate, and gap groups.

The project is geared towards providing housing for the "middle market" in the tradition of Mililani Town (Chapter 2.5). A range of housing types are proposed including single family detached dwellings, duplex and townhomes. Provisions have been made to accommodate low-mod to gap-group households. Close coordination in the State and County housing agencies will be necessary to assure that these needs are met.

- (4) *In establishing the boundaries of the districts in each county, the Commission shall give consideration to the General Plan of the County in which the land is located.*

The Honolulu General Plan (discussed in detail in Chapter 3.4) provides a general population distribution for the year 2005 for each of the development plan areas on Oahu. As noted in this report, the development of the Mililani-Mauka residential community would exceed the current year 2005 population distribution guidelines of the General Plan. At the same time, however, it would implement a number of other General Plan objectives and policies (See Chapter 3.4). Thus, in a broad sense, the proposed action can be seen to

implement much of the policies and objectives of the General Plan. It is likely that the population distribution guidelines will be amended by the Honolulu City Council in the near future to accommodate increased residential growth in Central Oahu, thus bringing the project wholly in conformance with the General Plan.

The Mililani-Mauka development will be constructed over a 10 to 15 year period starting in the lower areas closest to Mililani Town and working up-slope. Because it is a totally planned community, all infrastructure systems, public facilities and amenities have been sited.

Land Use Commission Rules allow for the reclassification of larger tracts of land under certain conditions described below.

15-15-78 Incremental Districting. (a) If it appears to the commission that full development of the subject property cannot substantially be completed within five years after the date of the final county zoning approval and that the incremental development plan submitted by the petitioner can be substantially completed, and if the commission is satisfied that all other pertinent criteria for redistricting the premises or part thereof to urban are present, then the commission may:

- (1) Grant the petitioner's request to reclassify the entire property to urban; or
- (2) Redistrict to urban only that portion of the premises which the petitioner plans to develop first and upon which it appears that total development can substantially be completed within five years after the date of the final county zoning.

3.4 CITY AND COUNTY GENERAL PLAN

The subject petition implements the objectives and policies of the County General Plan document in the following areas: population, economic activity, housing, transportation and utilities, and physical development and urban design. This section will quote the applicable General Plan objective or policy, and then discuss its applicability to the proposed projects.

Population, Objective B - "To plan for future population growth."

Comment: Mililani-Mauka will offer a wide range of residential units to meet the existing and future housing needs of Oahu's growing population. The projects provide housing aimed at a range of markets in planned environments close to a growing number of employment centers resulting in an improved quality of life for Central Oahu residents.

Population, Objective B, Policy 1: "Allocate efficiently the money and resources of the City and County in order to meet the needs of Oahu's anticipated future population."

Comment: Because the applicant will install the required project infrastructure, City funds will not be diverted from the existing capital improvements program.

Population, Objective C - "To establish a pattern of population distribution that will allow the people of Oahu to live and work in harmony.

Comment: The proposed site is an extension of a larger urban complex providing employment opportunities nearby. Specifically, the development of the proposed Mililani High Technology Park across Waikakalaua Gulch and the presence of nearby military installations such as Schofield Barracks and Wheeler Air Force Base constitute significant employment centers for those residing in Mililani-Mauka. Further removed, but still within reasonable commuting distance due to the freeway network, are major employment centers, such as the Honolulu International Airport and its surrounding industrial areas, Hickam Air Force Base, and Pearl Harbor Naval Shipyard. Campbell Industrial Park and Barbers Point Deep Draft Harbor, presently under construction, and the proposed Ewa Secondary Urban Center are considered other major employment areas that promote contraflow traffic.

From a regional context, as the center of population has moved northwest along the urban corridor, major facilities such as Aloha Stadium and the Pearlridge Shopping Center have followed population movement. Both of these facilities, as well as other commercial outlets such as restaurants, private recreational facilities, and health care centers, are readily accessible to those residing in Mililani Town. Looking to the future, one can anticipate that additional facilities to serve the needs of new residents will be developed in the Central Oahu and Ewa Development Plan areas to keep pace with population growth.

Finally, the proposed development could be viewed as compatible with the establishment of the secondary urban center in Ewa in that one of the objectives of such a center is to provide an employment base. Residents of Mililani-Mauka are located 12 miles away. This land-use arrangement reserves extensive land requirements for industrial uses on the Ewa Plain, and separate areas of residential use where residents have indicated preference for home sites.

One of the impacts of such an arrangement would be to divert traffic away from critical congestion points such as on the H-1 Freeway at Red Hill and Fort Shafter. From Mililani-Mauka to the secondary urban center, three principal arterials are available: the H-2 Freeway, Kamehameha Highway and Kunia Road in the north/south direction, and the H-1 Freeway and Farrington Highway in the east/west direction. During peak hours, traffic flow in the east/west direction will be in the opposite direction from the main traffic flow, thus making the overall circulation system more efficient.

Population, Objective C, Policy 4: Seek a year 200[5] distribution which would accord with Table 6:

TABLE 6: DISTRIBUTION OF RESIDENTIAL POPULATION

<u>Location</u>	<u>% of Year 200[5] Islandwide Population</u>
Primary Urban Center	47.5-52.5
Ewa	9.0-10.0
Central Oahu	12.8-14.2
East Honolulu	6.2-6.8
Koolaupoko	12.4-13.6
Koolauloa	1.3-1.5
North Shore	1.6-1.8
Waianae	4.2-4.6

Source: General Plan, 1982

Comment: Based on a year 2005 Oahu population of 954,500, the population policy would allow for a year 2005 Central Oahu population of between 122,176 and 135,539 persons. The additional population attributable to the proposed Mililani-Mauka development (approximately 21,000) would exceed this range.

The population policy in the General Plan stands alone in terms of absolute specificity when measured against other objectives and policies of the General Plan. The General Plan is by design, "...a very general document, and one of its purposes is to establish a coherent set of broad guidelines in developing plans, programs, and legislation for guiding Oahu's future" (emphasis added) (General Plan 1982:16). Thus, if the policies and objectives of the General Plan are to be construed as "broad guidelines", the proposed project can be seen as implementing the policy thrust of the General Plan. The applicant has shown that the proposed development is consistent with most of the public policy goals and objectives of the Hawaii State Plan, the General Plan and the Central Oahu Development Plan. The fact that it does not meet the very stringent population "guideline" of the General Plan while meeting many of the others should not by itself be grounds for rejection.

The applicant understands that DGP is preparing a General Plan amendment for submittal to the City Council in January 1987 which would permit added growth in the Central Oahu Development Plan area. Early in 1986, the DGP prepared a request to amend the General Plan to have Central Oahu and Ewa as the growth centers of Oahu in order to provide for greater growth capacity in Central Oahu (to accommodate development proposals such as Mililani-Mauka). The City Council rejected DGP's request. The Chief Planning Officer has informed the applicant that he is preparing another amendment to the General Plan which "addresses various growth alternatives for Central Oahu" and advised the applicant to submit an amendment request for the 1987 annual review.

Economic Activity, Objective A, Policy 1 - "Encourage the growth and diversification of Oahu's economic base."

Comment: The construction and operational phases of Mililani-Mauka will provide employment opportunities. Based on past experience, it is estimated that during construction, there will be a need for approximately 600 workers in the construction trades. It is expected that 130 new permanent jobs will be created there. The majority of which would be in the neighborhood commercial center. Up to 450 jobs could be created at the college/university site.

Economic Activity, Objective A, Policy 6: "Encourage the continuation of a significant level of Federal employment on Oahu."

Comment: Federal defense expenditures have constituted one of the principal sources of growth in Hawaii's income. One of the obstacles to expanding the military sector is lack of housing, as witnessed in the USS Missouri homeporting decision. Creating attractive living environments by providing housing, educational, and other facilities and services close to military installations will encourage continued federal defense spending on Oahu. The projects will provide housing opportunities for those who work at or are stationed at Wheeler Air Base, Schofield Barracks, Barbers Point, Pearl Harbor, and Hickam Air Force Base.

Economic Activity, Object G, Policy 4: "Encourage the continuation of a fairly high level of military related employment in the Hickam-Pearl Harbor, Wahiawa, and Kailua-Kaneohe areas."

Comment: The 1983 Mililani Purchaser's Profile Final Report found that 40% of the purchasers were military or government related employees. Undoubtedly, Mililani Town will continue to provide housing for those in the armed forces and civilians employed at nearby military installations.

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

Comment: This objective has been one of the principal development guidelines of Mililani-Mauka. This is supported by a sales history which shows Mililani homes to be a popular choice among families in a wide range of income groups, including newly formed households.

Housing, Objective A., Policy 1: "Develop programs and controls which will provide decent homes at the least possible cost."

Comment: To date, the applicant has been successful in implementing this policy. Land ownership has been in the hands of the applicant's parent company for a considerable period of time. The fact that the land is ideally

suited for development (gentle slopes of between 3-5%) has contributed to cost control. The opportunity at Mililani to work with a substantial acreage of vacant property, coupled with extensive comprehensive planning have resulted in desirable homes located in an aesthetically pleasing environment.

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

Comment: In the interests of implementing this policy, the applicant over the last 16 years has experimented with a variety of housing types and land ownerships. For example, Mililani Town, Inc., was one of the principal innovators in developing subdivided cluster housing wherein each purchaser is given outright title to his house and lot. The current market demand appears to be for smaller, single-family dwelling units on smaller lots, a concept that is incorporated into the Mililani's New Design homes. These units cost less and, therefore, are more affordable to a larger segment of the community.

Housing, Objective A, Policy 10: "Promote the construction of affordable dwellings which take advantage of Oahu's year-round moderate climate."

Comment: The typical weather pattern in the area includes mild year round temperatures, infrequent storms, and northeasterly trade winds that prevail most of the year. The average annual rainfall in the project area is about 40 inches. Temperatures at Wheeler Air Force Base, near Mililani Town, average 63.7° for the coolest month (January) and 74.8° for the warmest month (August). In general, the air is clean, primarily due to favorable topography, the presence of tradewinds, and the absence of heavy industry. The present homes in Mililani Town have been planned and developed with due consideration for the existing weather characteristics of the area. Many residents consider the cooler weather a definite asset.

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

Comment: Mililani-Mauka will increase the choices of those seeking a home. The comprehensively planned Mililani-Mauka community located in the urban fringe area of Oahu provides a different lifestyle from that of apartment living in the central city. The H-2 Freeway, coupled with increasing urbanization towards Central Oahu and Ewa, have increased accessibility to employment centers and to commercial and recreational facilities.

Housing, Objective C, Policy 3: "Encourage residential development near employment centers."

Comment: The 1983 Mililani Purchaser's Profile Report shows that less than 50% of the 1983 purchasers work in Central Honolulu. Areas such as Wahiawa, Waipio, Schofield, Pearl Harbor, Hickam and the Airport district offer a wide

range of employment opportunities for Mililani-Mauka residents. Implementation of the proposed high technology park will further increase and diversify employment opportunities for present and future residents of these communities.

Housing, Objective C, Policy 5: "Discourage residential development where roads, utilities and community facilities cannot be provided at a reasonable cost."

Comment: Absence of land acquisition costs and the emphasis on comprehensive planning have enabled roads, utilities, and community facilities to be provided at reasonable cost and in compliance with the latest planning and engineering standards.

Transportation and Utilities, Objective A, Policy 10: "Discourage the inefficient use of the private automobile, especially in congested corridors and during peak hours."

Comment: The principal congested corridor during peak hours is the H-1 Freeway, particularly at the Waiawa interchange and Fort Shafter Flats. Worsening congestion is a problem which must be solved at a regional level, involving improvements to mass transportation, increased roadway capacity, alteration of driving patterns, and prudent arrangement of land uses. The growth of employment opportunities outside the central Honolulu area including the secondary urban center, the Mililani High Technology Park and the Leeward Central Oahu and North Shore Employment Centers will redirect some current traffic flows. Plans for Mililani-Mauka which will also support this policy include the college or university campus which could alleviate student trips into Honolulu and the park-and-ride facility which would encourage people to use buses or transit vehicles in lieu of their automobiles.

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

Comment: The timeliness of any new development is measured by market acceptance. In Mililani's case, acceptance has been consistent over the 16-year development period, with slow years corresponding to periods of high interest rates. As a planned community, design is an important feature of the development, not only of the units themselves, but also common areas and facilities. The relatively flat lands are appropriate for residential use and do not impose any extraordinary constraints on construction.

Physical Development and Urban Design, Objective A, Policy 2: "Coordinate the location and timing of new development with the availability of adequate water supply, sewage treatment, drainage, transportation, and public safety facilities."

Physical Development and Urban Design, Objective A, Policy 3: "Phase the construction of new development so that they do not require more regional supporting services than are available."

Comment: The Honouliuli Wastewater Treatment Plant can be expanded to adequately handle the flow of effluent from the project. Modifications to the H-2 Freeway's on- and off-ramps at the Mililani Interchange will be required at the point when 4,200 units (out of 6,600 projected units) are developed on the mauka property. Prior to that, the addition of turning lanes and signalization of critical intersections will accommodate the projected traffic flow.

Physical Development and Urban Design, Objective A, Policy 4: "Require new developments to provide or pay the cost of all essential community services, including roads, utilities, schools, parks and emergency facilities that are intended to directly serve the development."

Comment: The applicant will continue to comply with this policy in the development of Mililani-Mauka.

Physical Development and Urban Design, Objective A, Policy 8: "Locate community facilities on sites that will be convenient to the people they are intended to serve."

Comment: The developed portion of Mililani Town has provided community facilities in accordance with accepted planning standards. In planning for the mauka area, further refinements will be made to locate community facilities, such as church sites, in areas of greater convenience to all residents. The proposed transit parking area will accommodate approximately 500 vehicles and is sited for the convenience of express bus riders and for users of surrounding facilities during evening hours and on weekends.

3.5 CENTRAL OAHU DEVELOPMENT PLAN

This EIS accompanies a formal request to amend the Central Oahu Development Plan submitted to DGP in July, 1986. The DP amendment application presents a more detailed analysis on: (1) the specific problem/need forming the basis for the requested amendment to the Central Oahu Development Plan; and, (2) the appropriateness of the proposed action. This section of the EIS presents a brief overview of the DP process and summarizes the major points made in the aforementioned DP amendment application.

Development Plans, according to the City Charter, are relatively detailed guidelines for the physical development of the island. They must implement and accomplish the objectives of the General Plan. The Central Oahu Development Plan (DP), adopted by the City Council in 1983, is one of eight development plans covering the City and County of Honolulu. The development plans are comprised of two basic parts: text and maps. The text portion is also comprised of two parts: Common Provisions and Special Provisions. The Common Provisions contain

provisions which are common to the eight development plan areas. Included in this section are definitions, implementation mechanisms, general urban design principles and controls, sequencing of public development, guidelines regarding the social impact of development, and DP amendment procedures. The second text portion is specific to each of the development planning areas (Special Provisions) and is comprised of three parts: an area description; specific urban design principles and controls for the particular planning area; and, development priorities.

There are two map elements of the DPs: the land use map and the public facilities map. Like the special provisions discussed above, each DP area has a unique set of maps. The land use map defines the DP area and distributes the various DP land uses in a manner which implements the objectives and policies of the General Plan. The public facilities map identifies planned public and private facilities and infrastructure.

During the 1983-84 annual review of the DP, the City approved the land use redesignation of a 70-acre parcel within the Waikakalaua Gulch from agriculture to residential use. This was the first urban expansion easterly or mauka of the H-2 Freeway. In 1984, the Council approved redesignation of a 256-acre site between Waikakalaua Gulch and the Leilehua Golf Course from agriculture to industrial use for a proposed high-technology park. In both cases, the City found that urban development would be consistent with the intent of the Oahu General Plan and the Central Oahu Development Plan. The State Land Use Commission has also supported reclassification of the high-technology park site from the Agricultural to Urban District.

During the 1985/86 annual review, the City granted partial approval for Waitec Development's Village Park residential community (agriculture to residential), partial approval for the Gentry Company's Waiawa Ridge development (from agriculture to commercial-industrial mixed use), and approved a small area south of Mililani Town for residential development (from agriculture).

3.5.1 Common Provisions

Broader urban design principles and controls are contained in the common provisions of the Development Plan, Section 4.6, which states:

"Existing built-up, single-family residential areas. The areas designated for residential use consist of both existing built-up, single-family residential communities and areas that are considered appropriate for future residential development. New development in existing communities shall generally be limited to that which is compatible with or enhances the desired physical and social character and life-style. Changes affecting the present physical and social nature of these areas shall be made only when community needs or general public interests can be demonstrated."

"New residential development in rural areas shall be compatible with the general rural character of the area. The architectural design of non-residential structures shall be compatible in character with the surrounding residential uses."

Mililani-Mauka is essentially an extension of an existing residential community. Because of this, compatibility in design, social characteristics, and lifestyle are primary considerations of the petitioner. Different types of land uses, such as the college campus, neighborhood commercial area, district and neighborhood parks, school sites and transit parking area are designed to expand the range of facilities and amenities available to residents by capitalizing on a critical mass of potential users to support these services.

3.5.2 Special Provisions

The Special Provisions of the Central Oahu DP place considerable emphasis on the need to retain lands for agricultural pursuits to sustain the State's agricultural industry. Due to changed circumstances concerning pineapple production and the availability of other lands better suited elsewhere, conversion of the subject properties to urban use will not materially impact prospects for pineapple operations.

Specific design considerations are provided in Section 15, "Urban Design Principles and Controls for Central Oahu." All proposed developments will conform and implement these provisions. Section 16 lists development priorities. Mililani is second in priority among the three major Central Oahu development areas.

3.5.3 Land Use Map

The proposed mapping changes to the Central Oahu Development Plan Land Use map are presented in Figure 11. The proposed Mililani-Mauka DP designations are bordered to the north by the Melemanu Woodlands Phase III residential development with the Hawaii Technology Park industrial uses beyond. To the west (makai of the H-2 Freeway) lies the Wheeler Air Force Base complex and the residential communities of Waipio Acres and Mililani Town. To the south an east lie undeveloped lands within Kipapa Gulch and the Ewa Forest Reserve.

3.5.4 Public Facilities Map

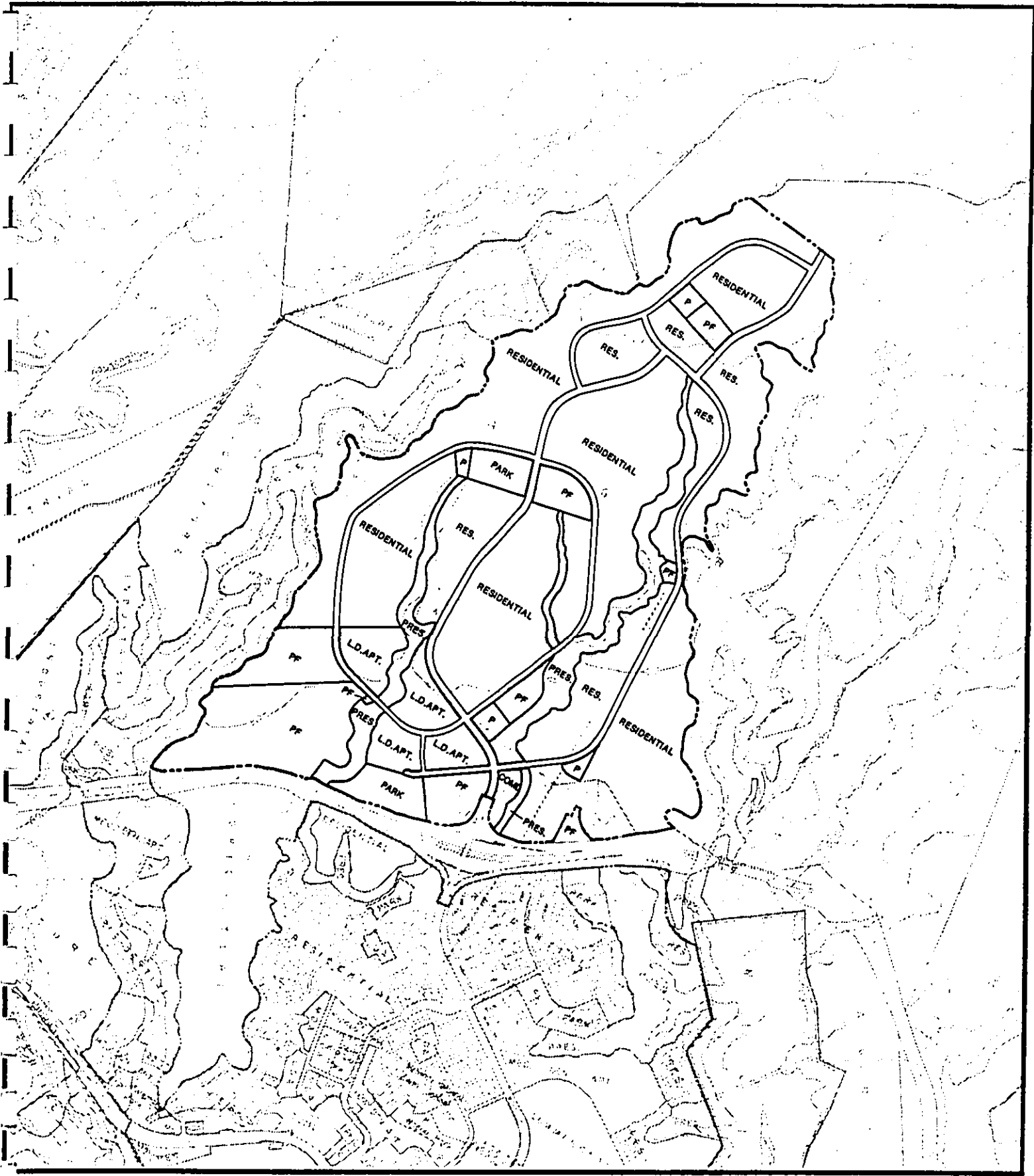
The proposed public facilities map (Figure 12) identifies a system of schools, parks, public thoroughfares, highways and streets, and the relocation and improvement of major public/private facilities for utilities and drainage.

3.6 ZONING

The entire land area of Mililani-Mauka is zoned "Ag-1" (Restricted Agricultural District). The applicant will apply for zoning district changes at the appropriate time in the development process.

3.7 COASTAL ZONE MANAGEMENT ACT (CHAPTER 205-A, HRS)

Mililani-Mauka is not located within the special management or coastal zone management areas and therefore is not required to submit a permit application.



Proposed Central Oahu
DP Land Use Map

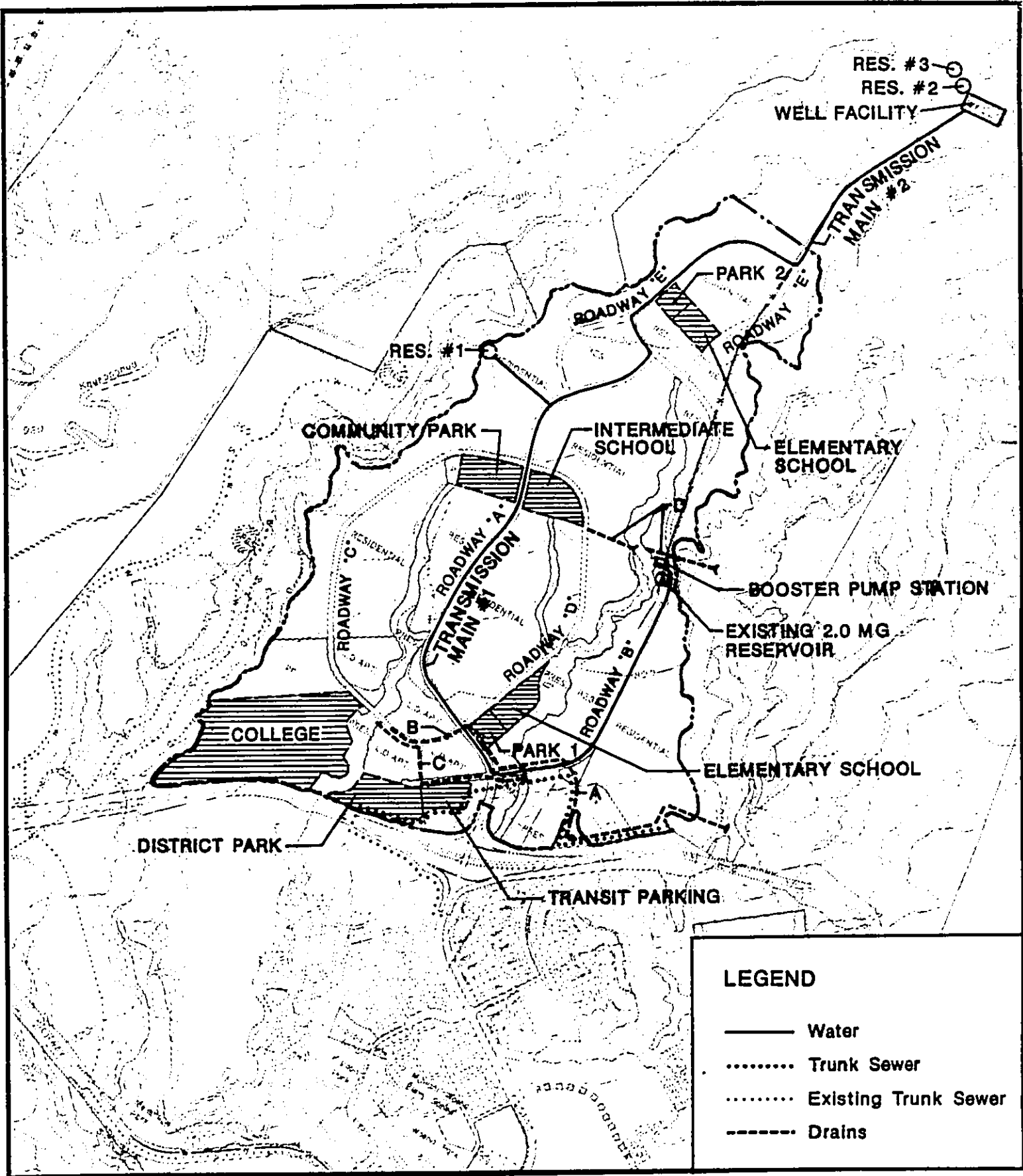
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Figure: 11

MILILANI-MAUKA

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Proposed Central Oahu DP
Public Facilities Map
MILILANI-MAUKA

0 2000'

Figure: 12

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3.8 ENVIRONMENTAL IMPACT STATEMENTS (CHAPTER 343, HRS)

Section 343-5 (a)(6) HRS notes that the provisions of Chapter 343 apply to "any amendment to existing County general plans where the amendment would result in designations other than agriculture, conservation, or preservation..."

A State Attorney General opinion (Opinion No. 85-30) has broadened the scope of the definition of County general plans to include "...non-County initiated actions which propose amendment or change to a county's planning documents, however denominated, as development plans or otherwise, and which would result in a designation other than agriculture, conservation or preservation." Thus, because the Mililani-Mauka residential community will require a change in development plan designation from agriculture to residential, low-density apartment and commercial (among others), it is subject to the Chapter 343 requirements.

Accordingly, an environmental assessment of the project was prepared and submitted to the Department of General Planning. On July 24, 1986 DGP informed the applicant that an EIS would be required pursuant to the provisions of Chapter 343.

CHAPTER IV

IMPACTS ON THE PHYSICAL ENVIRONMENT

This chapter describes elements of the physical environment in which the development will be situated. After a brief description, each element is analyzed in terms of probable impact (where appropriate) both to and from the proposed development. In certain cases, impacts are distinguished as: (1) *Short-term impacts*, confined primarily to the construction period; (2) *Long-term impacts*, that occur while the development is operational or represent irreversible impacts; or (3) *Cumulative impacts*, resulting from the combined effects of developing the Mililani-Mauka residential community and other nearby lands. Measures to mitigate probably adverse impacts are proposed where appropriate.

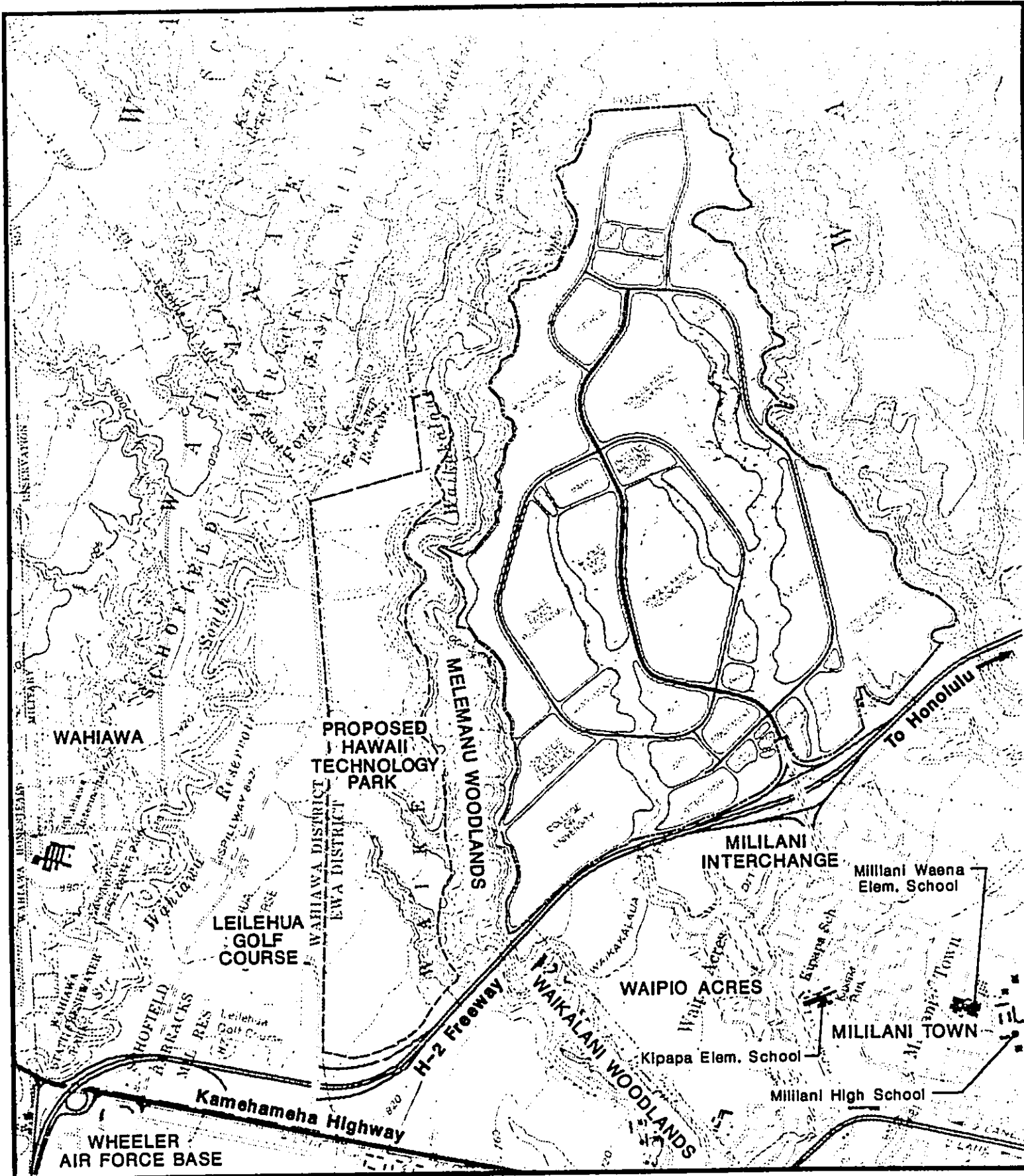
4.1 CLIMATE

Average annual rainfall varies from 40 to 45 inches per year in the lower elevations near the H-2 Freeway, to 75 inches at the mauka boundary. Approximately two-thirds of this rainfall accumulates between November and March of a typical year. Northeast trade winds occur more than 8 months out of the year, but are most consistent between April and October. Average wind speed is 10 mph. Kona winds are experienced about 3 months a year, mostly during winter months. Daytime summer temperatures average between a low of 66° F and a high of 82° F. Winter temperatures average between a low of 60° F and 75° F during daytime hours. As elevation increases, temperature levels and solar radiation decrease.

4.2 SURROUNDING LAND USES AND OWNERSHIP

The site is bounded to the north and south by the Waikakalaua and Kipapa Gulches, respectively. A small private orchard and residence are maintained on a 128-acre parcel abutting the mauka boundary of the site. Beyond this parcel lies the Ewa Forest Reserve. The site is bounded at the eastern border by the H-2 Freeway which bisects the proposed "mauka" expansion area from the rest of Mililani Town (Figure 13). Castle & Cooke, Inc. is the major landowner in the area with the federal government a close second. Several developments, both existing and planned, are located in the vicinity of the proposed development. These are briefly described below.

Mililani Town. The planned community of Mililani Town lies to the east of the project site. Originally planned and conceived in the early 1960s, the community covers approximately 2,300 acres of land and houses approximately 23,000 residents in 6,750 homes. Mililani is the largest residential community in Central Oahu and the makai portion will reach build-out within the next few years.



Surrounding Developments

0 2000'



Figure: 13

MILILANI-MAUKA

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Waipio Acres. Waipio Acres is small fully-built residential subdivision developed in the early 1960's. The project is located in a gulch area downstream of the H-2 Freeway and adjacent to the northern end of Mililani Town.

Waikalani/Melemanu Woodlands. This is a 233-acre residential development located in Waikakalaua Gulch to the north of the project site. The final phase of this development, Melemanu Woodlands Phase III, has recently received zoning approvals from the Department of Land Utilization for the construction of 1,122 housing units on a 70-acre site adjacent to the northern border of Mililani-Mauka (Gray, Hong and Associates, 1985).

Hawaii Technology Park. Oceanic Properties, Inc. has received final zoning approvals for the first phase of the 256-acre Hawaii Technology Park to be constructed on lands adjacent to Waikakalaua Gulch and north of the project site. The first increment (approx. 150-acres) will consist of a mix of campus industrial, business commercial, recreational/educational and open space land uses linked by a central boulevard. The High Technology Park will become Central Oahu's major employer with up to 12,138 direct on-site jobs projected (Belt Collins and Associates, 1985).

Wheeler Air Force Base. Approximately one mile to the northeast of the project site lies the 1,370-acre Wheeler Air Force Base. Dedicated in 1922, the base provides Air Force and Navy housing, personnel support, administration, operation and supply facilities, and ordinance storage facilities. The single runway is used primarily by rotary wing aircraft attached to the U.S. Army's 25th Division, however Air Force and Army fixed wing aircraft such as the OV-10s and C-130s also use the field.

The Department of the Army began an air installation compatible use zone (AICUZ) study for Wheeler AFB in September, 1985. Published results of the AICUZ study are not expected to be available until March 1987 (personal communication with Mr. David Sox, Corps of Engineers, October 13, 1986). When published, the AICUZ program will identify the off-station impacts (i.e., noise levels, accident potential zones, and flight clearance requirements) associated with airfield operations which can then be used by landowners, developers, regulatory agencies and legislative bodies for consideration in land use planning and the enactment of land use controls.

Schofield East Range. The Schofield East Range is located beyond the High Technology Park to the north and north east of the project site. The range is used by the U.S. Army primarily for bivouac sites and the maneuvering of combat training units.

4.3 EXISTING IMPROVEMENTS

4.3.1 Existing Condition

The site is used for pineapple production and contains no permanent structures. Existing improvements are related to agricultural operations, such as dirt roads. The Hawaiian Electric Company maintains transmission lines and a below grade

communications cable which transit the site. Located within the boundaries of the Mililani-Mauka project area, but under separate landownership, are several water tanks and a water distribution facility owned by the Honolulu Board of Water Supply.

4.3.2 Probable Impact

The project area will be developed in close coordination with the Board of Water Supply, the Department of Public Works, the Hawaiian Electric Company, the Hawaiian Telephone Company and other affected organizations to minimize any disruptions to existing infrastructural systems.

4.4 PHYSICAL HAZARDS

4.4.1 Aircraft Operations

4.4.1.1 Existing Conditions

As noted above, the Wheeler AFB runway is approximately one mile from the project area in a northerly direction. The instrument departure (IFR) corridor from Runway 06 crosses the lower third of the project site in a north-south direction (Figure 14). Approximately 6 flights per day use this corridor crossing the property at between 1,600 to 3,100 feet above ground level. Discussions with Wheeler AFB pilots indicates that the standard visual flight (VFR) departure from Runway 06 involves a right turn at the Ku Tree Reservoir southbound towards the Mililani Cemetery - a flight track which crosses over the top portion of the project site. VFR aircraft transit the site at approximately 1,100 feet above ground.

4.4.1.2 Probable Impact

Although the project area is estimated to lie well outside the Wheeler AFB accident potential zone, the potential for any aircraft related accidents, although reduced, still exists. It is remotely possible that an emergency situation would result in the release of ordnance or fuel tanks into the area during a fly-by.

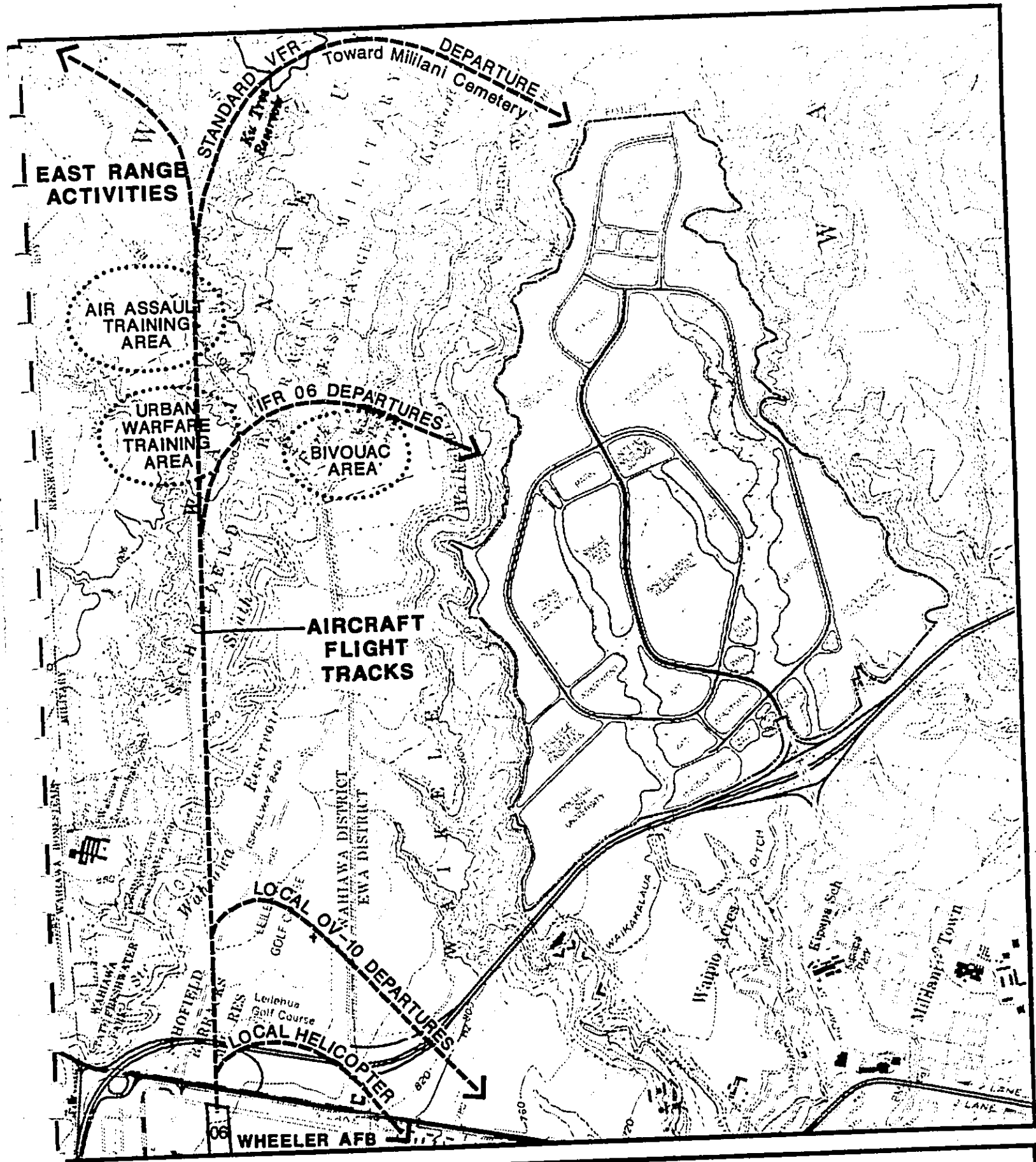
4.4.1.3 Mitigating Measures

The applicant will work closely with both the Air Force and the Army to assure that all land uses projected for Mililani-Mauka are compatible with continued aircraft operations from Wheeler Field.

4.4.2 Military Training Activities

4.4.2.1 Existing Conditions

The Army's East Range training areas are situated to the north of the project site. The Range is used for a variety of training activities, including urban warfare, offensive and defensive tactics, and chemical warfare techniques (Figure 14). All of these training missions are noise-intensive, utilizing blanks, grenade simulators, and artillery simulators. According to the Army, a key technique employed in the training is stealthy approaches followed by the application of overwhelming



Military Activities

0 2000'



Figure: 14

MILILANI-MAUKA

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firepower. CS gas and smoke generating devices are employed to give realism to the training. Representatives of the 25th Division have indicated that the conversion of the 25th to a "light infantry division" will increase the level of training activity above current levels (Belt Collins, 1985). There is no danger of live ordnance or any other direct physical intrusion of military activities into the project area.

4.4.2.2 Probable Impact

Representatives of the Army are particularly concerned about the noise impacts of military operations on prospective residents of the Mililani-Mauka community. (See Chapter 4.9 for discussion of noise-related impacts.)

4.5 PHYSIOGRAPHY AND TOPOGRAPHY

4.5.1 Existing Condition

The proposed Mililani-Mauka development project is located in the central portion of the Schofield Plateau. The site slopes gently upward towards the Koolaus from approximately 700 feet above sea level in the makai portion, to about 1,000 feet in elevation in the northern portion. Slopes below the 900-foot elevation average less than 5%. Above the 900-foot elevation, slopes are slightly steeper and range between 5-10%. Several gullies interrupt the otherwise uniformly sloping site.

The site lies between Kipapa Gulch to the east and Waikakalaua Gulch to the north. The gulches have steep walls which are heavily vegetated. The southwestern border of the site is defined by H-2, while the northeastern boundary is essentially defined by the Ewa Forest Reserve, designated conservation land.

4.5.2 Probable Impact

The topographic characteristics of the site are amenable to construction and will not require extensive earth moving.

4.6 SOILS AND AGRICULTURAL POTENTIAL



4.6.1 Existing Condition

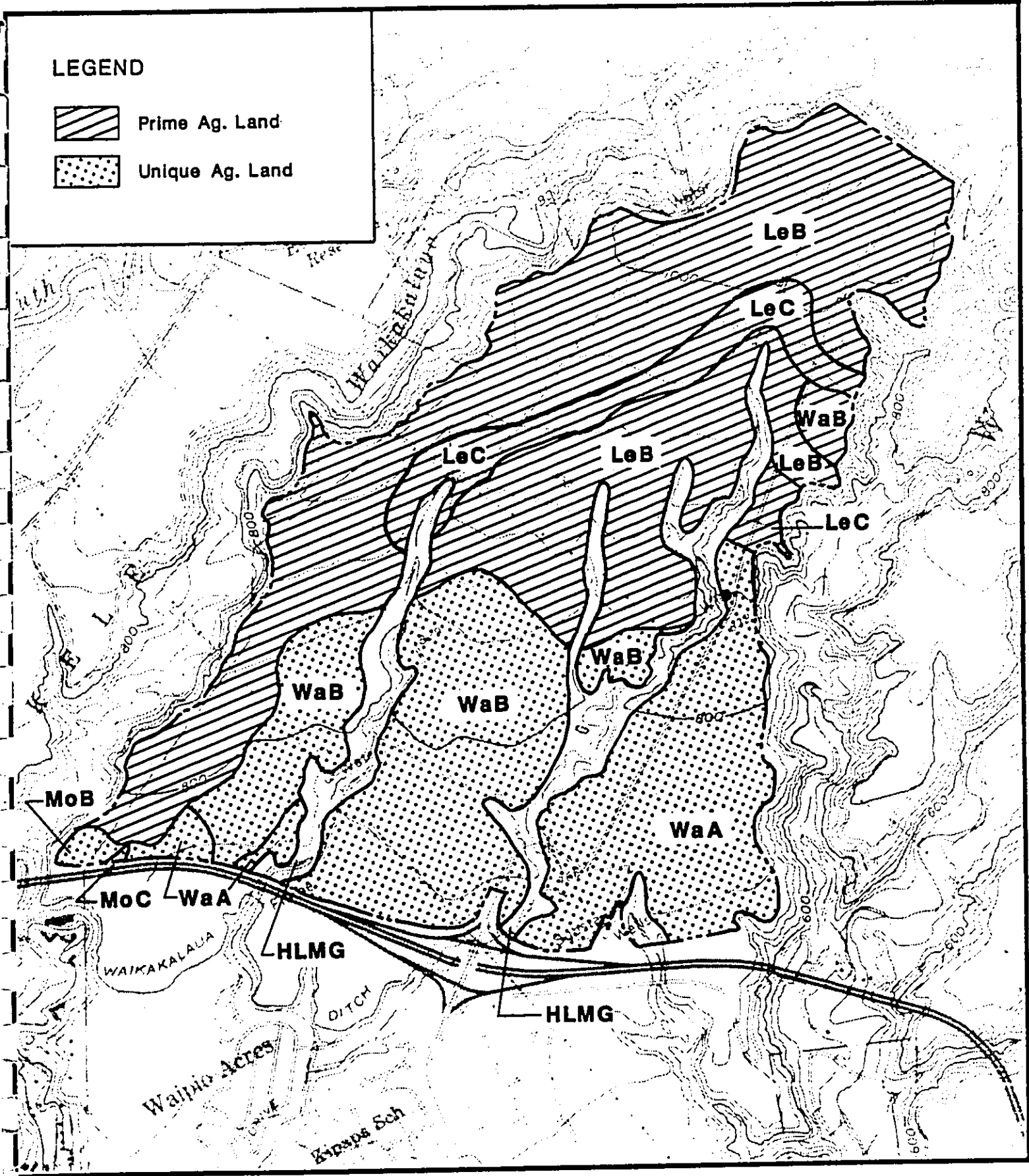
4.6.1.1 Soil Conservation Service Soil Survey

The soils in the vicinity of the Schofield Plateau consist primarily of material from weathered igneous rock. The major portion of the mauka site lies between 700 and 900 feet above sea level and contains soils in the Wahiawa silty clay series. At elevations between 900 and 1000 feet, soils in the Lelehua silty clay series are prevalent.

As noted previously, the site is presently unirrigated with no irrigation potential. Presented below is a description of each of the five soil types found on the site. The most predominant soil type found on the project site is Lelehua silty clay, 2 to 6 percent slopes (LcB) (Figure 15). This soil type comprises approximately 60 percent (720 acres) of the site and is generally located in the upper and northern

LEGEND

-  Prime Ag. Land
-  Unique Ag. Land



Soil Conservation Service Soil Types

0 1500'



Figure:15

MILILANI-MAUKA

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areas of the project area (capability classification: IIe). The next most predominant soil type is the Wahiawa silty clay, 3 to 8 percent slopes (WaB) comprising approximately 20 percent (240 acres) of the site. This soil type is found in the lower central area of the property (capability classification: IIe). The third largest soil type is the Wahiawa silty clay, 0 to 3 percent slopes (WaA) comprising approximately 10 percent (120 acres) of the site. This soil is found in the lower southeastern area of the site (capability classification: IIc). The gulches, classified as Helemano silty clay, 30 to 90 percent slopes (HLMG) occupy approximately 6 percent of the project area (72 acres) (capability classification: VIIIe) while Leilehua silty clay, 2 to 6 percent slopes (LeC) occupies the remaining 4 percent of the project area (48 acres) (capability classification: IIIe). A more detailed description of each soil type is presented below.

Leilehua silty clay, 2 to 6 percent slopes (LeB). This soil occurs as broad areas, as well as narrow areas bordered by gulches. Included in mapping were small areas of Manana soils.

In a representative profile the surface layer is dark reddish-brown silty clay about 12 inches thick. It contains concentrations of heavy minerals. The subsoil about 36 inches thick, is dark reddish-brown and dusky-red silty clay and clay that has subangular blocky structure. The substratum is dark reddish-brown clay mixed with weathered gravel. The soil is extremely acid throughout the profile.

Permeability is moderately rapid. Runoff is slow, and the erosion hazard is slight. The available water capacity is about 1.3 inches per foot of soil. Roots penetrate to a depth of 5 feet or more.

This soil is used for sugarcane, pineapple, and homesites. (Capability classification IIe, irrigated or nonirrigated; sugarcane group 2; pineapple group 5; pasture group 8; woodland group 7)

Leilehua silty clay, 6 to 12 percent slopes (LeC). On this soil, runoff is medium and the erosion hazard is moderate. Workability is slightly difficult because of the slope.

This soil is used for sugarcane, pineapple, and pasture. (Capability classification IIIe, irrigated or nonirrigated; sugarcane group 2; pineapple group 6; pasture group 8; woodland group 7)

Wahiawa silty clay, 0 to 3 percent slopes (WaA). This soil occurs on smooth, broad interfluves. Included in mapping were small areas of Kunia, Lahaina, and Leilehua soils.

In a representative profile the surface layer is very dusky red and dusky red silty clay about 12 inches thick. The subsoil, about 48 inches thick, is dark reddish-brown silty clay that has subangular blocky structure. The underlying material is weathered basic igneous rock. The soil is medium acid in the surface layer and medium acid to neutral in the subsoil.

Permeability is moderately rapid. Runoff is slow, and the erosion hazard is no more than slight. The available water capacity is about 1.3 inches per foot in the surface layer and about 1.4 inches per foot in the subsoil. In places roots penetrate to a depth of 5 feet or more.

This soil is used for sugarcane, pineapple, pasture, and homesites. (Capability classification I if irrigated, IIc if nonirrigated; sugarcane group 1; pineapple group 4; pasture group 5; woodland group 5)

Wahiawa silty clay, 3 to 8 percent slopes (WaB). On this soil, runoff is slow and the erosion hazard is slight. Included in mapping were small areas of nearly level soil.

This soil is used for sugarcane, pineapple, and pasture. (Capability classification IIe, irrigated or nonirrigated; sugarcane group 1; pineapple group 5; pasture group 5; woodland group 5)

Helemano silty clay, 30 to 90 percent slopes (HLMG). This soil is on the sides of V-shaped gulches. Included in mapping were small areas of Lahaina and Molokai soils. Also included were small areas of rock outcrop, steep stony land, and eroded spots.

In a representative profile the surface layer is dark reddish-brown silty clay about 10 inches thick. The sub-soil, about 50 inches thick, is dark reddish-brown and dark-red silty clay that has subangular blocky structure. The substratum is soft, highly weathered basic igneous rock. The soil is neutral in the surface layer and neutral to slightly acid in the subsoil.

Permeability 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. (Capability classification VIIe, nonirrigated pasture group 3; woodland group 15)

4.6.1.2 Agricultural Lands of Importance to the State of Hawaii (ALISH)

The ALISH maps were produced by the State of Hawaii Department of Agriculture as a means of classifying the state's agricultural land resources. The lower section of the property area is classified "unique agricultural lands" or lands that have "the special combination of soil quality, location, growing season and moisture supply and is used to produce sustained high quality, and/or high yields of a specific crop (in this case, pineapple) when treated and managed according to modern farming methods." The upper portion of the site is classified as "prime" agricultural land, defined as "having the soil quality, growing season, and moisture supply needed to produce a sustained yield of crops economically when treated and managed according to modern farming methods"

4.6.1.3 Land Study Bureau (LSB)

The Land Study Bureau's Detailed Land Classification system ranks soils in five overall productivity categories ranging from best - "A," to worst - "E." Factors in this ranking include machine tillability, stoniness, texture, clay properties, drainage, rainfall, elevation, and slope.

The LSB classifies a majority of the site in the Wahiawa soil series and ranks the entire buildable area as Overall Productivity Class "B." (Figure 15). Machine tillability is considered good, it is non-stony, and clay properties are non-expanding. The texture of this soil is moderate to fine, drainage is good, annual rainfall between 40 to 60 inches, and the slope is between 0% and 10% with an elevation of 250 to 1,200 feet.

The soils in the larger gulches are designated Overall Productivity Class "E," being steep with slopes between 36-80% and elevations from 0 to 2,000 feet.

4.6.1.4 Land Evaluation and Site Assessment (LESA) Commission

The Hawaii State Legislature in 1983 established the State of Hawaii Land Evaluation and Site Assessment Commission to formulate a system which would identify and recommend for legislative adoption "important agricultural lands" (IALs) based on a classification system developed by the Commission. Specifically, the Commission was to evaluate and recommend a set of agricultural production goals for the State including an assessment of economic feasibility and the identification of specific locational and land area requirements to attain this objective.

The 1986 Legislature declined to act on the Commission's 1986 report entitled A Report on the State of Hawaii Land Evaluation and Site Assessment System submitted in February 1986. The Commission lapsed after the 1986 Session as the Legislature failed to appropriate monies for its continued operation thus it is unclear what the present status of the Commission (or its findings and recommendations) is at this point. The 1987 Legislature may choose to renew the Commission's funding, adopt the Commission's findings and recommendations or none or both of the above.

Agricultural production acreage goals for the island of Oahu were projected to decline from 63,200 acres in the base year (1983) to 57,600 acres in 1995. Production acreage of the two principal agricultural crops, sugar and pineapple, was expected to remain relatively constant over the projection period (1983 - 1995). Pineapple acreage remained stable at 11,800 acres with sugar lands declining from 27,200 acres to 25,300 acres.

After determining production goals, the next major task of the Commission was to evaluate, prioritize and map the estimated production acreages. The Commission developed a land evaluation (LE) system which utilized standards comprised of

five separate interpretive or rating systems, all of which have been wholly or partly based on soils information. These soil ratings were weighted, totaled and averaged to derive a common index called the "LE rating." Each soil type was assigned a numerical value from 1 to 100, with a higher number representing more productive soil types.

While the LE ratings were developed to express the quality of the land based on the physical characteristics of the soils, the site assessment (SA) ratings were designed to express the relative quality of a site or area based upon its non-physical characteristics or attributes. The SA factors are criteria which indicate the agricultural viability of a parcel, site or area. Each area under consideration is scored against ten different SA factors which are in turn weighted and totaled to provide the "SA rating." The LE and the SA ratings for a specific parcel or site are then summed and averaged $((LE + SA)/2)$ to provide the final LESA score.

A numerical threshold or cut-off point was determined through an iterative process which would provide sufficient acreage to meet the production goals of each county. For the City and County of Honolulu, threshold LESA scores ranging from 53 to 77 (depending on type of agriculture under consideration) were determined to provide sufficient acreage to meet the 1995 county-wide production goal of 57,600 acres. Soils meeting or exceeding these threshold scores were then identified and mapped within the existing State Agricultural District. Small discontinuous parcels were eliminated as were lands controlled by the federal government.

As expected, the results of the mapping analysis closely follows findings of previous soils-based studies such as ALISH and LSB. Most of Central Oahu (including the project site), the Ewa Plain and the Mokuleia-Waimea region lie within the areas classified as "important agricultural lands" or IALs.

As part of their legislative mandate, the Commission has recommended the following standards and criteria to evaluate requests for redesignation of IAL parcels to the State Urban District:

1. *The proposed designation conforms to the Hawaii State Plan.*
2. *The proposed designation conforms to the County General and/or Community Development Plans.*
3. *The proposed redistricting is based on a demonstrated need for non-agricultural use, such as housing, employment, economic development or public facilities, which overrides the IAL designation based on agricultural need, impact on production goals and feasibility.*

As noted above, the Legislative has not adopted these recommendations as State policy. Nevertheless, the proposed residential community conforms to the intent and spirit of the Hawaii State Plan, the State Land Use Law, and the County General and Development Plans. The proposed amendment to the Central Oahu DP is based on a demonstrated need for housing in the area.

4.6.2 Probable Impact

The full build-out of the project area will displace approximately 1,000 acres of productive pineapple lands. The impacts of the project on soils alone consist of two elements: erosion and indefinite loss of land for agricultural use. Erosion would result from changes in topography, drainage patterns, and vegetative cover due to land clearing and construction. After construction is completed and vegetative cover has been replaced, the level of erosion will decrease (See related discussion in Chapter 4.7.2).

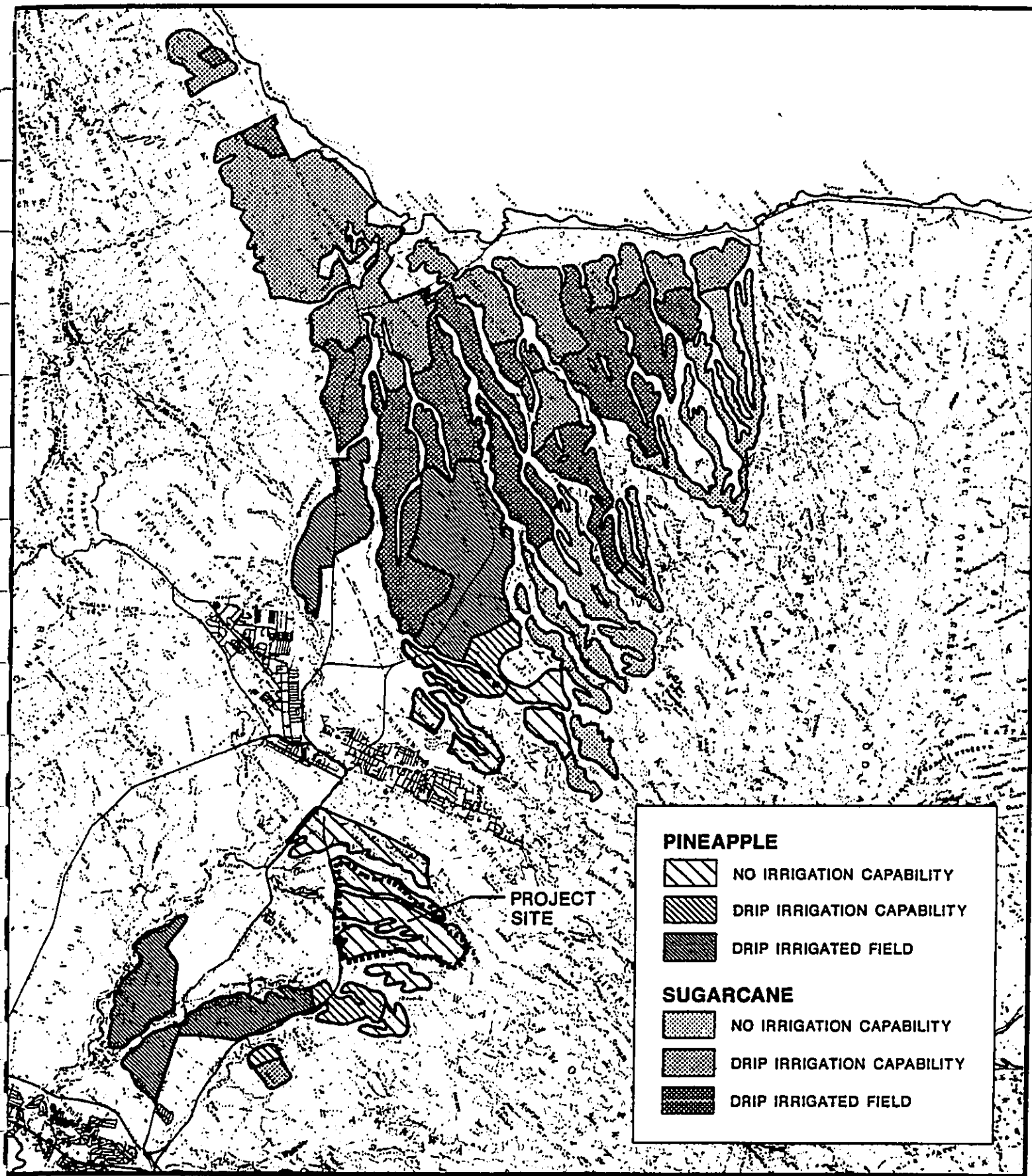
The issue of soil loss for agricultural use ties in closely with the general discussion of land use and economics. An assessment of this impact is addressed below.

4.6.2.1 Agricultural Land Hierarchy Study (Castle and Cooke)

In 1984, Castle and Cooke, Inc. prepared an *Agricultural Land Hierarchy Study* in order to assist in long-range land use decision-making (see Appendix I). The objective of the study was to assess and forecast the economic and agricultural probability of 21,900 acres of land in Central Oahu. Included in this study were 5,400 acres of land leased for production and used by Waialua Sugar Company and Dole Pineapple. Over the past decade, Dole Pineapple's Oahu operation has shifted its focus from processing, (i.e., canning) to production for a fresh fruit market. This has altered some of the agronomic requirements and emphasized the necessity for harvesting pineapple year round. A successful fresh fruit operation needs to produce fruit continuously throughout the year and thus calls for planting on a monthly basis.

The study indicates that two factors determine prime agricultural land in Central Oahu: high insolation and drip irrigation capability. The productivity of agricultural soil is not as critical a factor because nutrient deficiencies can be supplemented with fertilizers. As elevation increases, the amount of insolation decreases while the level of rainfall increases. In order to avoid soil compaction of these frequently wet soils, fields can only be prepared and planted during the drier summer months. The cooler temperatures lengthen the growing cycle, and the inability to prepare fields regularly decreases potential plant productivity. Mapping analyses conducted for the study (Figure 16) identifies Castle & Cooke lands by crop type (sugar, pine) and irrigation capability (no capability, capability already drip irrigated). As noted above, the higher elevation fields (including the project site) have been rated as having no irrigation capability.

Another problem arising from the heavier rainfall at higher elevations is greater susceptibility to pesticide leaching. Telone II, a new nematocide designed to replace the currently banned EDB, is a very volatile substance and requires application to the right soil moisture conditions. The warmer, drier weather of lower elevations can be economically fitted with drip irrigation systems and can provide faster, shorter growing seasons. Soil moisture can be controlled for the application of pesticides such as Telone II. These factors also allow more control in plantation induced "fruit forcing," and tend to keep pesticides from leaching into deeper soils. Lower elevation fields are better for Dole Pineapple because of the ability to plant, cultivate, and harvest year round.



Agricultural Land Hierarchy Study

0 10000'



Figure: 16

MILILANI-MAUKA

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4.6.3 Mitigating Measures

Impacts due to erosion during the construction period will be mitigated by the utilization of generally accepted erosion control techniques, in conformance with the City and County grading ordinance and erosion control standards. Overall impact to the current farming operation will be mitigated by a phased withdrawal of cultivated lands. The fields closest to the H-2 will be fallowed first to correspond with the initial development phase. Additional fields will be fallowed as development schedules warrant. Pineapple lands to be converted to urban uses have been replaced through lease arrangements with Waialua Sugar Company. These lands have become available due to increased operational efficiencies of the Waialua Plantation.

4.7 HYDROLOGY

Some of the activities and changes associated with the development of Mililani-Mauka have the potential to significantly affect water resources. Despite the fact that all State and County Codes and Standards would be strictly adhered to during the construction, operation, and maintenance stages of the development, hydrologic impacts would occur both immediately and over the long-run. The following probable impacts have been identified:

1. Changes in effective topography and in the permeability and texture of the land surface that would alter the volume and route of storm water runoff;
2. Changes in water withdrawals from and recharge to the Pearl Harbor aquifer that would affect this important groundwater resource.
3. Changes in the amount of soil erosion, the types of chemical pollutants present (i.e., insecticides, street surface contaminants, etc.) that could potentially impact water quality of adjacent streams and receiving waters.

Changes in effective topography and related conditions are discussed in Chapter 6.4, "Storm Drainage." Changes in water withdrawals and recharge are discussed in Chapter 6.2, "Water System." Changes in water quality are discussed below. Information for this section was obtained from the 1978 EIS prepared for Mililani Town (Belt, Collins & Associates, May 1978), and personal communications with U.S. Fish and Wildlife Service, U.S. Geologic Survey, National Marine Fisheries, Hawaii State Department of Health-Pollution Investigation and Enforcement Branch, Hawaii State Department of Land and Natural Resources-Marine Fisheries Branch, University of Hawaii Water Resources Research Council, the Honolulu Department of Public Works Drainage Branch and the Honolulu Department of General Planning.

4.7.1 Existing Conditions

There are no perennial streams in the project area. Storm water runoff from the site either percolates into the basal lens system or drains into Waikakalaua Gulch to the west, Kipapa Gulch to the east, or into one of two smaller gulches which run

through the project site. Both Waikakalaua and Kipapa Gulches are tributary to Waikele Gulch which drains into the West Loch of Pearl Harbor. The riparian habitat of these gulches is not highly productive because of the intermittent nature of the streamflows.

Pearl Harbor is a valuable estuarine ecosystem and is designated Class 2 waters by the State to be protected for the propagation and sustenance of fish, shellfish and wildlife, and also for recreational uses. It contains several ponds, marshes, mudflats and settling basins on the perimeter of the West and Middle Lochs, which constitute important habitat and feeding grounds for water fowl. Pearl Harbor also contains a National Wildlife Refuge consisting of two separate units: The Pearl City unit and the West Loch unit. As an estuary, it is an important breeding ground for the Nehii which are used as bait by the Hawaii fishing industry.

Fish catches in Pearl Harbor have been declining in recent years for a number of reasons, including: decrease in ambient nutrient levels due to the reduction in sewage effluent entering the basin; decrease in the size of the fishing fleet; and decrease in accessibility to the fleet due to tightened security requirements of the Pearl Harbor Naval Complex (Personal Communication with Mr. Dave Sumerton, National Marine Fisheries, January 21, 1987).

The Mililani-Mauka project site is classified as a "non-point" source of water pollution. Runoff from agricultural lands such as the subject site transport soil particles, fertilizers, and pesticides into the adjacent gulch areas. The existing storm runoff has the potential to significantly impact water quality due to its concentration of sediment and other agricultural pollutants.

Sediment is soil which has been eroded and is in transport by suspension in water. Erosion is a natural geological process in which the climatic factors endlessly reshape the land by breaking down the solid materials into smaller particles so that running water can carry them away to lower areas where they are deposited. Periodic cultivation and harvesting of pineapple fields leaves acres of land without vegetative protection for months and, therefore, susceptible to erosion. The sediment resulting from such sources is also likely to contain chemical and biochemical precipitates used in all agricultural operations, i.e., fertilizers, insecticides and herbicides as well as additional decomposed organic material, such as humus which contribute to greater turbidity of receiving waters. Nutrients derived from fertilizers can cause excessive phytoplankton growth in receiving waters and may result in the disruption of ecosystem balance. The toxic substances found in herbicides and insecticides as well as heavy metals may also impact the ecosystem.

There is considerable variation in the proportion of streamflow from the site that actually reaches Waikele Stream and Pearl Harbor beyond. During periods of relatively low or moderate streamflow, much, if not all of the flow exfiltrates into the ground through the streambed or is diverted below Mililani Town for irrigation purposes. At such times the relatively small amounts of suspended solids in the water are deposited in the stream channel. Siltation becomes a serious

problem in Kipapa and Waikele Streams only during periods of intense rainfall. During these periods a "flushing" action occurs. Soil particles previously deposited on the channel bottom are dislodged and put into suspension. Redisposition and consequent siltation, occurs when the water reaches the lower energy environment near the mouth of the stream or in Pearl Harbor. While down- and side-cutting by the stream itself produces a limited amount of sediment carried by the stream, the bulk of it is eroded from the top of the plateau.

4.7.2 Proposed Development

The development of the proposed action will result in a change in the volume and composition of storm runoff generated by the site and an eventual decreasing of the sediment load leaving the site as the development matures. Basically, the components of runoff will change from agricultural types (fertilizers, pesticides, etc.) to those associated with urban development, such as street surface contaminants. As noted in Chapter 6.4, the volume of storm runoff will increase due to the increase in impervious surfaces associated with urban development.

As residents occupy their homes and establish yard planting programs, there should be a reduction in the sediment load of the runoff suggesting a gradual reduction in erosion and sedimentation potential. However, for low-intensity rains, the soil's polluting effect will probably be the same as it is at present due to the ease with which fine particles of soil can be removed from streets and other impermeable surfaces where they have collected and be carried through conduits typical of residential development.

Urban runoff pollutants enter the ecosystem in the following manner: typically, rain falling on impervious surfaces such as streets, sidewalks, and parking lots initially fills the tiny depressions on the surface. Additional rainfall results in surface runoff which can carry away litter, dirt, and other substances that have accumulated. These substances may include organic material, such as leaves, pesticides, animal droppings and bacteria they carry. Oils, heavy metals, and other toxic pollutants like mercury may also be transported in the process.

A study conducted by the U.S. Geological Survey (Water-Resources Investigations Report 85-4265, December 1985) analyzed the storm runoff at two sites within Mililani Town. High concentrations of suspended solids, Kjeldahl nitrogen and phosphorus concentrations were identified, as were mercury, lead, and fecal coliform bacteria levels. Suspended solids in urban runoff consist mostly of sediment from soil erosion and particles from the wear of automobile parts. Mercury and lead are found in batteries, insecticides, paint. Lead is also used in the formulation varnishes and gasoline. Possible sources of nitrogen and phosphorus include fertilizers washed or blown off lawns, soil erosion, auto exhaust, and animal and plant wastes. Feces from domestic pets are probably the major source of fecal coliform bacteria.

4.7.3 Probable Impacts

The pollutants described above are typical of urban stormwater runoff and generally characterize that which can be expected to be generated by the proposed Mililani-Mauka development. As noted previously, much of the storm runoff leaving the site never reaches its final drainage destination but is exfiltrated back into the ground. Because of the intermittent nature of Kipapa, Waikakalaua and the two small tributary gulches which drain the project area, and the pollutant composition of existing runoff waters, no adverse effect on stream biota is expected. Another potential impact would exist when the storm water is discharged into the receiving waters of Pearl Harbor's West Loch. This would occur only on the relatively few days during the year when flow in the stream is too great to allow for 100 percent exfiltration. On such occasions, some runoff from the site, together with its accompanying contaminants, would reach the West Loch.

The aquatic Resources Division of the DLNR notes that "The project is not expected to adversely affect aquatic resource values in the Waikakalaua and Kipapa Gulches, Waikele Stream, and Pearl Harbor, providing mitigating measures to control erosion and proposed wastewater disposal and storm runoff drainage improvements are complied with." (p. XIII-15).

The change from agricultural to urban uses should result in a long-term net reduction in the sediment load entering adjacent gulches from the project site. In the short-term however, the amount of soil eroded from portions of the project site actually under construction would be higher than it is at present even assuming that all feasible mitigating actions are taken (Belt Collins and Associates, 1978:IV-4). The eroded soil would eventually appear as sediment in the streams. However, given that the project represents a continuation of the existing level of construction activity for the entire Mililani area, not an increase, it seems likely that the receiving waters and their biota would not be adversely affected.

Given the size of the proposed development relative to the size of the drainage basin as a whole, the relatively non-polluting nature of residential development, the mitigative measures discussed below that will be employed in the completed development, and in the general absence of scientific data to the contrary, the impact of the proposed action on water quality is projected to be slight.

4.7.4 Mitigative Measures

Mitigating measures to reduce erosion and sedimentation are discussed in Chapters 4.6.3 "Soils and Agricultural Potential" and 4.10.3 "Air Quality." Measures to reduce accumulation of pollutants prior to runoff include street flushing and sweeping, controls of certain chemicals, fertilizers, etc., control use of lots (such as discouraging vacant lots where litter collects), and proper maintenance of storm drainage systems.

4.8 FLORA AND FAUNA

A flora and fauna survey of the site was conducted in August 1985. The survey area also included the forest reserve areas adjacent to the site. A complete report of the findings, "Terrestrial Flora & Fauna Survey - Proposed Mililani-Mauka Project, Island of Oahu", is found in Appendix J. A summary of the study is presented below.

4.8.1 Existing Condition

4.8.1.1 Flora

Most of the site has been in pineapple cultivation for an extended period and, as a result, other plant species are rare or consist of weedy species. More or less undisturbed vegetation is found in the smaller gulches which run almost the length of the study area and on its periphery.

Two major vegetation types can be found on the site: pineapple fields and mixed forests. Only a few weedy species are found in the fields or along roadsides, and they are mainly grasses. The mixed forest type found in the gulches consists of a mixture of introduced tree species such as Eucalyptus spp., and silk oak (Grevillea robusta), and the native tree species 'ohi'a (Metrosideros collina ssp. polymorpha) and koa (Acacia koa).

Adjacent to the site in the Ewa Forest Reserve, alien or introduced plant species are dominant. Two native species located adjacent to the project site are 'ohi'a (-Metrosideros collina ssp. polymorpha) and koa (Acacia koa).

No rare, threatened, or endangered plant species were found during the survey. The proposed housing development will be sited on the cultivated areas, avoiding the interior and peripheral gulches. The native species found in the gulches occur on the steep slopes and will not be affected by proposed park plans. These species also occur throughout the Hawaiian Islands in similar types of habitat.

4.8.1.2 Fauna

The introduced vegetation which has been established on the site does not provide suitable habitat for any of the endemic forest birds or mammal (Hawaiian hoary bat, Lasiurus cinereus semotus). Eight species of introduced birds were sighted on the study site, primarily in the forested areas. The barred (Geopelia striata) and spotted (Streptopelia chinensis) doves were the birds encountered most frequently.

Several introduced species of mammals are probably present in the study area (although none were sighted), including the roof rat (Rattus rattus) and small Indian mongoose (Herpestes auropunctatus). No endangered bird or mammal species were observed in the study area. It is highly unlikely that they would occur here as the habitat has been greatly disturbed and modified.

4.8.2 Probable Impacts

No endangered plants or animals were found to exist on the site or in the adjacent portions of the Ewa Forest Reserve. As stated in the survey report, most of the plant and wildlife species found in the study area are introduced with some considered as pests.

4.9 NOISE

Much of the information for this section has been summarized from the noise study prepared for the adjacent Hawaii Technology Park (Y. Ebisu & Associates, September 1985) and included in the Hawaii Technology Park EIS (Belt Collins & Associates, October 1985). Both the high-tech park site and the Mililani-Mauka site are assumed to have similar noise characteristics to the extent of their similar physiographic orientations, both front the H-2 Freeway, and both are exposed to noise from air traffic operations related to the Wheeler Air Force Base. Major differences between the two sites are that Mililani-Mauka site extends further east and away from the H-2 Freeway and is also further away from Wheeler AFB and the Army's East Range. In addition, the H-2 Freeway passes the Mililani-Mauka site in a cut which provides significant noise attenuation from vehicular movements.

4.9.1 Existing Conditions

4.9.1.1 Non-Traffic Noise

Existing noise levels vary significantly within the project site, with average noise levels greatest adjacent to the H-2 Freeway. Studies conducted for the adjacent Hawaii Technology Park (HTP) indicate that sound levels below flight tracks were significantly less than 65 L_{dn}. "...the level of activity would have to increase by an order of magnitude, to approximately 2,750 fly-bys per day (and 365 days per year) for noise levels at the site to reach 65 L_{dn} (Belt, Collins, Page 4-44). (By comparison, the Air Force estimates that approximately six flights per day transit the project area). Considering the HTP is much closer to Runway 06, aircraft would transit the HTP site at lower altitudes than over the Mililani-Mauka site, thus amplifying ground level noise impacts. Based on the Hawaii Technology Park study and data provided by the Corps of Engineers, ambient on-site noise levels are projected at between 45-50 L_{dn}.

Army East Range activities can be heard from the project site. Single shots and bursts of weapons firing were measured from the nearby HTP site between 2:00 PM and 3:40 PM, September 5, 1985. The larger weapon was fired in bursts and is believed to have been a large caliber machine gun. The quieter weapon was fired singly and is believed to have been an M-16. It is estimated that the firing occurred approximately one mile from the monitoring site. L_{max} (using the FAST meter response) during the weapons firings was estimated at 70 to 75 dB for the machine gun and 60 to 65 dB for the quieter M-16.

**Table 7: EXTERIOR NOISE EXPOSURE CLASSIFICATION:
RESIDENTIAL USES**

<u>Noise Exposure Class</u>	<u>Day-Night Sound Level</u>	<u>Equivalent Sound Level</u>	<u>Federal Standard</u> ¹
Minimal Exposure	<55 Ldn	<55 Leq	Acceptable
Moderate Exposure	>55 Ldn <65 Ldn	>55 Leq <65 Leq	Acceptable ²
Significant Exposure	>65 Ldn <75 Ldn	>65 Leq <75 Leq	Normally Unacceptable
Severe	>75 Ldn	>75 Leq	Unacceptable

(1) Federal Housing Administration, Veterans Administration, Department of Defense, and Department of Transportation.

(2) FHWA uses Leq instead of the Ldn descriptor. For planning purposes, the two are equivalent if: (a) heavy trucks do not exceed 20 percent of the 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.

Source: Federal Interagency Committee on Urban Noise, June 1980. Reprinted from Hawaii Technology Park Draft EIS p. 4-43

4.9.1.2 Traffic Noise

The existing traffic along the H-2 Freeway in the vicinity of the project site produces roadside noise levels between 65 and 70 L_{dn}. Tabulations prepared for the Hawaii Technology Park indicate that traffic noise levels (100 feet from the highway centerline) south of the Park could increase to 71.5 L_{dn} with the full development of the HTP. It should be noted that this estimate does not compensate for the sound attenuation offered by the earthen banks fronting the Mililani-Mauka site (roadway sections in cuts provide significant noise attenuation) and the H-2 Freeway, thus these estimates should be considered extreme case or maximum values.

4.9.2 Probable Impacts

4.9.2.1 Non Traffic Noise

Prospective residents of the Mililani-Mauka site will experience noise from aircraft operations from Wheeler AFB and military activities in the East Range area. These noise levels are projected to be well within Federal and State guidelines for average noise exposures for residential areas.

4.9.2.2 Traffic Noise

Upon project completion, areas next to the H-2 Freeway and Meheula Parkway will experience varying levels of traffic noise, depending on the design and structure of buildings. Noise intensity will increase and decrease according to periods of peak traffic flow. The applicant has had direct experience in developing properties adjacent to the H-2 Freeway and will apply this experience in planning the appropriate mix of land uses, setbacks and sound attenuation features for the appropriate areas of the project site.

Internal street system generated by residential-related vehicular movements within the proposed residential community may exceed 65 L_{dn} at a 50 foot setback from an internal street curb edge. During the 10-15 year construction phase of the development, farming of the mauka pineapple fields is expected to continue (with an ample buffer of vacant land between production fields and urban land uses). Trucks carrying pineapples will utilize the main spine road to access the pineapple fields (as they currently do along Meheula Parkway in Mililani Town).

4.9.2.3 Construction Noise

As this site is currently unoccupied, the immediate noise impacts caused by construction should be insignificant. The H-2 Freeway will serve as a buffer between Mililani-Mauka and the makai area. As people move into Mililani-Mauka, they will be exposed to temporary disturbances from heavy truck and construction equipment noise. All construction activities will comply with noise regulations contained in Chapter 43, Administrative rules for the State Department of Public Health.

4.9.3 Mitigating Measures

The Department of the Army, speaking for both Wheeler AFB flight operations and East Range maneuvers, has noted their concern that "historically, it has taken only one or two vocal complainers to generate actions that have a negative impact on training and readiness" (Department of the Army, November 28, 1986). This concern is noted by the applicant and prospective residents will be advised of the military activities in the area. Pending an evaluation of the forthcoming AICUZ study and further discussions with the Army and Air Force, additional mitigative actions may be deemed appropriate.

Suggested mitigating measures to reduce the impact of internal street system noise include use of 50 to 100 foot setbacks for residential units along main thoroughfares, minimize heavy vehicle traffic between the hours of 10:00 p.m. and 7:00 a.m., encourage the use of noise buffers through building design, landscaping and berming. Internal street system noise is unlikely to exceed the HUD maximum noise level of 75 L_{dn}. Therefore, the interior residential lots may be developed to HUD and other federal noise criteria.

All on-site construction will be designed to comply with the provisions of Title 11, Administrative Rules Chapter 43, Community Noise Control for Oahu. Noise from stationary equipment such as air conditioning/ventilation units and exhaust units will be attenuated to meet the allowable noise levels of the regulation based upon the zoning districts. The location and design of recreational facilities and schools has been planned to minimize their potential for adverse noise impacts on adjacent land uses. Design features such as the use of noise barriers and special noise insulation treatments will be considered to mitigate traffic noise associated with the H-2 Freeway and interior roadways.

Activities associated with the construction phase of development will also comply with the provisions of Chapter 43. Traffic noise from heavy vehicles travelling to and from the construction site will be minimized near existing residential areas and will comply with the provisions of Title 11, Administrative Rules Chapter 42, Vehicular Noise Control for Oahu.

4.10 AIR QUALITY

Information for this section is summarized from relevant portions of an air quality study (Root, 1986) conducted for the applicant and included in this report as Appendix M. The study also examined the probable air quality impact of a 240-unit multi-family residential project located west of Kamehameha Highway in Mililani Town.

4.10.1 Existing Condition

Present air quality in the project area is estimated to be very good. Long-term monitoring stations maintained by the State Department of Health have consistently recorded airborne particulate and sulfur dioxide levels that are well within allowable State of Hawaii Air Quality Standards (AQS). However, particulates and carbon dioxide emissions from nearby sugar cane or pineapple fires do present some potential to degrade air quality in the project area for short periods of time. Results of peak hour and eight hour carbon monoxide analyses at the Mililani Interchange indicate that State of Hawaii AQS are being exceeded but levels are well within the Federal AQS.

4.10.2 Probable Impact

Probable air quality impacts can be divided in two categories: direct and indirect.

Direct impacts include those generated during the site preparation and construction phases of development. During these phases, land disturbance will create "fugitive dust" pollution. A major generator of fugitive dust is heavy equipment moving

over unpaved roads. All forms of air pollution generated on-site would be carried by trade winds coming from the northeast, which could become a problem for a portion of Mililani Town. The probability for dust pollution is greater during the summer months because wind speed increases and rainfall levels drop.

The major source of indirect air pollutants will be from automobile traffic generated by the proposed residential development. Motor vehicles, especially those with gasoline-powered engines, are prodigious emitters of carbon monoxide. Federal control measures on the auto industry have succeeded in reducing carbon monoxide and nitrogen dioxide emissions from automobile exhausts. By the year 2000, carbon dioxide emissions from the Oahu vehicle fleet then operating are mandated to be little more than half the amounts now emitted.

Increased traffic generated by the proposed development will increase emissions of carbon monoxide and nitrogen dioxide along routes leading to urban Honolulu. To quantify the impact of the proposed development, critical receptor sites were located at the west side of the H-2 Freeway near the Mililani Interchange (directly below the project site), and further downstream, approximately mid-way between the Waiawa and Halawa Interchanges of the H-1 Freeway. Detailed carbon monoxide modeling conducted at these sites indicate that under worst case* morning peak hour traffic and meteorological conditions, estimated current and projected future concentrations are expected to be in excess of allowable State of Hawaii AQS (i.e., values exceeded more than once per year) but well within Federal AQS. It should be noted that all projected CO levels at the receptor sites will be less than current levels (with or without the project) due to the over-riding influence of the federal pollution abatement programs.

4.10.3 Mitigating Measures

Direct sources of air pollution have been identified as fugitive dust emissions from site preparation and grading. State of Hawaii regulations stipulate the control measures that are to be employed to reduce this type of emission. Primary control consists of wetting down loose soil areas. An effective watering program and the installation of dust screens can reduce particulate emission levels from construction sites by as much as 50 percent. Other control measures include good housekeeping on the job site and pavement or landscaping of bare soil areas as quickly as possible.

Vehicle emissions can be reduced through several actions: encouraging mass transit use and carpooling, improving road design, reducing individual vehicle emission

* Worst case assumptions include: peak morning traffic; cold winter morning temperatures (55 degrees F); uniform wind speeds of one meter per second; a high proportion of vehicles in a "cold-start" mode (least efficient). It should be noted that the worst case conditions have a relatively low probability of occurrence. The meteorological conditions used in the model have a probability of occurrence in the order of 0.3 to 1.0 percent (somewhere between one and four mornings per year). Average wind speed (essentially inversely proportional to CO level) is usually much higher than that used in the model.

rates, and limiting the number of vehicles. The construction of the two loop ramps at the Mililani Interchange will significantly reduce ambient pollution levels in the project vicinity. As a further mitigative measure, the applicant will be providing a six acre site for a park and ride facility within the Mililani-Mauka site which will promote the use of mass transit and expand the opportunities for carpooling.

4.11 SCENIC AND VISUAL RESOURCES

4.11.1 Existing Condition

The Waikakalaua and Kipapa Gulches, which form the Wahiawa and Diamond Head boundaries, respectively, add interest to the mauka site by breaking up the landscape. Looking into the gulches one can find good views of dense vegetation and mature trees. Panoramic vistas of the Waianae range and the ocean can be viewed from the mauka slopes (Figure 19).

4.11.2 Probable Impact

After the completion of the Hawaii Technology Park, to be located across Waikakalaua gulch from the development site, visual resources in the Wahiawa direction will be somewhat altered. The developer plans an unobtrusive, "campus-like" development, applying architectural and design controls so that most buildings will be lower than the tree line. Buildings will cover only 25% to 30% of the development leaving most of the site in open space.

The development will also change the visual character of the property from pineapple fields to an urban landscape as viewed from outside of the property.

4.11.3 Mitigating Measures

Buildings and infrastructure will be designed to create an aesthetic residential community. The elevation of structures will be kept low and utility lines will be installed underground.

4.12 HISTORICAL AND ARCHAEOLOGICAL SITES

4.12.1 Existing Condition

The archaeological consulting firm Chiniago, Inc. conducted a field survey and literature search on the Mililani-Mauka site in July 1985 (see Appendix K). The fieldwork involved a brief walk-through of the area now planted in pineapple and a more intensive inspection of Waikakalaua and Kipapa Gulches. No archaeological or historic remains were located during this survey.

The literature search identified a legend referring to a battle which took place in Waikakalaua and Kipapa Gulches. Two heiaus and wild taro have been noted to exist in Kipapa Gulch in times past. The survey report concluded that if any remains of an archaeological or historical nature ever existed on the property, agricultural land uses have erased this evidence. The State Historic Sites Office has reviewed the archaeological report and concurs with its findings.

=====**CHAPTER V**=====

SOCIO-ECONOMIC BENEFITS AND IMPACTS

This Chapter discusses the socio-economic impact of the proposed development with respect to the economy, employment, population and housing.

5.1 PRESENT LAND USE

The 1,200-acre Mililani-Mauka site is classified in the Agricultural Land Use district. Two sides of the parcel are bounded by urban land uses, which consist of the current makai portion of Mililani Town to the southwest, and a newly designated urban area to the northwest that will be developed into the Hawaii Technology Park. The mauka and southeast borders are adjacent to Conservation district and Agricultural district lands, respectively. The agricultural land is presently under pineapple production, with operations being carried out by the Dole Wahiawa Pineapple Plantation. There are seven fields or portions of fields which occupy the site.

The planned Mililani expansion would displace some 1,000 acres of pineapple fields currently used by Dole. The economic importance of these fields have diminished with the emphasis on fresh fruit production, the main thrust of Dole's Wahiawa operations. The acreage converted to urban use will be replaced with fields released by Waialua Sugar Company as it reorganizes land resources to maintain an economically feasible production schedule.

5.2 ECONOMY

Several changes in the tax structure will occur as land is converted from agricultural to urban use. Operating expenditures of the State will increase; however, the revenue collected by increased real property values, income taxes, and sales tax, will more than offset these operating expenditures. The revenue and expenditure changes are common to any land use change similar to the one proposed herein.

Real property tax rates will change when land use classification change takes place. In 1984 real property tax valuations were \$21,965 for agricultural land and \$125,539 for improved residential land. It is apparent that revenues will increase dramatically with the conversion of this land to residential use. Increased revenue will have a positive affect on the State budget, which will in turn benefit all residents of Hawaii.

5.3 EMPLOYMENT

5.3.1 Existing Conditions

Most of the Mililani Town Sales Office data on employment is based on jobs held by the male head of household only. Thirty-three percent of the men were employed in service industries; 18% were employed in professional fields, 15% were technicians, 15% worked for the Department of Defense, 10% worked in

construction, and 9% had other forms of employment. The general area of employment for 50% of the husbands was the Central Honolulu/Waikiki area. The Pearl Harbor/Hickam area employed an average of 20% of the Mililani husbands; the Aiea/Airport area drew 10%; and Wahiawa/Waipio/Schofield, Pearl City, and Waipahu/Ewa employed 3% each. Mililani itself employed 1% of the husband work force.

5.3.2 Future Conditions

A study of potential year 2005 employment levels for Oahu's Central, Leeward, and North Shore areas has been prepared for Oceanic Properties, Inc. as part of the ongoing regional planning program for their Central Oahu landholdings (Community Resources, Inc., 1985). Major projects which have been approved or proposed were used to derive future job counts. Results from the study indicate that the great majority of direct job growth within the Leeward, Central and North Shore study area would come from two activities which have yet to be developed on a large-scale basis in the study area: tourism (at West Beach and Kuilima) and high-technology (at the Hawaii Technology Park).

A number of scenarios were generated in the study, each with different assumptions about the future performance of the tourism and high technology industries. The performances of these industries in turn affect job creation in businesses that sell them goods or services (indirect jobs) and jobs supported by employee wages and business profits (induced jobs). The latter would be largely retail, service, or governmental in nature.

Findings for the entire study area indicate a 1980 base employment level of 27,974 civilian jobs. Employment projections for the year 2005 ranged from a high of 44,884 new civilian jobs (assuming optimistic build-out rates for tourism and high technology industries) to a low of 12,938 new jobs (assuming no new growth in tourism and high technology industries). A mid-range projection of 27,974 new jobs (assuming only moderate success in tourism and high technology industries) was also made.

The findings of the study indicate that the traditional employment base of Central Oahu residents will gradually shift over the next 25 year period from the Primary Urban Center to a number of other areas including Ewa, the North Shore and, in part, to the Hawaii Technology Park in Mililani. These findings reinforce the desirability of providing housing (such as at the proposed Mililani-Mauka community) in reasonable proximity to new employment growth areas.

5.3.3 Probable Impacts

No reduction in agricultural jobs will occur as a result of the phased withdrawal of pineapple lands. The proposed residential development will not significantly contribute to long-term employment growth in the Central Oahu area. Certain land uses within the project area will provide limited employment opportunities. The college/university campus could employ a total of 450 persons (Community Resources, Inc., 1985). The five acre commercial site, the proposed public schools and the various community facilities (parks, churches, etc.) will provide some additional long-term employment opportunities. During the construction phase, the

number of jobs in the mauka area will increase, providing approximately 660 temporary jobs.

5.4 POPULATION

The population of Mililani Town in 1986 stands at approximately 26,491 residents living in 7,861 dwelling units. Approximately 1,371 dwelling units (with an associated residential population of 4,456 residents) remain to be developed in the "makai" area. The "mauka" area is projected to add 6,640 dwelling units and an associated residential population of 21,000 residents. Upon the completion of the entire 3,500-acre Mililani Town project there will be approximately 15,000 dwelling units and a population of about 50,000 residents.

5.5 HOUSING

A comprehensive housing market analysis has been conducted by the applicant (Appendix A) and is summarized in Chapter 2.5.1. The information presented below discusses the profiles of present Mililani Town home purchasers and projected profiles of prospective Mililani-Mauka residents.

5.5.1 Community Characteristics

In 1983 an average of 40% of home purchasers in Mililani were government employees, including both military and civilian. In 1984 more than three-fourths of the single-family units purchased in Mililani Town were bought by previous residents of Mililani. A large number of potential purchasers will be former renters, thereby releasing rental units in what is considered a tight market.

Judging from past trends in the composition of the Mililani Town community, and in recognition of the applicant's intent to maintain the level of quality associated with the existing Mililani community, the future residents of Mililani-Mauka will be similar to those of the existing community.

Over the past 13 years the buyers of single-family residences in Mililani Town have been asked to voluntarily complete a questionnaire distributed by the Mililani Sales Office. More than 85% have responded, providing a fairly reliable profile of homeowners. These statistics show that 80% of Mililani buyers come from the island of Oahu. A broad range of ethnic backgrounds can be attributed to the residents. The largest group, 42%, are Japanese-American. Caucasians rank second in number, with 25%. The remaining residents are Filipino-Americans, Chinese-Americans, or of mixed ethnicities, making up between 12% and 7% of the purchasers' ethnic backgrounds.

The average age of husbands is 35-37 years; 33-34 years for wives. Both husband and wife average 14.4 years of education. Most of the wives, 80%, are working mothers, and 70% of families have children. There is an average of 1.6 children per family. In 1984, the combined income for purchasers of the detached single-family units were \$33,300 for New Design homes, \$42,794 for the traditional homes, and \$50,160 for the executive homes. The Mililani Terrace Condominium Apartment project is intended for owner-occupant buyers with gross incomes not exceeding \$17,550 to \$26,600 (or 80% of median Oahu income), depending on family size.

CHAPTER VI

IMPACTS ON PUBLIC FACILITIES AND SERVICES

This chapter describes the existing conditions of public facilities, utilities and services in the Mililani-Mauka service area and the relationship of these systems to the proposed development. Public facilities are those systems which are provided, staffed, and maintained by government to serve the public health, safety and welfare. They include roadways, schools, fire and police protection, and refuse disposal areas. Public utilities are distributed services, such as electricity, water, wastewater, and communications, that are provided either by a public agency directly or by a publicly regulated utility. Project-related impacts are discussed primarily in terms of anticipated requirements generated by the development. Mitigation measures are preliminary proposals for how that demand may be satisfied. Portions of this chapter have been extracted or summarized from the following reports, which are appended to this document:

Preliminary Engineering Utilities Reports (M&E Pacific, Inc):	Appendix C & D
Preliminary Drainage Report (EDP Hawaii, Inc.):	Appendix E
Traffic Impact Studies (Parsons Brinckerhoff Quade and Douglas, Inc.):	Appendix F, G & H

6.1 TRANSPORTATION FACILITIES

Traffic Studies: Two site specific traffic studies and one regional study have been conducted by Parsons Brinckerhoff Quade and Douglas, Inc., for the Mililani-Mauka development. The first study, conducted in May 1984, assessed traffic conditions both with and without the proposed project (*Traffic Impact Study*, Appendix G). In January 1985, another study looked at alternative traffic patterns and impacts (*Loop Ramp Study*, Appendix H). Both documents provide conclusions and recommendations for planning efficient traffic flow which have been summarized below. A regional study was released in May 1986 which analyzed the regional transportation issues affected by potential development in Central and Leeward Oahu. This study utilized the most recent available projections of population and employment to project transportation demands, and determine appropriate growth strategies and/or transportation improvements to provide acceptable future traffic conditions (*Central and Leeward Oahu Transportation Study*, Appendix F). Findings from this study are also summarized below.

6.1.1 Existing Conditions

Primary access to the proposed mauka portion of Mililani Town will be provided by the extension of Meheula Parkway, which is the major arterial through the existing area of Mililani Town. Meheula Parkway runs north-south through the Mililani interchange, where there is access to and from H-2 in the Wahiawa- and Honolulu-bound directions. Key features of the interchange include: (1) a full

diamond configuration, which has resulted in conflicting traffic movements; (2) stop-sign controlled approaches to the Parkway from H-2; (3) single-lane ramps; and (4) striping for 6 lanes on Meheula Parkway at the H-2 bridge--two for through traffic and one for left turns in each direction. A traffic count conducted by the State Highways Division in September 1983 found that capacity was exceeded on the Koolau-side Mililani-bound off-ramp during afternoon rush hour.

The most significant regional transportation problem in Central and Leeward Oahu is the lack of sufficient traffic capacity in the H-1 corridor between the Waiawa and Halawa interchanges. This corridor is significantly congested during peak periods in the peak direction of travel. The morning peak period congestion is more severe than the afternoon peak period. A related problem is the lack of sufficient capacity on the transition from H-2 to H-1 in the Waiawa interchange. During the morning peak period, this bottleneck on this transition ramp combines with the H-1 capacity constraint to back up traffic onto H-2.

Trends in employment and population distribution on Oahu have been used to predict traffic distribution in the Mililani-Mauka area. A fully established and functioning Hawaii Technology Park has also been included in assessing potential traffic problems. The *Traffic Impact Study* considered the future traffic impacts of both the proposed Mililani project and additional developments which may take place in the future. At 64% of full development (4,200 units), traffic generated by the existing Mililani-Mauka community is expected to exceed the capacity of the Mililani interchange.

Existing traffic conditions downstream of the proposed project have become increasingly congested. Peak hour conditions in the most congested locations of the H-1 corridor were classified as "Level of Service F" - a condition where volume exceeds roadway capacity and where significant congestion results.

6.1.2 Access Improvements

Increased traffic flow can be most efficiently accommodated by improving the capacity of the road at the Mililani interchange (Figure 9). The *Traffic Impact Study* recommended the following improvements:

- (a) Signalization of Meheula Parkway intersections with both off-ramps.
- (b) Ramp widening to two lanes for the Honolulu-bound ramps.
- (c) Restriping of the existing bridge to allow a double-lane configuration for the left turn to the Honolulu-bound ramp.
- (d) Widening of the westbound lanes of Meheula Parkway to increase capacity through the Koolau-side intersection.

Because of the high traffic volumes which will be generated by the total development of Mililani-Mauka, the Mililani Interchange capacity will be exceeded at approximately 64 percent build-out of the "mauka" area. The *Loop Ramp Study*

recommended the construction of loop ramps to eliminate some traffic conflicts and improve operations along Meheula Parkway. Two alternatives were developed and evaluated in the study:

Alternative 1: The first alternative is a loop ramp in the Wahiawa-Koolau quadrant which would accommodate traffic coming from Honolulu and turning left from H-2 to Meheula Parkway. On-ramps to H-2 toward Wahiawa would be relocated outside of the loop ramp. A traffic signal would be installed to control makai-bound Meheula Parkway traffic in order to reduce delays to traffic turning left from the Parkway on to the H-2 ramp toward Wahiawa.

Alternative 2: The second alternative would place loop ramps on both sides of H-2 on the Wahiawa side of Meheula Parkway to handle the increased number of left turns which would otherwise be crossing the Parkway. Loop ramps would each be two lanes. Traffic signals are suggested for both loops at their intersection with Meheula Parkway. Existing ramps in these quadrants would be relocated outside of the loop ramps.

Alternative 2 has been selected as the preferred alternative as it affords the greatest increase in capacity for both the "makai" and "mauka" areas and would be sufficient to accommodate projected population growth. In addition to the interchange improvements, the H-2 Freeway would also require an additional lane in each direction (from three to four) between the Mililani and Waiawa Interchanges.

6.1.3 Probable Impacts

6.1.3.1 Local Implications

Outbound traffic from Mililani-Mauka would be generated primarily by the residential sector. However with support facilities, such as schools, churches, retail stores, and recreational centers, provided within the 3,500-acre community, Mililani will become more independent of other urban centers and able to satisfy many of the residents' needs internally. Every trip that remains within the community will eliminate the need for external, and thus longer, trips. Provision of bikeways and pedestrian paths may also encourage conservative use of vehicles, thus minimizing the amount of traffic otherwise expected from a significant population increase in the area.

Preliminary findings from an employment study conducted for Mililani Town, Inc. indicate that 28,000 to 45,000 new jobs could be created in Oahu's Central, Leeward, and North Shore areas by the year 2005, spurred primarily by growth in tourism and high-technology industries (See discussion in Chapter 5.3). In addition, traffic attractors in Mililani-Mauka itself, such as a college campus, retirement community, and additional commercial space have two beneficial effects on traffic: (1) they would stimulate vehicular flow in the opposite direction from peak flows; and (2) they would reduce the number of vehicles from these suburban areas entering the existing traffic flows.

6.1.3.2 Regional Implications

The Central and Leeward Oahu Transportation Study reports that in all growth scenarios (including the development of the subject property), traffic conditions in 1995 are projected to be better than existing conditions. This improvement can be attributed to the planned H-1 capacity increase between Waiawa and Halawa interchanges.

By the year 2005, traffic conditions will have again deteriorated to unacceptable levels, and will be worse than existing conditions unless travel demand is reduced.

6.1.4 Mitigating Measures

Several actions are needed to accommodate future travel demands in the H-1 and H-2 corridors. These actions, recommended by the *Central and Leeward Oahu Transportation Study*, will require the cooperative efforts of the City, State, OMPO, major employers and property owners.

- o A policy which encourages high employment growth combined with moderate population growth in Central and Leeward Oahu could significantly reduce peak traffic in the H-1 corridor. The feasibility and economic impacts of such growth policy should be analyzed, to determine the socio-economic impacts of such a policy.
- o Establishment of a ridesharing coordination program, implementation of HOV lanes, greater utilization of flexible working hours, increases in express bus service, and provisions of exclusive bus facilities will all help to reduce peak hour traffic congestion. These measures should be implemented. The need for a higher-capacity (i.e. rail) long-range transit system to serve Central and Leeward Oahu cannot be specifically determined [at this time]; however, it appears that such a system by itself would not help to reduce peak traffic demand in the H-1 corridor.
- o To accommodate the projected year 2005 traffic volumes at an acceptable level of service, and to accommodate growth beyond year 2005, additional measures should be implemented to increase vehicle occupancy, reduce the number of single occupant vehicles, and/or increase the vehicle capacity of the H-1 corridor. Possible measures could include:
 - charging tolls for vehicles entering the PUC.
 - increasing parking rates in the PUC.
 - rationing gasoline.
 - prohibiting or restricting single occupant vehicles on certain roadways.
 - changing school hours.
 - widening or double-decking H-1 or Kamehameha Highway.
 - constructing a new highway tunnel across Pearl Harbor.

The applicant is committed to working closely with State and County transportation agencies and interested community groups to implement these recommendations.

6.2 WATER

6.2.1 Existing Conditions

The project site is located near the apparent boundary between the Schofield high level aquifer and the Pearl Harbor basal lens aquifer. This boundary is formed by impermeable vertical rock structures called dikes which restrict the flow of groundwater between the two aquifers. Consequently, the fresh water in the Schofield high level aquifer is at an elevation of 270 to 280 feet above mean sea level (MSL), while the groundwater head in the Pearl Harbor aquifer is between 20 and 25 feet above MSL.

Mililani Town is presently supplied by a self-contained potable water system and current consumption is approaching an average of 3.2 million gallons per day (MGD). The water sources lie within the Pearl Harbor Ground Water Control Area (GWCA) which has a 225-MGD ceiling on total pumpage from the underlying Pearl Harbor aquifer. Mililani's share of this total is 4.98 MGD.

As of December 1986, the sustainable yield of the Koolau Subzone of the Pearl Harbor GWCA was 200 MGD. The total authorized amount was 199.910 MGD with 0.090 MGD "available" (See DLNR letter dated January 22, 1987, p. XIII-15).

The existing well sources for the entire Mililani Town area are shown on Figure 1 of the Water Master Plan (Appendix E). The declared capacities and DLNR preserved use amounts of the wells are as follows:

Table 8: MILILANI WELL CAPACITIES

<u>Well Field</u>	<u>Declared Capacity (5 year average)</u>	<u>Preserved Use</u>
1,2,3,4	2.72 MGD	2.98 MGD
5,6	1.0 MGD ^a	2.0 MGD ^b
7,8 ^c	---	---

^a Source: Board of Water Supply

^b Permitted Use

^c Undetermined--wells have been drilled but pumps have not yet been installed

(Source: M&E Pacific, Inc., 1986)

6.2.2 Proposed Development

A revised Mililani Town Water Master Plan (December 1986) is currently being reviewed by the Board of Water Supply (Appendix D). The proposed potable water system for Mililani-Mauka is discussed in Chapter 2.4.3. As noted, the average day potable water demand for the proposed Mauka development is estimated at 3.8 MGD. Much of this demand could be satisfied by reductions in sugar operations within the Koolau Subzone. It is estimated that an additional 7.0 MGD of water will be needed: 1.3 MGD for the Hawaii Technology Park and 5.7 MGD (maximum day consumption) for Mililani-Mauka. It should be noted that the Hawaii Technology Park will receive water from the proposed Wahiawa Corporation Yard well and not from the Mililani Town Wells (Board of Water Supply letter dated January 15, 1987, Page XIII-44)

None of the 32 MGD currently exported from the Pearl Harbor GWCA to Honolulu is derived from these well sources. All of the water from Mililani Town Wells 1 through 8 is and will continue to be used for Mililani Town. No Waiahole Ditch water will be utilized for the proposed project.

Since the proposed new well sources located near the 1,160-foot elevation are upgradient of agricultural fields, pesticide contamination of the proposed wells is not anticipated. Should the well water be contaminated, an alternative well site will be sought or the water will be treated to comply with Safe Drinking Water Act standards and potable drinking water regulations of the Hawaii State Department of Health. Any such additional source development or water treatment would be funded by the developer.

The development of water sources in the mauka area will be contingent upon the Department of Land and Natural Resources (DLNR) approval. As noted above, the mauka area is within the Pearl Harbor Groundwater Control District; therefore the applicant will seek DLNR permission to withdraw water for their use. All such efforts will be coordinated with the Board of Water Supply.

All new sources of public potable water (Section 11-20-29, HRS) and public water distribution systems (Section 11-20-30, HRS) must be approved by the Director of the Department of Health, except when approval authority is delegated to the Board of Water Supply (BWS) for BWS distribution systems. Application for source approval is predicated on the submittal of a satisfactory engineering report prepared after initial well exploration. Distribution system approval requires the submittal of satisfactory construction plans and specifications.

6.2.3 Probable Short-Term Impacts

The probable short-term impacts associated with the development of the Mililani-Mauka water system are essentially those associated with construction inconveniences. The noise, dust, and traffic disruptions due to the construction of the water system should be temporary, lasting only for the duration of the construction.

6.2.4 Probable Long-Term Impacts

Probable long-term impacts are associated with visual and noise concerns of the water system facilities such as pumphouses, above-grade pipes and related noise impacts of operating pumps.

6.2.5 Probable Cumulative Impacts

In principle, the sustainable yield of the Pearl Harbor Basin may be adversely impacted, albeit indirectly, by land use changes that lessen the permeable area available for groundwater recharge. As a practical matter, the changes anticipated are not significant compared to natural causes.

The proposed 1,200-acre project represents approximately one percent of the estimated 130 square miles of noncaprock area overlying the Waianae and Koolau aquifers within the Pearl Harbor Ground Water Control Area. Furthermore, not all of the land within the project area will be rendered impermeable. Runoff generated by the project will be diverted to the gulches that border the site with the major portion being channeled into Kipapa Gulch. A significant portion of any intermittent flow in the gulches infiltrates into the ground, contributing to recharge. It should also be noted that the actual impact on groundwater recharge is not only a function of the areal extent of the impermeable surface, but of location, soil and topographical features as well. Rainfall is the major contributor to recharge. The vast majority of rainfall (and recharge) occurs along the higher slopes of the Koolau Forest Reserve (reaching 300 inches of rainfall per year) mauka of the subject property.

The development of a well system will have an adverse impact on the sustainable yield of the Pearl Harbor Groundwater Basin to the extent that the new residents will consume water that otherwise may have gone to some other use or migrated out to sea.

6.2.6 Mitigating Measures

The visual and noise impacts can be mitigated by careful site selection, aesthetic architectural design, and the use of natural screening and/or mechanical mufflers.

Impacts to the sustainable yield of the Pearl Harbor Aquifer can be alleviated by: obtaining pumping rights from other sources within the basin; reducing the quantity of water transported out of the Pearl Harbor Basin to compensate for mauka area water requirements; and/or importing water to the Pearl Harbor Basin to compensate for mauka area water requirements.

6.3 WASTEWATER TREATMENT AND DISPOSAL

6.3.1 Existing Facilities

The Mililani-Mauka collection system (described in Chapter 2.4.3) will be connected to the existing 21-inch diameter sewer line (inactive) under the H-2 Freeway and conveyed via the existing Mililani Town trunk sewer system to the Mililani Waste Water Treatment Plant (WWTP) which serves Mililani Town and portions of

Melemanu Woodlands and Waipio Acres. Effluent from this plant is sent to the Honouliuli Wastewater Treatment Plant via the Waipahu waste water pump station (WWTP) for eventual discharge from the Barbers' Point marine outfall.

The Mililani trunk sewer has adequate capacity to accommodate the projected additional wastewater flow from the proposed Mililani-Mauka development (Department of Public Works letter dated September 2, 1986). The Mililani WWTP will be phased out of operation in the near future (Ibid) and raw wastewater presently treated at Mililani WWTP will be conveyed to Honouliuli WWTP for treatment. The existing Mililani secondary effluent line connecting to the Honouliuli sewer system, hereafter referred to as Line A, would be used to transport raw wastewater to Waipahu WWPS. Aerated grit chambers and bar screens would be installed at Mililani WWTP to remove solids that would otherwise settle in Line A. When the 17 MGD capacity of Line A is reached in the future, equalization basins shall be constructed at Mililani WWTP to dampen wastewater flows below the capacity of Line A.

Presently, effluent from Mililani WWTP provides the only flow into Line A. In the near future, wastewater flow may also enter the line from the Waikele development and other developments in Central Oahu. However, the Division of Wastewater Management (DWM) is uncertain on the long-term function of Line A, or for that matter, Waipahu WWPS because of the indefinite direction of development in Central Oahu.

Raw wastewater from Mililani-Mauka will ultimately be treated at Honouliuli WWTP. The current capacity of Honouliuli WWTP is 25 MGD. Presently, flow in to the plant is 17.25 MGD. The DWM is asking for funds to expand the plant's capacity to 51 MGD by the end of 1993 to accommodate the proposed developments in Central Oahu. This project will not be EPA supported and other sources of revenue must be sought. The Barbers Point Outfall has a hydraulic capacity of 112 MGD, the projected peak flow for the year 2020.

6.3.2 Probable Impacts

The probable impacts associated with the onsite facilities and offsite improvements are mainly the inconveniences related to construction. The noise, dust, and traffic disruptions caused by normal construction operations should be the only adverse impact. These inconveniences should only be temporary, lasting only during the installation of the wastewater facilities. The additional wastewater flows generated by the development of the Mauka area should have minimal impact on the existing Mililani Town trunk sewer system. The existing sewer will be able to accommodate the additional flows. The expansion of the Honouliuli WWTP, if required, will increase additional construction and operations and maintenance costs. The impact on land requirements of the WWTP expansion will be minimal since all improvements will be located on the existing WWTP site.

6.4 STORM DRAINAGE

Information on storm drainage presented below is summarized from a study entitled Preliminary Drainage Report for Mililani-Mauka prepared by EDP Hawaii Inc (October 18, 1986) and is included in this report as Appendix E. The Drainage

Report was accepted by the Department of Public Works by letter dated October 27, 1986 (Page E-27). Potential water quality impacts resulting from the change from agricultural to urban storm runoff are discussed in Chapter 4.7.

6.4.1 Existing Conditions

The Mililani-Mauka area is currently used for the cultivation of pineapple and is situated on gentle plateaus with a natural grade of 2% to 5% sloping east to west. The site is traversed by two main gullies in a naturally vegetated state. The current drainage pattern follows the furrows in the pineapple fields and along the service roads which lead to the two main gullies (hereinafter referred to as the north and south gullies) which act as the drainage basins for approximately 988 acres of the 1,200 acre development. Storm runoff flows from the project site into culverts crossing the H-2 Freeway, the Waipio Acres drainage system and eventually into Waikele Stream within Waikakalaua Gulch. North and south fringe areas (20 and 212 acres respectively) of the development sheetflow into Waikakalaua and Kipapa Gulches and are both tributaries for and part of the 45.7 square mile drainage basin for Waikele Stream (See page E-4, "Existing Drainage Pattern for Mililani-Mauka").

The Waipio Acres subdivision lies directly downstream of the north and south gullies which traverse the project site. The Waipio Acres storm drainage system is sized to carry 600 cubic feet per second (CFS) from the north branch and 970 CFS from the south branch. The current sizing indicates that an additional 300 CFS and 754 CFS from Mililani-Mauka can be allowed to drain into the north and south branches of the Waipio Acres drainage system, respectively.

The developments within Waikakalaua Gulch cannot accommodate increased storm runoff attributed to upstream development. Thus, no additional flows from the proposed development can be diverted into Waikakalaua Gulch.

6.4.2 Proposed Improvements

Increased paving in the mauka area is expected to reduce the volume of storm water absorption as well as the rate of absorption, thereby increasing surface runoff. From the qualitative run-off factors generated for the Mililani-Mauka development, approximately 79 acres and 198 acres within the north and south gully tributary areas respectively can drain into the Waipio Acres drainage system. The storm runoff generated from the remaining 711 acres of the 998 acre drainage area of Mililani-Mauka, currently flowing into Waipio Acres, will be directed into Waikele Stream via Kipapa Gulch.

Future drainage improvements will include the construction of cut-off ditches, box culverts and pipe systems designed to transport storm runoff (in excess of the Waipio Acres' drainage system capacity) to Kipapa Gulch. All drainage improvements will conform to the requirements and design standards of the City and County of Honolulu.

6.4.3 Probable Impacts

As Mililani-Mauka and Kipapa Gulch are existing tributaries of Waikele Stream, diverting storm runoff from Mililani-Mauka to Kipapa Gulch is not expected to adversely affect the peak runoff flows in Waikele Stream near Waipahu.

Except for temporary disruptions normally associated with construction of such drainage facilities (dust and noise), no other adverse impacts are anticipated.

6.5 SOLID WASTE DISPOSAL

6.5.1 Existing Conditions

The City and County of Honolulu handles the collection and disposal of all refuse within residential areas of Oahu, such as Mililani Town. Private collectors dispose of refuse from multi-family housing areas and commercial establishments.

Solid wastes are either disposed of at the City's Waipahu Incinerator or at the privately operated Palailai Sanitary Landfill (SLF). The Waipahu incinerator is currently operating at capacity (120,000 tons/year) and the disposal site adjacent to the incinerator is estimated to reach capacity in 1989. The Palailai SLF is estimated to reach capacity in 1988.

6.5.2 Future Conditions

The Mililani-Mauka development will generate approximately 15,000 tons/year of solid waste (21,000 residents X 3.5 lb/capita/day) at full build out (10-15 years from start of construction).

The City is scheduled to open a new SLF at Waimanalo Gulch with operations estimated to begin in mid-1987. The estimated life of the landfill is approximately 8 years with a total capacity of 312,000 tons.

The City is also planning to develop a Resource Recovery Facility (H-POWER) at the Campbell Industrial Park. When this plant is operational, it is expected to have a capacity of 560,000 to 750,000 tons/year. This capacity would accommodate most of Oahu's solid waste (including that of the proposed action). The ash and residue from the H-POWER facility will be disposed of at the proposed Waimanalo SLF.

6.5.3 Probable Impact

The refuse generated by the project site (projected to start in 1991) will initially be disposed of at the proposed Waimanalo SLF. Disposal will shift to the H-POWER facility when it becomes operational.

6.6 POWER AND COMMUNICATIONS

6.6.1 Existing Conditions

The project site is essentially without utilities except for the existing Hawaiian Electrical Company's (HECo) facilities which cross the site. The two overhead

power line crossings are in easements granted to HECO which permit them to operate 46 KV transmission circuits. HECO also maintains two 138 KV overhead transmission lines located to the east of the site. The Hawaiian Telephone Company has a below-grade joint trunking cable traversing the site which will require relocation.

6.6.2 Probable Impacts

HECO's generation capacity is approximately 1,300 MVA, with a present system peak capacity of approximately 935 MVA. The project's demand requirements are well within the reserve capacity of the generation system and therefore can be absorbed without taxing the HECO generation system and limiting other developments. Power for the site is to be supplied from the HECO Waiiau power plant. Electrical distribution equipment will be installed by Mililani Town, Inc. and dedicated to HECO. HECO anticipates that either one of their existing 46-KV circuits which traverse the site can absorb the estimated 22.5-MVA increase in load due to the proposed development; however, an additional substation will be required to service the new electrical users. HECO expects to install a 40-MVA substation on a lot size of 12,000 square feet. The proposed substation site is to be in the vicinity of the existing 46-KV transmission lines in order to minimize the cost of extending 46-KV circuits to the substation. The entire system will be an underground facility with only the substation, switching vaults, 46-KV lines, and individual service transformers visible above ground.

The Hawaiian Telephone Company does not have any local telephone facilities within the site, with the exception of the joint trunking cable discussed above; their nearest telephone facility is the duct bank stubout mauka of the Mililani interchange. This duct bank will be adequate to serve the development. Hawaiian Telephone Company will need a parcel of land, approximately 5,000 square feet in area near the Mililani interchange for a switching facility. The applicant will provide the required site.

Cable television facilities do not exist on the site but can be obtained from the trunking cable facilities located at the intersection of Meheula Parkway and Kuahelani Avenue.

6.7 POLICE PROTECTION

6.7.1 Existing Conditions

A police station recently established in Wahiawa provides police protection services to Mililani. This area is part of the Honolulu Police Department's second district.

6.7.2 Probable Impacts

As long as adequate police facilities are maintained, including sufficient personnel, equipment (especially vehicles), and communications, the Honolulu Police Department feels that they will be able to provide adequate service to Mililani's expanding population. At the same time, the Police Department has expressed

concern about the number of planned and proposed development in the Central Oahu and Ewa areas in relation to increased traffic that will be generated and probable impacts on traffic safety.

6.8 FIRE PROTECTION

6.8.1 Existing Conditions

Existing fire protection facilities for the proposed Mililani-Mauka development are as follows:

Table 9: FIRE STATIONS AND RESPONSE DISTANCES

<u>Fire Station</u>	<u>Response Distance</u>	<u>Service</u>
Mililani, Engine Co. 36	2 miles	Primary
Waiau, Ladder Co. 38	9 miles	Primary
Wahiawa, Engine Co. 16	3 miles	Secondary

6.8.2 Probable Impacts

The existing facilities are considered inadequate due to response distances in excess of accepted standards, given equipment and staffing levels. The Fire Department has projected a need to expand the Wahiawa Fire Station to include a ladder company. Improvements in fire protection coverage are expected to be implemented by year 1992. Additional facilities and equipment will be needed to service the proposed Wahiawa Ridge and Waikele developments.

6.9 EMERGENCY MEDICAL SERVICES AND HEALTH CARE FACILITIES

6.9.1 Existing Conditions

Emergency medical service in the Wahiawa area is managed by a phased emergency response system. If a specific ambulance unit is not able to respond to an emergency in a timely manner, the Fire Department is called to provide basic life support until the ambulance unit arrives. In 1983 the average number of calls per day was 3.9, and the average number per 1,000 persons was 33.5 calls. Average response time for ambulance service in the vicinity of Wahiawa was 8.9 minutes in 1983, well within the State's standard response time of 20 minutes (average) for 95% of calls.

6.9.2 Probable Impacts

If the development of Mililani-Mauka increases the population of the Wahiawa area by 20,000, the average number of calls per 1,000 persons would increase to 49.5, or 5.67 calls per day. The Emergency Medical Services Systems Branch of the

State Department of Health feels that, even with the projected population increase, current levels of prehospital emergency medical service could be maintained.

6.10 SCHOOLS

Mililani-Mauka will provide sites for two elementary schools and one intermediate school. A college or university site has also been provided. The facilities will be built by the State government or non-profit organization as the community develops, thereby precluding additional pressure on existing schools in the vicinity. The university campus site is advantageously located near the proposed Hawaii Technology Park and amid a growing regional population. For similar reasons, the site would also be appropriate for other types of institutions, such as a community college, private college, or private elementary/secondary school.

6.10.1 Probable Impacts

The State Department of Education has indicated that the proposed Mililani-Mauka development will generate the following public school enrollments (Table 10).

Table 10: PUBLIC SCHOOL ENROLLMENT PROJECTIONS

<u>GRADE</u>	<u>APPROXIMATE ENROLLMENT</u>
K-6	950-1,750
7-8	250- 450
9-12	400- 750

Source: DOE, January 9, 1987

The two elementary schools and the one intermediate school planned for the development will be sufficient to meet the projected enrollment increase. Additional classrooms will be required to accommodate the additional enrollment at Mililani High School. Close coordination will be maintained with DOE to assure that educational needs of the community continue to be met.

6.11 RECREATIONAL FACILITIES

To meet the recreational needs of future residents, the Mililani-Mauka master plan establishes four park sites: one 20-acre district park, one 12-acre neighborhood park, and two four-acre neighborhood parks. Three sites for recreation centers are also included in the plan. Park and recreational amenities will be dedicated to the City, and will comply with standards established by the Department of Parks and Recreation (DPR).

DPR has determined that the recreational plan for Mililani-Mauka is conceptually acceptable (DPR letter, September 11, 1986).

6.12 PUBLIC TRANSPORTATION

6.12.1 Existing Conditions

The City and County of Honolulu, Department of Transportation Services (DTS), operates The BUS on a supply and demand basis, subject to availability of resources. Two bus routes currently incorporate Mililani Town into their service area. Honolulu-bound busses depart from Mililani beginning at 5:15 a.m. and leave approximately every 15 minutes throughout the day until 12:44 a.m., Monday through Friday. From downtown to Mililani, bus service starts at 5:40 a.m. and departs every 10 to 30 minutes. On Saturday and Sunday bus service is less frequent, about every 20 to 40 minutes. Express busses to and from downtown and the University of Hawaii operate during the morning and afternoon peak periods.

6.12.2 Probable Impacts

Routes and schedules for Mililani-Mauka will be coordinated with existing bus service. The Mililani-Mauka master plan provides a 500-car park-and-ride facility in an effort to encourage public transportation use.

=====**CHAPTER VII**=====

ALTERNATIVES TO THE PROPOSED ACTION

Chapter 200 of Title 11, Environmental Impact Statement Rules (11-200-17 (f)) requires a discussion of "any known alternatives... which could feasibly attain the objectives of the action." The rules further specify that the alternatives be explored and evaluated in light of enhancement to environmental quality or the avoidance or reduction of adverse environmental effects.

Variations of two alternatives are examined in this section: (1) the alternative of no action or of postponing action pending further study; and (2) alternatives related to different designs of the proposed action which would present different environmental impacts.

7.1 NO ACTION ALTERNATIVE

The no action alternative, and its variant, postponement of action, would preserve the site in its present agricultural state. A discussion of the advantages and disadvantages of the no action alternative is discussed below.

Advantages

- o No further planning and design expenditures by the applicant would be required.
- o The present agricultural operations would continue in the short term (the long-term position of Dole Company is that the Mililani-Mauka fields are inferior to other lower-lying fields and that to reach its goal of a 100 percent fresh fruit operation, the higher, unirrigated fields will ultimately be phased out).
- o Perhaps alternative crops will be identified in the coming years which would prove economically feasible to grow on the site.
- o No action or postponement would result in an additional 3.8 MGD of potable water remaining in the Pearl Harbor Ground Water Control Area available for other uses.
- o Vehicular congestion along principal arterials would not be increased.

Disadvantages

- o As noted elsewhere in this report, Dole Company has indicated that it is desirable to replace the higher, non-irrigated fields with lower-lying drip irrigated field in order to maintain a consistent year-round crop necessary for the fresh fruit market. Recent changes restricting the use of nematocides has exacerbated the need to move to the lower-lying fields, principally those currently under sugar cultivation by Waiialua Sugar Company. Waiialua Sugar Company is experiencing increased yields per acre as a result of new management and farming techniques including the installation of drip irrigation. Because of the increased yields, they have been able to relinquish portions of their plantation for pineapple production without jeopardizing the economies of scale necessary to run a profitable operation (the Plantation is

expected to turn an operating profit in FY 1986). Because Mililani Town, Inc. (Applicant), Dole Company and Waialua Sugar Company are all wholly owned subsidiaries of Castle & Cooke, Inc., the distribution of capital assets (principally land) can be reorganized to maximize economic efficiency without jeopardizing any of "the parts." From this perspective, the no action alternative would have an unfavorable impact on the operation of Oahu's largest agricultural conglomerate.

- o A significant unmet demand exists for housing in Central Oahu. As residents of Mililani Town will attest, the applicant has been remarkably successful in meeting market demands on its lands located southwesterly of the H-2 Freeway in Mililani Town proper. The Mililani Town planned community has become a model for similar developments across the country. Approximately 2,300 acres have already been developed with approximately 150 acres left to be developed. Based on historic production levels of 400 units per year, the applicant anticipates build-out for this remaining acreage in the very near future. By initiating steps now for the required governmental approvals, the applicant is hopeful of commencing work on the subject property when the development southwesterly of the H-2 Freeway is completed. Postponement or further delays in permit processing will result in a costly break in construction programming, a potentially serious erosion in market share, and perhaps most important, a diminution of the substantial economies of scale now present at the site (land, labor and capital). Development related impacts such as increased vehicular congestion, noise, possible short-term air quality impacts, water withdrawal from the Pearl Harbor Aquifer, etc. would merely be transferred to another development; one perhaps less capable of dealing with these externalities in as responsible a manner as Mililani Town, Inc. has in the past.
- o The General Plan is replete with policies and objectives encouraging developments where basic infrastructure and supporting services are already available and discouraging those where they do not exist or are inadequate. Discouraging urban sprawl and the need to allocate public monies and resources in the most efficient manner constitute the basis for this requirement. Mililani Town has always been master planned to include the subject property as part of its total development. Major infrastructure such as the Meheula/H-2 Interchange and the H-2 itself are in place with excess capacity to service the proposed development. The applicant is able to assure the City that other infrastructural requirements can be met for the subject area at no installation cost to the City in a timely manner. In terms of development timing, the applicant will be able to proceed once planning and zoning permits are approved due to the existence of all basic infrastructure and services (in sharp contrast to other proposed developments where none of these facilities exist).

7.2 ALTERNATIVE LAND USE CONFIGURATIONS

As part of the Mililani-Mauka planning process, considerable input was obtained from key members of the local community (See discussion in Chapter 2.4). A number of alternative conceptual land use plans were presented to the Mililani-Mauka Planning Advisory Committee (and later to the Mililani community at large via a published questionnaire in the community newspaper Ka Nupepa, December 1984 ed.). The alternative plans were not meant to be accepted or rejected in their entirety. Rather the committee members were asked to identify the best (and the

worst) from each plan. Although environmental impact analyses were not conducted on each of these conceptual plans, it can be assumed that potential impacts of each plan were at least indirectly considered by the community groups.

A total of five alternative concept plans were prepared, each with a particular emphasis: (1) Employment Center; (2) Retirement Community; (3) Recreational Community; (4) Residential Community; and (5) University Community (Table 11).

Table 11: ALTERNATIVE CONCEPT PLANS

<u>Concept Plan</u>	<u>Typical Land Uses</u>
<i>Employment Center</i>	High-Tech Park, Office Park, Professional Office Center, Vocational/Technical School, Durable Goods Outlets, Service Commercial Facilities, Convenience Center, Large Community Park, Low-Density Apartments.
<i>Retirement Community</i>	Retirement Community, Elderly Housing, Senior Citizens Center, Community Gardens, Par 3 Golf Course, Convenience Center, Satellite City Hall, Police Sub-station, Private College, Community Park, Low-Density Apartments.
<i>Recreational Community</i>	Large Community Park, Pet Training Center, 18-hole Golf Course and Driving Range, Large Recreation Complex, Dirt-Bike Track, Shooting/Archery Range, Walking/Jogging Trails in Gulches, Community College, Park & Ride (Express Bus) Facility, No Commercial, Luxury Housing.
<i>Residential Community</i>	Mass Transit Stop (w/ Park & Ride), Neighborhood Shopping Center, Low-Density Apartments, Consolidated Church Sites, Intermediate School, Teen Center, Community Park, Recreation/Entertainment Hall, Swimming Center (w/ Major Pool).
<i>University Community</i>	UH/West Oahu College Campus, Research Park, University Shopping Area, Ohana Housing, Low-Density Apartments, Mass Transit Terminus.

Advisory group members and later members of the Mililani community were asked to register their preferences by pre-printed questionnaire forms. In this manner, committee members were forced to deal with the underlying complexities of the land use planning process by optimizing compatible land uses consistent with community goals and direction. Land uses which were strongly supported by both groups include the following:

Luxury Housing, Intermediate School, University Campus, Private School (all grades), Walking/Jogging Trails, Large Recreation Complex, Community Park, Senior Citizens Center, Neighborhood Shopping Center, Professional Offices, Police Substation, Fire Station, Satellite City Hall, Express/Feeder Buses, Fixed Guideway/Bus.

Where economically feasible and supported by market demand, these uses were incorporated in the "recommended" plan. Subsequent meetings with City and State agencies have led to further modifications/refinements of the plan.

7.3 ANALYSIS AND CONCLUSIONS

The EIS rules concerning "rigorous exploration and objective evaluation" of feasible alternatives apply both to public and private actions. However, feasibility is evaluated differently in the two cases. The benefits of public actions are measured by their contribution to the public good, which is determined by an inherently political process. On the other hand, the feasibility of a private action is ultimately determined by expected future returns, including a return on investment, compensation for risk, and a reasonable profit. The importance of a private development project's economic feasibility, measured in these market terms, is underscored by the weight this factor is given in certain public decisions, such as those made by the State Land Use Commission regarding the petitioners financial stability. Therefore, although the EIS rules state that alternatives be evaluated, "even though more costly," the consequences on a private action's bottom line set a minimum standard for establishing the feasibility of a given alternative.

The "no action" or postponement alternative would preserve, for an indefinite period of time, the non-urban condition of the Mililani-Mauka site. This action would not necessarily assist the agricultural economy of the State. Both the Dole Company and the Waialua Sugar Company (collectively one of the largest agricultural concerns in the State) support this application and have made the necessary arrangements in their planting schedules to accommodate the loss of pineapple acreage. This action would simply transfer the development-related impacts discussed above to a different developer, possibly one with considerably less experience than the applicant in dealing with community concerns and regional impacts.

Through the Mililani-Mauka planning process, the applicant has involved a wide cross-section of the community in determining appropriate uses for the Mauka site. A number of conceptual alternatives have been analyzed with the best of each consolidated into the recommended plan. State and County agencies, public utilities, and interested community groups have all had an opportunity to provide input into the land use plan.

In conclusion, the applicant has evaluated alternative proposals and finds that the proposed plan is the highest and best use of the subject site. Moreover, the proposed plan offers the greatest public benefit in terms of providing a high quality residential environment in the proven tradition of Mililani Town.

Chapter 200 of Title 11, Environmental Impact Statement Rules (11-200-17 (k)) requires the "identification of unavoidable impacts and the extent to which the action makes use of non-renewable resources during the phases of the action, or irreversibly curtails the range of potential uses of the environment..."

The construction and long term residential occupation of the Mililani-Mauka site will permanently commit money, time, labor and physical resources. Replacement of presently cultivated pineapple fields with urban structures and land uses establishes a direction that is unlikely to be reversed (although it has been suggested that these fields will ultimately be abandoned regardless of the outcome of this application). Other unavoidable impacts include increased traffic congestion at critical intersections and corridors and related diminution of ambient air quality levels.

The loss of these resources, however, should be evaluated in light of recurring benefits to the residents of the region and the County, and the alternative of taking no action.

=====**CHAPTER VIII**=====

**IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF
RESOURCES THAT WOULD BE INVOLVED IN THE PROPOSED
ACTION SHOULD IT BE IMPLEMENTED**

Chapter 200 of Title 11, Environmental Impact Statement Rules (11-200-17 (j)) requires a brief discussion of the "extent to which the proposed action involves trade-offs between short-term losses and long-term losses or vice-versa, and a discussion of the extent to which the proposed action forecloses future options, narrows the range of beneficial uses of the environment, or poses long-term risks to health or safety..."

As discussed elsewhere, the proposed action will result in the eventual urbanization of approximately 1,200 acres of non-urban lands. This action will not adversely impact the State's long-term agricultural economy. No short-term exploitation of resources that will have long-term consequences has been identified in the impact analyses conducted in conjunction with this EIS. Traffic and related air quality concerns have been studied in depth and mitigating measures have been proposed that will relieve their respective impacts. There are no known long-term risks to public health and safety which would occur as a result of project implementation.

As the property develops, its productivity in terms of generating tax revenues will increase. Employment and educational opportunities generated on the site will have benefits that will ripple through the regional economy. Income from property, personal, and excise taxes are expected to more than offset expenses associated with expanded public services to meet the requirements of the proposed residential community.

=====**CHAPTER IX**=====

**RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE
ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT
OF LONG-TERM PRODUCTIVITY**

10.1 Consulted Parties

The Environmental Impact Statement Preparation Notice (EISPN) for the proposed Mililani-Mauka residential community was published in the OEOC Bulletin on August 8, 1986. The thirty-day review period, announced in the OEOC Bulletin, ended on September 8, 1986. In addition, a more detailed EISPN, including maps of the project, was mailed directly to the 30 agencies and organizations listed below. The list contains parties believed to have an interest in the project or who requested consulted party status.

*** indicates agencies or individuals who sent a written response to the EISPN (See Chapter XI for responses).

Federal Agencies

- * Department of Agriculture, Soil and Conservation Service
- * Department of the Air Force, 15th Air Base Wing (PACAF)
- * Department of the Army, Engineering Division
- * Department of the Army, US Army Support Command
- * Department of the Interior, Fish and Wildlife Service

State Agencies

- Department of Accounting and General Services
- * Department of Agriculture
- * Department of Education
- * Department of Health
- * Department of Land and Natural Resources
- * Department of Planning and Economic Development
- * Department of Transportation
- Office of Environmental Quality Control

County Agencies and Boards

- * Department of General Planning
- Department of Housing and Community Development
- * Department of Land Utilization
- * Department of Parks and Recreation
- * Department of Public Works
- * Fire Department
- * Police Department
- * Board of Water Supply

Public Utilities

- * Hawaiian Telephone Company
- * Hawaiian Electric Company

Neighborhood Boards, Community Associations

- Mililani Town Association
- Gentry Waipio Community Area Association
- Mililani/Waipio/Melemanu Neighborhood Board No. 25
- Waipahu Neighborhood Board No. 22
- Wahiawa Neighborhood Board No. 26
- * North Shore Neighborhood Board No. 27
- Waipahu 2000 Community Council

10.2 Participants in the DEIS Preparation Process

The DEIS was prepared for Mililani Town, Inc. by Helber, Hastert, Van Horn & Kimura, Planners. The following list identifies individuals and organizations who were involved in the preparation of the DEIS and their respective contributions.

Helber, Hastert, Van Horn & Kimura, Planners

- Mark H. Hastert, AICP: Principal-in-charge and Project Manager
- Thomas A. Fee, AICP: Project Planner and Principal Author
- Nancy I. Nishikawa, AICP: Contributing Author
- Deborah T. Parks: Contributing Author
- Toshiko Matsushita: Graphic Artist
- Lorraine M. Hope: Editing

Subconsultants

- | | |
|---------------------------------------|---------------------------------|
| Community Resources: | Socio-economic |
| Parsons Brinckerhoff Quade & Douglas: | Traffic |
| Tyrone Kusao, AICP: | Planning Consultant |
| Char and Associates: | Botanical and Terrestrial Fauna |
| M & E Pacific, Inc.: | Civil Engineering |
| EDP Hawaii, Inc.: | Drainage |
| Chiniago, Inc.: | Archaeology |
| Barry D. Root: | Air Quality |

CHAPTER X

**CONSULTED PARTIES AND PARTICIPANTS IN THE DEIS
PREPARATION PROCESS**

A total of 21 letters were received in response to the Environmental Impact Statement Preparation Notice (EISPN) published in the August 8, 1986 issue of the OEQC Bulletin; the individuals and agencies are listed below.

The following pages contain (1) a copy of DGPs determination that an EIS will be required; (2) a copy of the EISPN and the cover letter requesting review of the proposed development with respect to issues that should be addressed in the DEIS; and (3) comments received and follow-up responses (where appropriate).

Federal Agencies

Department of Agriculture, Soil Conservation Service
Department of the Army, Engineering Division
Department of Housing and Urban Development
Department of the Interior, Fish and Wildlife Service

State Agencies

Department of Agriculture
Department of Education
Department of Health
Department of Land and Natural Resources
Department of Planning and Economic Development
Department of Transportation

County Agencies

Department of Parks and Recreation
Department of Public Works
Department of Water Supply
Fire Department
Planning Department
Police Department

Public Utilities

Hawaiian Electric Company, Inc.
Hawaiian Telephone Company

Individuals/Community Organizations

North Shore Neighborhood Board

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



FRANK P. FAR...
1986

DONALD A. CLEGG
CHIEF PLANNING OFFICER
GENE CONNELL
DEPUTY CHIEF PLANNING OFFICER
ML/DGP 7/86-9108

July 24, 1986

Mr. Mark Hastert
Helber, Hastert, Van Horn & Kimura, Planners
Grosvenor Center, P.O. Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Hastert:

Central Oahu Development Plan
Amendment Application from Agriculture
to Various Uses at Mililani
Tax Map Key 9-5-02: 1, 87/00-3

This is to inform you that your request to amend the
Central Oahu Development Plan will be processed in the 1987
Annual Amendment Review.

Your request for a development plan amendment was subject
to an environmental assessment pursuant to Chapter 343, HRS,
the State Environmental Impact Statement (EIS) law. It has
been determined that an EIS will be required for the proposed
Mililani Mauka development as explained in the attached EIS
Preparation Notice.

In order that your request is processed in the 1987 Annual
Amendment Review, this department must receive the draft EIS by
February 1, 1987 and accept the final EIS by April 1, 1987.
The State Office of Environmental Quality Control (OEQC) has
been notified of our determination. They will be publishing a
notice in their "OEQC Bulletin."

If there are any questions, please call Walter Lee of my
staff at 527-6015.

Sincerely,

Donald Clegg
DONALD A. CLEGG
Chief Planning Officer

Attach.

cc: OEQC

August 20, 1986

Mililani-Mauka Residential Community
Mililani, Oahu, Hawaii
TMK 9-5-02: 1

Dear

The official environmental impact statement preparation notice (EISPN)
for the Mililani-Mauka residential community was published in the
OEQC Bulletin dated August 8, 1986 (copy enclosed). Anyone can be
consulted in the preparation of the EIS by writing to the listed contacts
within the 30-day review period ending September 8, 1986. Because your
agency has been identified as one which may be interested in
participating in the preparation of the EIS as a consulted party, we have
also enclosed a copy of the complete EISPN to assist you in evaluating
potential project-related impacts.

We would greatly appreciate your assistance in this process by either
responding with written comments to the enclosed EISPN or by
identifying an individual within your organization whom we may contact
to discuss the project in greater detail. Thank you for your cooperation.

Sincerely,

HELBER, HASTERT, VAN HORN & KIMURA, Planners

Thomas A. Fee
Project Planner

Enclosure

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

MILILANI-MAUNA RESIDENTIAL COMMUNITY.
MILILANI, OAHU, Oceanic Properties, Inc./City and County of Honolulu Dept. of General Planning

The subject property is comprised of approx. 1,200 acres of land (currently under pineapple cultivation) located northeast of the existing Mililani residential community and the H-2 Freeway. The site is approx. 2-mi. from the existing urban center of Mahiava and approx. 5-mi. from the communities of Pearl City and Waijahu. The property is situated within the Ewa Judicial District and is part of the Central Oahu Development Plan area. The entire site is owned in fee by Castle & Cooke, Inc., the parent company of Mililani Town, Inc., hereinafter referred to as the applicant. The project, referred to as "Mililani-Mauna," is part of the original 2,500-acre master plan for Mililani Town which was initially conceived in the 1960's. The property is bounded on the north and south by the Waikakahu and Kipapa gulches, respectively, and extends to the edge of the Honolulu Forest Reserve at the main border. The applicant plans to develop at least 4,200 single-family residential units, including luxury homes, zero-lot-line and cluster homes, and conventional subdivisions. A full-service retirement community containing up to 1,400 units is planned for a large area in the southeastern portion of the site. Approx. 1,000 low-density apartment units will be developed in areas adjacent to the proposed college or university campus planned for the southwestern corner of the site. Retail facilities will be provided in a 5-acre convenience shopping area, similar to the existing Mililani Marketplace. The designated commercial area is adjacent to the Mililani Interchange fronting the main access road to the proposed development. Four park sites are proposed: one district park (20-acres) near the entrance to the site; one large neighborhood park (12-acres) near the center of the development; and two 4-acre neighborhood parks adjacent to the proposed development; and two 4-acre neighborhood parks adjacent to the proposed elementary school sites. Three

REGISTER OF CHAPTER 243, HRS DOCUMENTS

August 8, 1986

Volume III

165 SOUTH KING STREET - KEOHUNAUA BUILDING - HONOLULU, HAWAII 96813 (PHONE 595) 445-8819

GOVERNOR
 GEORGE R. ARIYOSHI

LETITIA N. UYEHARA
 DIRECTOR

OFFICE OF ENVIRONMENTAL QUALITY CONTROL

OEQ
BULLETIN

No. 15

sites for recreation centers have also been identified on the master plan. The recreation center closest to the freeway may be developed as a large, entertainment hall-type facility due to its convenient location near the proposed transit parking area which would be able to accommodate a large number of patron vehicles. It may also include a day-care center as a convenience to transit riders. The second recreation center is sited adjacent to the 12-acre neighborhood park discussed above. The third site will be incorporated into a senior center in conjunction with the proposed retirement community. Sites have been reserved for two elementary schools (6-acres each), one intermediate school (12-acres) and one college or university campus (75-acres). The elementary and intermediate schools are located at the locus of the major residential areas. The College/University campus has been sized to accommodate a university campus but may also be appropriate for some other type of institution, such as a community college, private college, vocational/technical school, and/or a private school. Five individual church sites are provided near the Mililani Interchange. These sites have good accessibility and visibility, and are set away from the major residential areas. Locations adjacent to commercial and transit facilities allow for shared parking. A transit parking facility is planned for a 6-acre site located just south of the Mililani Interchange. The parking area will be provided initially for express bus riders with the potential for future development of a transit station. Transit parking will be able to accommodate approx. 500 vehicles. Approx. 108-acres, comprised primarily of Interior Gulches, will be utilized as drainage ways and generally preserved in their natural states.

Requests to be consulted and comments should be sent to:

Mr. Mark Hastert
 Planner
 Hagler, Hastert, Van Horn & Kimura,
 Grosvener Center, PBI Tower
 733 Bishop Street, Suite 1590
 Honolulu, Hawaii 96813

Deadline: September 8, 1986.

**ENVIRONMENTAL IMPACT STATEMENT
PREPARATION NOTICE**

**MILILANI-MAUKA
RESIDENTIAL COMMUNITY
MILILANI, OAHU, HAWAII**

TMK 9-5-02: 1

I. IDENTIFICATION OF APPLICANT

A. Applicant:

Mililani Town, Inc.
130 Merchant Street
Honolulu, Hawaii 96803

B. Consultant for EIS:

Heiber, Hasterl, Van Hora & Kimura, Planners
Grosvenor Center, PFI Tower
733 Bishop Street, Suite 2590
Honolulu, HI 96813

Phone No. (808) 545-2055

II. IDENTIFICATION OF APPROVING AGENCY (ACCEPTING AUTHORITY)

Department of General Planning,
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

III. SUMMARY OF PROPOSED ACTION

Applicant action. The Environmental Impact Statement (EIS) will be prepared pursuant to Chapter 343, HRS as an integral part of an application for a Development Plan amendment to change a portion of the Central Oahu Development Plan area from the present Agricultural designation to the following land use categories: Residential, Low-Density Apartment, Commercial, Parks and Recreation, Public and Preservation.

IV. AGENCIES CONSULTED IN PREPARING ASSESSMENT *

- A. State Agencies**
1. Department of Health, Emergency Medical Services Systems Branch
 2. Department of Transportation, Highways Division
- B. City and County Agencies**
1. Department of General Planning
 2. Department of Public Works
 3. Department of Parks and Recreation
 4. Department of Transportation Services
 5. Honolulu Police Department
- C. Public Utilities**
1. Hawaiian Electric Company
 2. Hawaiian Telephone Company

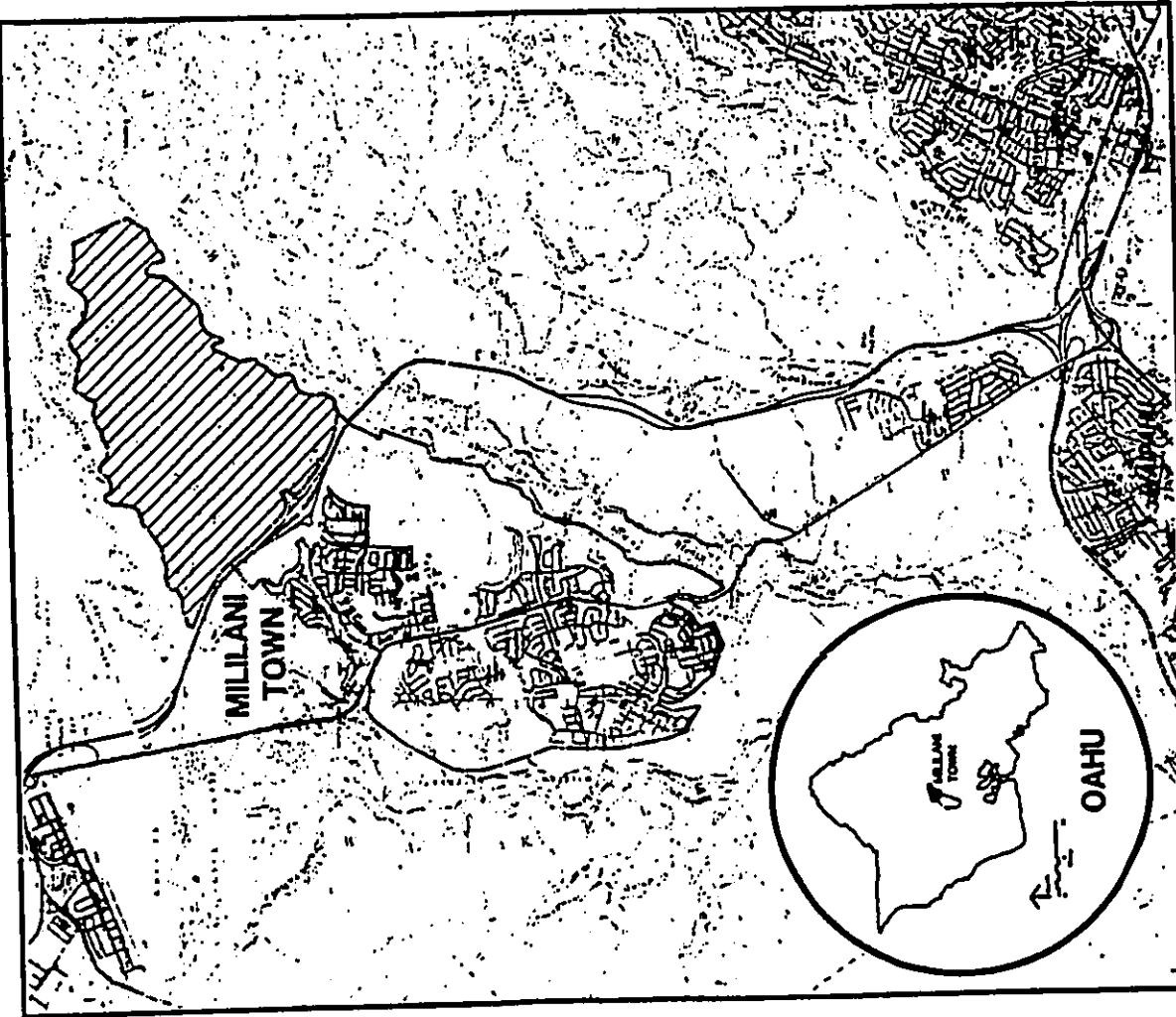
* A number of these agencies submitted their comments on the proposed project pursuant to the State Land Use Commission petition filed in February 1986. Since no changes have been made to the development proposal, and because of the relatively short time interval involved, these comments are still assumed to be germane.

V. PROJECT DESCRIPTION

A. Location and Ownership
The subject property is comprised of approximately 1,200 acres of land (currently under pineapple cultivation) located northeast of the existing Mililani residential community and the H-2 Freeway (Figure 1). The site is approximately 2-miles from the existing urban center of Wahiawa and approximately 5-miles from the communities of Pearl City and Waipahu. The property is situated within the Ewa Judicial District and is part of the Central Oahu Development Plan area. The entire site is owned in fee by Castle & Cooke, Inc., the parent company of Mililani Town, Inc, hereafter referred to as the applicant. The project, hereafter referred to "Mililani-Mauka," is part of the original 3,500-acre master plan for Mililani Town which was initially conceived in the 1960's.

The property is bounded on the north and south by the Waikakahu and Kipapa Gulches, respectively, and extends to the edge of the Honolulu Forest Reserve at the mauka border (Figure 2).

B. The Master Plan
Mililani-Mauka is planned as a self-contained residential community which will offer residents of Oahu a range in housing accommodations, styles and prices. Mililani Town, Inc., the developer of Mililani Town and the proposed Mililani-Mauka community, has a proven track record of building quality residential communities.



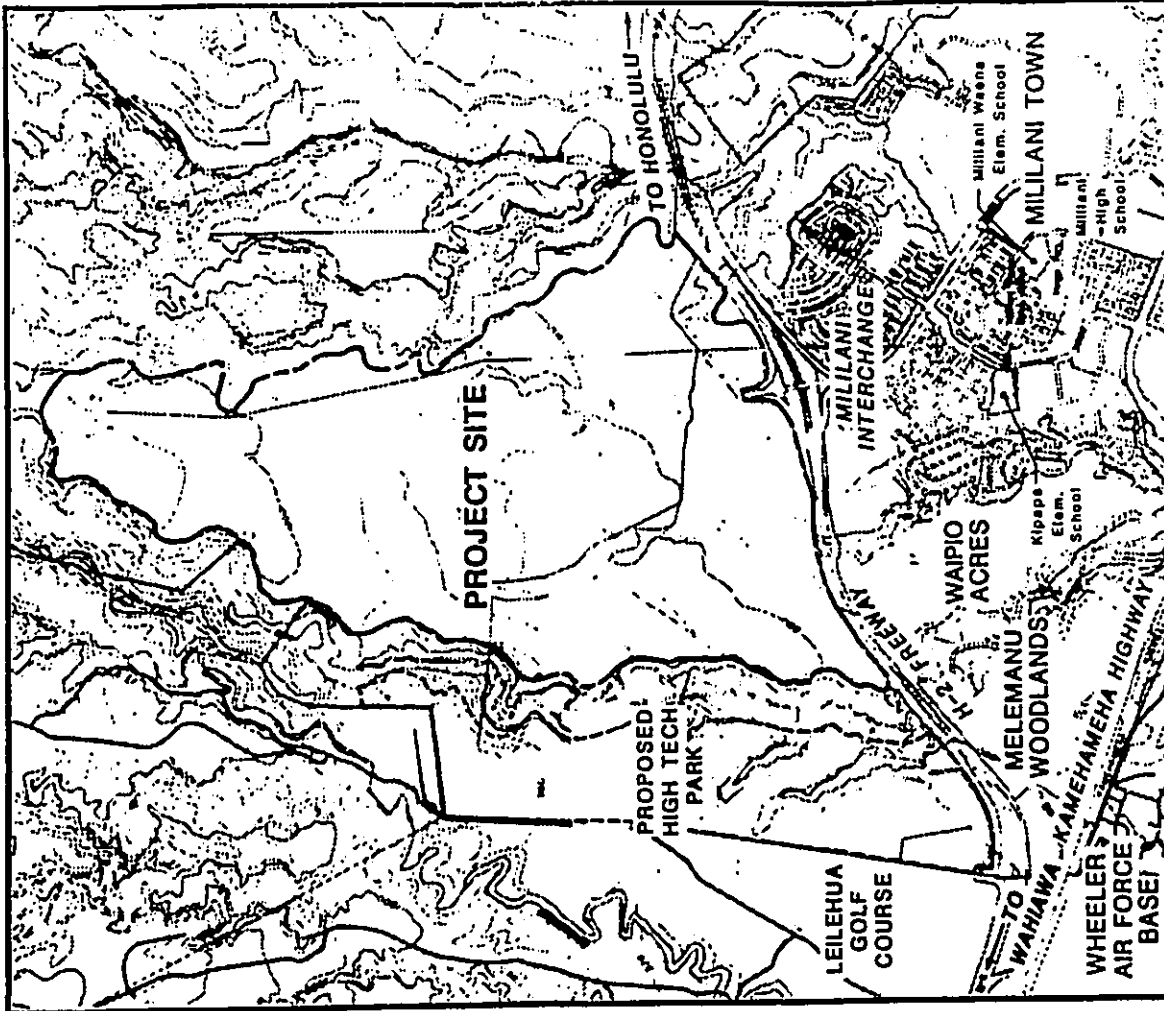
Location of Project Area

0' 4,000'

HELBER, HASTERT, VAN HORN & KIMURA
 2000 KALANANĀ'OHUE STREET, SUITE 2100
 HONOLULU, HAWAII 96815 TELEPHONE: 808-947-0811

3

Figure: 1



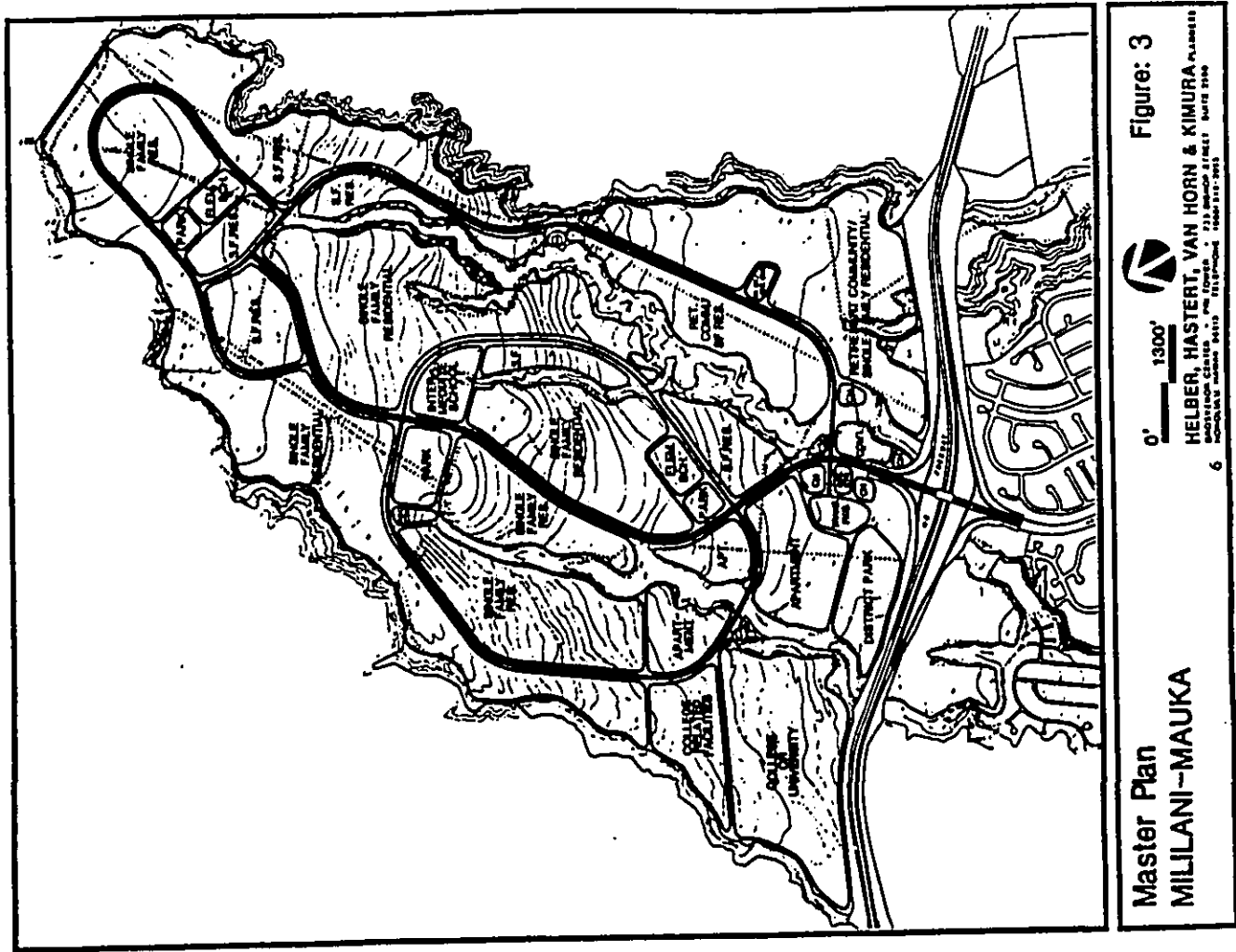
Surrounding Developments
 MILILANI-MAUKA

0' 2,000'

HELBER, HASTERT, VAN HORN & KIMURA
 2000 KALANANĀ'OHUE STREET, SUITE 2100
 HONOLULU, HAWAII 96815 TELEPHONE: 808-947-0811

4

Figure: 2



1. Land Use
The master plan for the entire project site (Figure 3) consists of the following land uses:

LAND USE SUMMARY

Land Use	Acreage	Housing Units
Residential	770	5,630
Low-Density Apartment	60	1,010
Commercial	5	
Park/Recreation	46	
Community Facilities	211	
Preservation	108	
TOTAL	1,200	6,640

- Residential**
The applicant plans to develop at least 4,200 single-family residential units, including luxury homes, zero-lot-line and cluster homes, and conventional subdivisions. A full-service retirement community containing up to 1,400 units is planned for a large area in the southeastern portion of the site.
- Low-Density Apartment**
Approximately 1,000 low-density apartment units will be developed in areas adjacent to the proposed college or university campus planned for the southwestern corner of the site.
- Commercial**
Retail facilities will be provided in a 5-acre convenience shopping area, similar to the existing Mililani Marketplace. The designated commercial area is adjacent to the Mililani Interchange fronting the main access road to the proposed development.
- Recreation/Parks**
Four park sites are proposed: one district park (20-acres) near the entrance to the site; one large neighborhood park (12-acres) near the center of the development; and two 4-acre neighborhood parks adjacent to the proposed elementary school sites. Three sites for recreation centers have also been identified on the master plan. The recreation center closest to the freeway may be developed as a large, entertainment hall-type facility due to its convenient location near the proposed transit parking area which would be able to accommodate a large number of patron vehicles. It may also include a day-care center as a convenience to transit riders. The second recreation center is sited adjacent to the 12-acre neighborhood park discussed above. The third site will be incorporated into a senior center in conjunction with the proposed retirement community.
- Community Facilities**
Sites have been reserved for two elementary schools (6-acres each), one intermediate school (12-acres) and one college or university campus (75-acres).

**Master Plan
MILILANI-MAUKA**



Figure: 3

HELBER, HASTERT, VAN HORN & KIMURA, PLANNERS
2115 SANDWICH STREET, SUITE 104
HONOLULU, HAWAII 96819

The elementary and intermediate schools are located at the locus of the major residential areas. The College/University campus has been sized to accommodate a university campus but may also be appropriate for some other type of institution, such as a community college, private college, vocational/technical school, and/or a private school.

Five individual church sites are provided near the Mililani Interchange. These sites have good accessibility and visibility, and are set away from the major residential areas. Locations adjacent to commercial and transit facilities allow for shared parking.

A transit parking facility is planned for a 6-acre site located just north of the Mililani Interchange. The parking area will be provided initially for express bus riders with the potential for future development of a transit station. Transit parking will be able to accommodate approximately 500 vehicles.

- o Preservation
Approximately 108-acres, comprised primarily of interior gulches, will be utilized as drainage ways and generally preserved in their natural state.

2. Infrastructure
Preliminary engineering studies have been conducted to determine infrastructure and utility needs of the proposed development (MAE Pacific, Inc., August 1985; EDP Hawaii, Inc., August 1985). The results of the engineering studies are summarized below.

- o Water
The anticipated water demand for the Mililani-Maui development is estimated at 3.8 million gallons per day (MGD) average daily consumption. To accommodate this demand, five wells (2.0 MGD each) with pumps and motors and two storage reservoirs (3.0 MG each) will be required. On-site transmission lines will be designed to supply the maximum day demand flow plus the fire flow with residual pressure of 20 psi at the critical fire hydrant, the peak-hour flow with a minimum pressure of 40 psi and a maximum velocity of 6 fps in accordance with the provisions set forth in the Water Systems Standards.

- o Wastewater
The anticipated wastewater flows range from 2.76 MGD average dry weather flow to 7.88 MGD peak wet weather flow. Onsite facilities include the development of a wastewater collection system which will connect to the existing inactive sewer line under the H-2 Freeway and conveyed via the existing Mililani Town trunk sewer system to the existing Mililani Wastewater Treatment Plant (MWTP). Offsite improvements include sewer line modifications and possible expansion of the MWTP.

- o Electrical/Communications System
Electrical System. The projected electrical power demand of the proposed residential development is estimated to be approximately 22.5 MVA, which

will require the construction of a substation. The Hawaiian Electric Company (HECO) anticipates the ultimate installation of a 40 MVA substation on a minimum of 12,000-square foot area lot. The proposed substation will be located in the vicinity of the existing HECO 46 KV transmission lines (which cross the site) so as to minimize the cost of extending 46 KV circuits to the substation. Electrical power will be distributed within the project area via an underground system.

Telephone. Telephone cross-connect pedestals will be provided by the Hawaiian Telephone Company at various locations to permit access and telephone service tap-offs. In addition, Hawaiian Telephone will need an approximately 5,000 square foot parcel of land near the Mililani Interchange for a switching office.

Cable Television. Cable Television facilities will be provided via hook-up with the trunking cable facilities located at the intersection of Meheula Parkway and Kuahelani Avenue.

- o Drainage
Drainage improvements for the proposed development will be designed to divert storm runoff flows from portions of the project site away from surrounding residential developments and into Kipapa Gulch which is a natural drainage tributary to Waialeale Stream. All drainage improvements will conform to the requirements and drainage design standards of the City and County of Honolulu.

- o Traffic and Access
At full build-out, the project is estimated to generate peak hour traffic volumes of 3,070 vehicles per hour (VPH) (Parsons Brinkerhoff Quade and Douglas, Inc., May 1984). To accommodate this volume of vehicular movement, major improvements, such as construction of loop ramps and increased signalization, will be required to the existing H-2/Meheula Parkway full-diamond interchange (Parsons Brinkerhoff Quade and Douglas, Inc., January 1985).

Primary access to the development will be provided by the extension of the Meheula Parkway, which forms the major arterial through the existing Mililani Town. The Meheula Parkway extension will form the major arterial roadway through the central portion of the development. Primary roadways will loop through the east and west side of Mililani-Maui. Collector streets will provide access to the entire development. Local streets and driveways to serve individual units and clusters will be built as necessary.

- 3. Phasing
The entire project area is expected to be built-out within a 10-20 year period. The project will be developed in phases generally starting near the H-2 Freeway and working in a maui direction. A production and market absorption rate of 400 to 500 units per year is being targeted which is consistent with historical absorption rates experienced at Mililani Town.

VI. DESCRIPTION OF AFFECTED ENVIRONMENT

A. Physiography, Climate and Soils
Physiography. The development is located in the central portion of the physiographic region known as the Schofield Plateau. The site slopes gently upward towards the Koolau mountains range from approximately 700 feet above mean sea level (AMSL) to about 1,000 feet AMSL in the northern portion. Slopes range from 0-5 percent. Several unnamed gullies dissect the otherwise uniformly sloping terrain.

Climate. Average annual rainfall varies from 40 to 45 inches in the lower elevations near the H-2 Freeway, to 75 inches at the mauka boundary. Daytime temperatures range between 60 and 82 degrees Fahrenheit.

Soils. The major portion of the Mililani-Mauka site lies between 700 and 900 feet AMSL and contains soils in the Waialua silty clay series. This series is defined by the Land Study Bureau Detailed Land Classification as "Deep, well drained, moderately fine textured, non-expanding, non-stony soil; slope 0 to 10 percent; elevation 250 to 1,200 feet; annual rainfall 40 to 60 inches. Productivity ratings: Overall, Class B; placeable, Class A."

The State Department of Agriculture has identified the entire site as containing Agricultural lands of Importance to the State of Hawaii (ALISH). The lower portion of the site has been classified as "Unique" agricultural land, while the mauka portion has been identified as "Prime" agricultural land (See discussion of significant potential impacts in Section V below).

B. Flora and Fauna

A flora and fauna survey of the site was conducted in August 1985 (Char & Associates, August 1985). No rare, threatened, or endangered plant or animal species were found to inhabit the site.

C. Historic and Archaeological Resources

An archaeological field survey was conducted in July 1985 (Chmiago, Inc, July 1985). No archaeological or historic remains were located during this survey.

D. Noise

Noise levels vary within the 1,200 acre site. Noise levels are greatest at the H-2 Freeway frontage and decrease upslope. Itinerant air traffic from the nearby Wheeler Air Force Base is another source of occasional noise.

E. Access

The primary access road to the property is the Meheula Parkway. The Parkway also forms the primary north-south corridor in Mililani Town, providing access to the H-2 Freeway through the Mililani Interchange. The Mililani Interchange is configured in a full-diamond, which allows all movements but also results in conflicting movements; traffic leaving the freeway and turning left on to Meheula Parkway is controlled by stop sign.

As indicated earlier in the description of the Master Plan, traffic engineering studies prepared for the project (Parsons Brinkerhoff Quade and Douglas, Inc,

Traffic Impact Study, May 1984; Loop Ramp Study, January 1985 indicate that existing levels of service for the unsignalized intersections of Meheula Parkway and the H-2 off-ramps indicate that the Koolau side, Mililani-bound off-ramp during the evening peak hour is already in excess of capacity (Level of Service F). The **Traffic Impact Study** recommended a number of interchange improvements which would improve existing ramp conditions including: (1) Signalization of Meheula Parkway intersections with both off-ramps; (2) Ramp widening to two lanes for the Honolulu-bound ramp; (3) Restriping of the existing bridge to allow a double lane configuration for the left-turn to the Honolulu-bound ramp; and, (4) Widening of the west-bound lanes of Meheula Parkway to increase capacity through the Koolau-side intersection.

Even with the intersection improvements cited above, the **Traffic Impact Study** noted that at approximately 64 percent of full project development (4,200 units), traffic generated by the Mililani-Mauka community could be expected to exceed the capacity of the Mililani Interchange.

In order to allow for full development of Mililani-Mauka, the **Loop Ramp Study** suggests the construction of loop ramps to eliminate some traffic conflicts and improve operations along Meheula Parkway. Two alternative ramp configurations were evaluated including a single loop in the Waialua-Koolau quadrant of the existing diamond interchange and two loop ramps, one on each side of the H-2, Waialua of Meheula Parkway. The study recommended the double loop ramp alternative because it would provide better traffic service at levels of service which would be less sensitive to change.

F. Public Safety

Police. The Honolulu Police Department (HPD) has reviewed the Mililani-Mauka development proposal. As long as adequate police facilities are maintained, including sufficient personnel, equipment, and communications, HPD feels that they will be able to provide adequate service to Mililani's expanding population. However, they express concern about the number of planned developments in Central Oahu and Ewa in relation to increased traffic that will be generated and potential impacts on traffic safety.

Fire. The Honolulu Fire Department (HFD) notes that existing fire fighting facilities in the area are considered inadequate due to excessive response times. HFD has projected a need to expand the Waialua Fire Station to include a ladder company. Improvements in fire protection coverage are expected to be implemented by 1992.

Emergency Medical. The Emergency Medical Services Systems Branch of the State Department of Health notes that the current adequate level of prehospital emergency medical service can be maintained with the proposed Mililani-Mauka development in place.

G. Public Utilities, Programs and Plans

A detailed discussion of the proposed development's congruence with the Hawaii State Plan, The State Land Use Law, The relevant State Functional Plans, the County General Plan and Development Plans is contained within the "Petition for Land Use District Boundary Amendment" (Docket No. A85-598) filed with the

State Land Use Commission in September 1985. Additional discussion of the relevant County policies is included in the "Central Oahu Development Plan Amendment Application" submitted to the Department of General Planning in July, 1986.

VII. SUMMARY OF SIGNIFICANT POTENTIAL IMPACTS

A. Traffic

Traffic studies prepared for Mililani-Maui (cited previously) indicate that vehicular traffic generated by the proposed residential development will provide a significant impact to vehicular movements at the Mililani Interchange. Various alternatives have been proposed to mitigate traffic impacts in the project area (including the Mililani interchange). Major regional traffic problems currently exist along the H-2/H-1 corridors into downtown Honolulu. This condition can be expected to become more severe without additional improvements to increase roadway capacity and reduce peak hour traffic demands. Cognizant of this potential impact, the applicant is in the process of preparing a detailed regional traffic impact assessment in close cooperation with the State and County transportation agencies. The purpose of the study is to assess the magnitude of the current regional traffic problem along the H-2/H-1 corridor, to evaluate current State plans for highway improvements, and to recommend structural and non-structural mitigative measures aimed at increasing levels of service currently experienced by Central Oahu and North Shore commuters.

B. Agriculture

The entire 1,200-acre site is presently under pineapple cultivation by the Dole Company's Waialua Plantation. A 1983-84 study of all Castle & Cooke sugar and pineapple lands (Castle & Cooke, Inc., March 1984) found that their best agricultural lands are located at lower elevations which receive large amounts of solar radiation and may be economically supplemented by a drip irrigation system. Average yields in the higher, mauka areas (such as the subject site) are considerably less than in the lower-lying irrigated areas for both sugar and pineapple. Consequently, the Mililani-Maui proposal will not adversely affect the long-term prospects for Central Oahu agriculture.

C. Public Policy

Adjustments to the projected island-wide population distribution found in the County General Plan will be required to fully implement this proposal. The Chief Planning Officer has indicated that he is now preparing a General Plan Amendment which will address various growth alternatives for Central Oahu. This amendment request should be submitted to the City Council by January 1987.

VIII. DETERMINATION OF SIGNIFICANCE

The Department of General Planning has determined that the subject applicant action requires an EIS pursuant to Chapter 343, HRS, because the proposal, which involves a City and County Development Plan amendment, may have significant impact on the environment. This determination was submitted to the Office of Environmental Quality Control (OEQC) on 24 July 1986 and the official EISP was published in the OEQC Bulletin on 8 August 1986.

IX. AGENCIES TO BE CONSULTED IN THE PREPARATION OF THE EIS *

A. Federal Agencies

1. U.S. Dept. of Agriculture, Soil Conservation Service
2. U.S. Air Force
3. U.S. Army, Schofield Barracks
4. U.S. Army Corps of Engineers
5. U.S. Fish & Wildlife Service

B. State Agencies

1. Department of Accounting and General Services, Division of Public Works
2. Department of Agriculture
3. Department of Health
4. Department of Land and Natural Resources
5. Department of Planning and Economic Development
6. Department of Transportation, Highways Division
8. Office of Environmental Quality Control
9. Department of Education

C. County Agencies

1. Department of General Planning
2. Department of Land Utilization
3. Department of Housing and Community Development
4. Department of Public Works
5. Department of Parks and Recreation
6. Honolulu Board of Water Supply
7. Honolulu Fire Department
8. Honolulu Police Department

D. Public Utilities

1. Hawaiian Electric Company
2. Hawaiian Telephone Company

E. Community Organizations

1. Mililani/Waipio/Melemanu Neighborhood Board No. 25
2. Waipahu Neighborhood Board No. 22
3. Waialua Neighborhood Board No. 26
4. North Shore Neighborhood Board No. 27
5. Gentry Waipio Community Area Association
6. Mililani Town Association
7. Waipahu 2000 Community Council

* If applicable

UNITED STATES
DEPARTMENT OF
AGRICULTURE

SOIL
CONSERVATION
SERVICE

P. O. BOX 50004
HONOLULU, HAWAII
96850

September 22, 1986

Mr. Thomas A. Fee
Project Leader
HAWAII PLANNERS
PFI Tower, Suite 2590
733 Bishop Street
Honolulu, HI 96813

Dear Mr. Fee:

Subject: Milliani Mauka Residential Community, Milliani, Oahu, Hawaii
EIS Preparation Notice

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

Thank you for the opportunity to review the document.

Sincerely,

Herbert J. Fyfe
ACTING

RICHARD W. DUNCAN
State Conservationist



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 15TH AIR BASE WING (PACAF)
HICKAM AIR FORCE BASE, HAWAII 96853 5000

REPLY TO
ATTN OF: DEEV (Mr Higa, 449-1831) 2 SEP 1986

SUBJECT: Miliiani Mauka Residential Community, Miliiani, Oahu, Hawaii, TMK 7-3-09:03 & 16
(Your Ltr, 20 Aug 1986)

TO: Helber, Hastert, Van Horn & Kimura, Planners
Grosvenor Center, PFI Tower
733 Bishop Street, Suite 2590
Honolulu HI 96813

1. As requested per referenced letter, the following points of contact (POC) are identified for your further coordination of the EIS preparation for sub-ject project:

- a. Primary POC - Capt Gary Vawter
15 ABS/DE
Wheeler AFB HI 96854-5000
Telephone No.: 655-1374
- b. Alternate POC - Mr George Fujimoto
15 ABM/DEEV
Hickam AFB HI 96853-5000
Telephone No.: 449-1831

2. If there are any questions, please contact Capt Vawter or Mr Fujimoto at the above respective telephone numbers.

VIRGIL J. CARR, JR., Colonel, USAF
Director of Civil Engineering

cc: 15 ABM/PA/JA w/Ref Ltr, 20 Aug 86
15 ABS/DE
HQ PACAF/DEEV

RECEIVED

SEP 3 1986

HELBER, HASTERT, VAN HORN
& KIMURA PLANNERS

4 September 1986

Virgil J. Carr, JR., Colonel, USAF
Director of Civil Engineering
Department of the Air Force
Headquarters 15th Air Base Wing (PACAF)
Hickam Air Force Base, Hawaii 96853-5000

Dear Colonel Carr:

Miliiani-Mauka Residential Community
Environmental Impact Statement Preparation Notice (EISPN)
Miliiani, Oahu, Hawaii TMK 9-5-02: 01

Thank you for your letter of 2 September 1986 (your reference: DEEV) regarding the EISPN for the proposed Miliiani-Mauka residential community.

We will be contacting Captain Gary Vawter in the near future to discuss the development proposal and to solicit any concerns your agency may have so that they may be incorporated into the Draft EIS.

Sincerely,

HELBER, HASTERT, VAN HORN & KIMURA, Planners

Thomas A. Fee
Project Planner



DEPARTMENT OF THE AIR FORCE
WITH AIR BASE SQUADRON (PACAF)
WHEELER AIR FORCE BASE, HAWAII 96814-2000

28 OCT 1986

REPLY TO DE (Capt Vawter, 655-1374)
ATTN OF:

SUBJECT: Request for Consultation Comments, Draft Environmental Statement, Millilani Mauka Residential Community, Millilani, Oahu, Hawaii TNAK 7-3-09:03 & 16

TO: Helber, Hastert, Van Horn and Kimura Planners
Grovernor Center, P.O. Tower
733 Bishop Street, Suite 2590
Honolulu, HI 96813

1. In response to your 20 Aug 86 letter requesting consultation comments the following is provided:

- a. **VEHICULAR TRAFFIC IMPACT:** Although your development will not have a direct impact on Wheeler Air Force Base traffic, it will have an effect upon access to and from the installation. During peak periods, the Millilani interchange will, as you have foreseen, be extremely cumbersome. This problem should be dealt with in the preliminary phases in an effort to make travel least inconvenient.
 - b. **AIRCRAFT NOISE AREA:** Noise has been a continuous problem to all surrounding residential areas. Your development will be subject to excessive noise levels, from time to time, by both fixed wing and rotor driven aircraft.
 - c. **AIRCRAFT ACCIDENT AREA:** Your proposed development is outside of our "clear zone"; however, the potential for aircraft related accidents, although reduced, still exists. It is remotely possible that an emergency situation would result in the releases of ordnance and/or fuel tanks into the area during a fly-by.
2. Wheeler Air Force Base maintains a class "B" airport that services both fixed wing and rotor driven aircraft. If this land is developed, notice should be given to prospective buyers as to the potential for aircraft noise and accident. Should further information be needed, contact Captain Gary L. Vawter, 655-1374.

MICHAEL E. HEZINN, Colonel, USAF
Commander

RECEIVED
OCT 30 1986
HELBER, HASTERT, VAN HORN
& KIMURA PLANNERS

X1-12

STAFF SUMMARY SHEET						
NO	TO	ACTION	INITIALS	DATE	INITIALS	DATE
1	AFVW-AV	Coord	Michael Helber	15 ABR/PA	15 ABR/PA	15-10-86
2	22 TSS/OC	Coord	John Van Horn	15 ABR/JA	15 ABR/JA	15-10-86
3	326 AD/DO	Coord	John Van Horn	15 ABR/DO	15 ABR/DO	15-10-86
4	326 AD/OC	Coord	John Van Horn	15 ABR/OC	15 ABR/OC	15-10-86
5	15 ABR/DE	Coord	Gary L. Vawter	15 ABR/DE	15 ABR/DE	15-10-86
SIGNATURE OF ACTION OFFICER AND GRADE		SYMBOL		PHONE	EXTENSION	
GARY L. VAWTER, Capt		15 ABR/DE		655-1374	KW	
SUBJECT						DATE
Proposed Millilani Mauka Residential Community						26 Sep 86
SUMMARY						
<p>1. In response to the request for comments from Helber, Hastert, Van Horn and Kimura Planners (Tab 2), I have compiled such comments from various sources to include base agencies and past responses to similar requests. This compilation is your response, and it is at Tab 1.</p> <p>2. Tab 3 is a copy of the package forwarded to Wheeler AFB agencies, and Tab 4 is the response received.</p> <p>Recommendation: Sign letter at Tab 1.</p> <p> GARY L. VAWTER, Capt, USAF Air Force Engineering Liaison Officer</p> <p>4 Tabs 1. Your Response 2. Proposal Package 3. Request for Comments 4. Returned Response</p>						

AF FORM 1768
SEP 86
PREVIOUS EDITION WILL BE USED.



DEPARTMENT OF THE ARMY
HEADQUARTERS UNITED STATES ARMY SUPPORT COMMAND, HAWAII
DUMRING HALL
FORT SHAFTER, HAWAII 96854-5000

REPLY TO
ATTENTION OF

APZY-PTV-0

2 October 1986

SUBJECT: Proposed Mililani Mauka Residential Community

15ABS/DE
ATTN: CPT Yawter
Wheeler AFB, HI 96854-5000



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 2814th AIR DIVISION (PACAF)
WHEELER AIR FORCE BASE, HAWAII 96854-5000

REPLY TO
ATTENTION OF

19 SEP 1986

SUBJECT: Mililani Mauka Residential Community (Your Ltr, Undated)

TO: 15 ABS/DE

1. Subject community will have an impact on 22 TASS flying operations at Wheeler AFB.

a. The project site is directly under the OV-10 instrument departure corridor. Historically, an average of six aircraft per day use this departure. Aircraft cross the area at 800-1000 feet above the ground. Due to the location of navigation aids required to fly the departure, altering the current routing is not a viable option.

b. Since aircraft would be required to fly directly over the site, it is remotely possible an emergency situation would result in the release of ordnance and/or fuel tanks into the area.

c. Considering the overflight altitudes, aircraft noise could generate numerous complaints from residents.

2. A residential community in the proposed area could eventually result in severe restrictions on OV-10 flying operations at Wheeler AFB. Our POC is Major Mike Shearer, 655-1712.

FOR THE COMMANDER

Steven K. Dingman
STEVEN K. DINGMAN, Lt Col, USAP
Director of Operations

1. Reference letter, 15ABS/DE dated 26 Sep 86, subject as above.

2. This directorate fully concurs with comments made by the Commander, Wheeler AFB, and 22nd TASS. The proposed project will have a tremendous impact on Army aviation flying operations at Wheeler AFB.

3. All flying operations out of Wheeler are severely restricted due to limited training areas and noise abatement programs. The addition of a residential community in the proposed location will certainly restrict operations further.

4. Emphasis must be placed on safety and noise considerations for prospective buyers. Alteration of training routes, traffic patterns, and arrival and departure procedures is not a viable option.

5. POC: CPT Mike Hoff, 655-0220.

FOR THE COMMANDER:

Michael J. Hoff CPT AV
STEPHEN J. COLETT
LTC, AV
Chief, Aviation Division, DPIM



DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, HONOLULU
BUILDING 230
FT. SHAFTER, HAWAII 96858

September 4, 1986

REPLY TO
ATTENTION OF:

RECEIVED
SEP 8 1986

HELBER, HASTERT, VAN HORN
& KIMURA PLANNERS

Mr. Thomas A. Fee
Helber, Hastert Van Horn and Kimura
Grosvener Center
733 Bishop Street, Suite 2590
Honolulu, HI 96813

Dear Mr. Fee:

Thank you for the opportunity to review and comment on the EIS preparation Notice for the Millilani-Hauka Residential Community, Millilani, Oahu. The following comments are offered:

- a. A Department of the Army permit will not be required for the project.
- b. The subject property is in Zone C, an area of minimal flooding according to the Flood Insurance Rate Map prepared by the Federal Insurance Administrator.

Sincerely,

Thomas A. Fee
Thomas A. Fee
Chief, Engineering Division

9 September 1986

Mr. Kiuk Cheung
Chief, Engineering Division
U.S. Army Engineer District, Honolulu
Building 230
Fort Shafter, Hawaii 96858

Dear Mr. Cheung:

Millilani-Hauka Residential Community
Environmental Impact Statement Preparation Notice (EISPN)
Millilani, Oahu, Hawaii TMK 9-5-02: 01

Thank you for your letter of 4 September 1986 regarding the EISPN for the proposed Millilani-Hauka residential community.

Your comments are appreciated and will be incorporated into the Draft EIS.

Sincerely,

HELBER, HASTERT, VAN HORN & KIMURA, Planners

Thomas A. Fee
Thomas A. Fee
Project Planner



DEPARTMENT OF THE ARMY
HEADQUARTERS UNITED STATES ARMY SUPPORT COMMAND, HAWAII
DUNNING HALL
FORT SHAFTER, HAWAII 96848-5000

18 AUG 1986

REF TO
ATTENTION OF

Directorate of Facilities Engineering

RECEIVED

AUG 13 1986

HELBER, HASTERT, VAN HORN
& KIMURA PLANNERS

Mr. Mark Hastert
Helber, Hastert, Van Horn & Kimura, Planners
Grosvener Center, PR1 Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Hastert:

US Army Support Command, Hawaii would appreciate being consulted during the preparation of the Environmental Impact Statement for Milliani-Mauka Residential Community, Milliani, Oahu.

If we may be of assistance, please contact the Environmental Management Office at 655-0694.

Sincerely,

Joseph S. Wasielewski
Joseph S. Wasielewski
Colonel, Corps of Engineers
Director of Facilities
Engineering

4 September 1986

Mr. Joseph S. Wasielewski
Colonel, Corps of Engineers
Director of Facilities Engineering
Department of the Army
Headquarters United States Support Command, Hawaii
Dunning Hall
Fort Shafter, Hawaii 96848-5000

Dear Colonel Wasielewski:

Milliani-Mauka Residential Community
Environmental Impact Statement Preparation Notice (EISPN)
Milliani, Oahu, Hawaii TMK 9-5-02: 01

Thank you for your letter of 18 August regarding the EISPN for the proposed Milliani-Mauka residential community.

We will be contacting the Environmental Management Office of your department in the near future to discuss the development proposal and to solicit any concerns your agency may have so that they may be incorporated into the Draft EIS.

Sincerely,

HELBER, HASTERT, VAN HORN & KIMURA, Planners

Thomas A. Fee
Thomas A. Fee
Project Planner



United States Department of the Interior

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

RECEIVED
Room 6307
SEP 4 1986

Helber, Hastert, Van Horn, and Kimura, Planners
Mr. Thomas A. Fee
Grosvenor Center, PRI Tower
Suite 2590
733 Bishop Street
Honolulu, HI 96813

RECEIVED
SEP 5 1986

HELBERT, HASTERT, VAN HORN
& KIMURA PLANNERS

Re: Environmental Impact Statement Preparation Notice, Mililani
Mauike Residential Community, Mililani, Oahu

Dear Mr. Fee:

We have reviewed the referenced Preparation Notice and offer the following comments for your consideration.

The Environmental Impact Statement should discuss the following:

- a. potential impacts to Waikakaleu and Kipepa streams from runoff from the proposed project;
- b. mitigation measures to control runoff and drainage into these streams;
- c. description of and potential impacts to rare and endangered resources in the Ewa Forest Reserve near the mauka boundary of the project.

We appreciate this opportunity to comment.

Sincerely yours,

Thomas A. Fee
for Ernest Kosaka
Project Leader
Office of Environmental Services

cc: State ORQC



Save Energy and You Serve America!

8 September 1986

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

Dear Mr. Kosaka:

Mililani-Mauka Residential Community
Environmental Impact Statement Preparation Notice (EISPN)
Mililani, Oahu, Hawaii TMK 9-5-02: 01

Thank you for your letter of 4 September 1986 (your reference: ES Room 6307) regarding the EISPN for the proposed Mililani-Mauka residential community.

Your comments are appreciated and will be addressed in the Draft EIS.

Sincerely,

HELBERT, HASTERT, VAN HORN & KIMURA, Planners

Thomas A. Fee
Thomas A. Fee
Project Planner

GEORGE B. JARVIS
GOVERNOR



JACK K. SUWA
CHAIRPERSON, BOARD OF AGRICULTURE
SUZANNE D. PETERSON
DEPUTY TO THE CHAIRPERSON

State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 So. King Street
Honolulu, Hawaii 96814-2312

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

August 19, 1986

RECEIVED

JUL 21 1986
WELLES, WOODS, VAN ZONEN
& PARTNER PLANNERS

Mr. Mark Hastert
Helber, Hastert, Van Horn and Kimura
Grosvenor Center, PFI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Subject: Environmental Impact Statement (EIS) Preparation
Notice for Mililani-Mauka Residential Community;
THK 9-5-02: 01; 1200 acres

Dear Mr. Hastert:

Pursuant to the subject notice as printed in the OEQC
Bulletin (Volume III, No. 15, August 8, 1986), please be
apprised that the Department of Agriculture would like to be a
consulted party.

Please send pertinent correspondence to:

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

Thank you very much.

Sincerely,

EARL J. YAMAMOTO
Agricultural Planner

GEORGE R. ARIYOHKI
GOVERNOR



JACK K. SUWA
CHAIRPERSON, BOARD OF AGRICULTURE
ELIZABETH D. PETERSON
DEPUTY TO THE CHAIRPERSON

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

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

September 3, 1986

Mr. Mark Hastert
Helber, Hastert, Van Horn, & Kimura,
-Planners
Crosvenor Center, PFI Tower
733 Bishop Street, Suite 2590
Honolulu, HI 96813

RECEIVED
SEP 11 1986

HELENE, MARILOU, VAN HORN
& MARILYN PLANNERS

Subject: Environmental Impact Statement (EIS) Preparation
Notice for Millilani-Mauka Residential Community
TMK: 9-5-02: 1 1,200 Acres
Millilani, Oahu, Hawaii

Dear Mr. Hastert:

The Department of Agriculture has reviewed the subject Preparation Notice for the proposed Millilani-Mauka Residential Community and offers the following comments.

The EIS Preparation Notice describes the proposed development of a residential community of approximately 1,200 acres in central Oahu. A total of 6,640 housing units are proposed to be constructed over a 10 to 20 year period. This proposal appears to be largely the same as that proposed in the State Land Use District boundary amendment petition (Docket No. A85-598), which was denied by the Land Use Commission on May 14, 1986.

The following concerns are based, in part, on comments found in our memorandum of December 5, 1985, to the Department of Planning and Economic Development regarding the aforementioned boundary amendment petition (see attached). The Draft EIS should include discussion of each of the following:

- The proposed Land Evaluation and Site Assessment system (February 1986), the Land Study Bureau Detailed Land Classification for Oahu (December 1972), the Soil Conservation Service Soil Survey (August 1972), and the Agricultural Lands of Importance to the State of Hawaii (ALISH) system (January 1977) all indicate that the project

Mr. Mark Hastert
September 3, 1986
Page -2-

site has generally good agronomic conditions. Approximately 1,000 acres (1,200 acres according to the EIS Preparation Notice) is utilized for non-irrigated pineapple cultivation by Dole Wahiawa Pineapple Plantation. The Draft EIS should discuss the impact on Dole Wahiawa Plantation resulting from the removal of these productive lands from pineapple cultivation. Furthermore, if alternative sites of comparable quality are proposed to replace this lost production acreage, these sites should be described in detail. If removal of Waialua Sugar Company lands is involved, the impact on that company should be addressed as well.

The Preparation Notice refers to the Castle and Cooke, Inc. "Agricultural Land Hierarchy Study" (1984) which identifies the "...best agricultural lands as those in lower elevations which receive large amounts of solar radiation and may be economically supplemented by a drip irrigation system". Everything else being equal, the ability to control moisture is one of the principal means to increase agricultural production. We understand from the Hierarchy Study that the entire project site has "no irrigation capability". Inasmuch as the availability and transmission of irrigation water at economic rates is an important element in determining the viability of agricultural activities, we believe that preference should be given to retaining in agriculture those lands below Waiahole Ditch.

The Preparation Notice states that the proposed project "...will not adversely affect the long-term prospects for Central Oahu agriculture". Switching agricultural production from site "x" to site "y" when site "y" is vacant does not necessarily mean that the status quo has been maintained. The volume of production may be unchanged, but the land resources of site "x" for agricultural use is forever lost. The incremental losses of a resource like arable land, if left uncontrolled, will have a devastating and irreversible cumulative effect on the viability of agriculture within the affected region and throughout the state.

It is difficult at best to predict the future of agriculture in the Central Oahu area, much less the State. The economic returns from alternative non-agricultural uses

Mr. Mark Hastert
September 3, 1986
Page -3-

of the land would almost invariably be superior to the returns from agriculture. The apparently logical economic decisions of individual landowners, to put agricultural land to "higher and better" use, may have significant and adverse effects upon the State's agricultural production. In considering the need to retain agricultural lands in their agricultural designation, the State must consider conditions and events beyond the scope and time frame of private landowners. The broader interests of society must be considered. The Draft EIS should gauge the economic impact on the State attributable to the irreversible transition of agriculturally productive lands to urban uses in Central Oahu.

The Draft EIS should indicate how the proposed project conforms to the State Agriculture Functional Plan and its objectives and policies, in particular Implementing Action B(5)(c) which states that "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." As noted above, the subject parcel has agronomic conditions which fit the provisional description of "important agricultural land" (IAL) which, pursuant to the State Constitution, is to be conserved and protected.

The Preparation Notice states that the City and County of Honolulu Department of General Planning is considering amending the General Plan to address growth alternatives for Central Oahu. This course of action appears to be unavoidable, as the accommodation of the entire proposed project would clearly require amendments to the General Plan, as well as the Development Plans, which may have significant adverse impacts upon the agricultural resources of Central Oahu. However, if the subject property is developed, less growth may be required in agronomically suited areas such as the Ewa plain. The Draft EIS should address the cumulative impact of such plan amendments on the agricultural resources of the island.

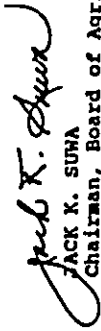
X1-19

Mr. Mark Hastert
September 3, 1986
Page -4-

- The Draft EIS should address, as alternatives to the proposed action, the potential of establishing viable alternative agricultural uses on the project site.

We will provide further comment upon our receipt and review of the Draft EIS.

Sincerely,


JACK K. SUWA
Chairman, Board of Agriculture

Attachment

cc: DPZD
DLU
DGP
OEQC

Mr. Kent M. Keith
December 5, 1985
Page -2-

December 5, 1985

MEMORANDUM

To: Mr. Kent M. Keith, Director
Department of Planning and Economic Development

Subject: Petition for an Amendment to the State Land Use
District Boundaries
A85-598 (Mililani Town, Inc.)
Agricultural to Urban
Mililani Town Expansion
THK: 9-5-02: 1 Mililani, Oahu
Acres: 1,200

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

According to the Petition, the applicant seeks to
redesignate the subject properties from the Agricultural to the
Urban District to develop a primarily residential community.
The proposal is a portion of the 3,500-acre master plan for
Mililani Town. Approximately 1,000 acres of the subject parcel
is in nonirrigated pineapple cultivation by Dole Wahieva
Pineapple Plantation. The subject area is classified as "Prime"
in the mauka portion and "Unique" near the H-2 Highway according
to the Agricultural Lands of Importance to the State of Hawaii
(ALISH) system. It should be noted that the lands classified
"Unique" would also be "Prime" if irrigation were provided. The
applicant states that land converted to urban uses can be
replaced through lease arrangements with Waialua Sugar Company
as they are able to reduce the acreage cultivated because of
greater efficiency in their sugarcane operations (Exhibit 3,
page 44).

The proposed development, if approved and constructed,
would result in the irreversible withdrawal of 1,000 acres of
productive agricultural lands and will require an average daily
water consumption of 3.8 million gallons per day. The latter
will require the assignment of water resources reallocated from
Oahu Sugar Company.

Land Evaluation and Site Assessment (LESA) Commission

According to the preliminary findings of the Land
Evaluation and Site Assessment (LESA) Commission, the
Mililani-Mauka project area possesses the qualities that
constitute the Land Evaluation and Site Assessment (LESA)
Commission's definition of "important agricultural lands" or
"IAL". These are lands capable of producing high agricultural
yields, lands which produce commodities for export and local
consumption, lands not currently in production but needed to
attain desired projected levels of agricultural activities and
income, and lands designated by public policies as important
agricultural lands resulting from some unique quality, setting
or use. By definition, IAL excludes lands deemed inappropriate
or economically infeasible for agricultural use, or which have
been designated by State or county policy or plans to be of
greater benefit to the general public in some other current or
potential non-agricultural use; but includes irrigated lands or
land not irrigated but having the capability of higher yields if
irrigation water is available.

The subject area has Land Evaluation (LE) and Site
Assessment (SA) ratings of 96, 94, 81, and 72 (excluding the
gulches) on a scale of 15 to 100 ("Soil Types, LE Ratings and LE
+ SA Situation Scores - Oahu", LESA Commission, dated July 31,
1985). The LE values are a composite of a number of factors of
that describe the overall quality of the physical properties of
the land. These properties include: soil characteristics;
growing season; moisture supply; temperature; humidity;
sunlight; air quality; drainage; elevation; slope; aspect; and
related factors associated with the sustained production of high
agricultural yields. Another important consideration is the
availability of irrigation water, or potential for irrigation
water development ("A Progress Report of the State of Hawaii
Land Evaluation and Site Assessment System to the Thirteenth
Legislature, State of Hawaii", prepared by the LESA Commission,
March 1985).

Site Assessment (SA) values incorporate the potential of a
site or area for continuing economically viable agricultural
activities and are combined with the LE ratings. Site
Assessment factors include: including but not limited to State
and county land use designations; zoning; State policy and
functional plans; county general plans; availability of public
infrastructure; non-agricultural needs; financial feasibility
for continued agricultural operations; and effect on
self-sufficiency.

Mr. Kent M. Keith
December 5, 1985
Page -3-

State Agriculture Functional Plan

In recognition of the ongoing efforts of the LESA Commission to carry out its Constitutional mandate, the State Agriculture Functional Plan contains implementing Action B(5)(c) which states that "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." Since the subject parcel fits the provisional description of IAL, the parcel should remain in the Agricultural District unless "...the preponderance of the evidence presented..." shows that "...injustice or inequity..." will result if the land is not reclassified, or "...overriding public interest..." can be shown that the land is needed for a non-agricultural purpose.

County Plans

The General Plan of the City and County of Honolulu (Resolution No. 82-188) and the Central Oahu Development Plan (Ordinance No. 83-7, as amended) indicates a population distribution range for Central Oahu of 12.8 percent to 14.2 percent of the island-wide total. According to the report entitled "Residential Development Implications of the Development Plans" (prepared by the Department of General Planning, City and County of Honolulu, August 1985), Central Oahu is projected to have a population of 139,800 by the year 2005, or an increase of 25,400 from the 1984 estimate (page 34 and 38, Table 13 and 16). Housing requirements for the year 2005 are projected at 40,500 housing units, or 10,700 more than what existed and is planned for (page 35, Table 14). The projected housing supply (the sum of committed housing developments (page 28, Table 11) and housing potential of the developable lands (page 14, Table 6)) is projected to be 9,700 units (page 29, Table 12) or 1,000 units short of demand. According to DGP, the 577-acre Waialea residential project and other projects found on the Central Oahu Development Plan Land Use Map (Ordinance No. 85-48, dated May 29, 1985) are included in these figures but not the Mililani-Mauka proposal.

The 6,640 units and the 21,000 person increase in population attributable to the Mililani-Mauka project will increase Central Oahu's percentage share of the island-wide population to 16.8 percent, or about two and one-half percent

Mr. Kent M. Keith
December 5, 1985
Page -4-

over the present General Plan allocation (provided everything else remains constant). The housing demand shortfall of 1,000 units by the year 2005 will be exceeded by 5,640 units by the Mililani-Mauka proposal.

Permitting a development the scale of Mililani-Mauka would appear to be contrary to the current General Plan policy of West Beach-Makalo as the Secondary Urban Center (Population, Objective C, Policy 2). Other potential developments within the Central Oahu area such as Waiawa (2,350 acres) and Village Park expansion (511 acres) would be even further out of line with currently adopted City and County policy.

The magnitude of potential development posed by the Mililani-Mauka project in the Central Oahu area indicates to us that accommodation of the entire project would require amendments to the General Plan as well as several Development Plans. In the Department of General Planning's (DGP) "Residential Development Implications..." report, it is suggested that because of the "...substantial acreage designated and available for housing..." and the current market trends reflecting the desirability of the area with respect to residential location by home buyers, "...it may be appropriate to re-examine the GP's population policy for Central Oahu" (Report, page 39). However, an increase in Central Oahu's population distribution to accommodate Mililani-Mauka would appear to require alterations in the population distributions allocated to other Development Plan areas, as well as re-evaluation of the concept and location of the Secondary Urban Center (Population, Objective C) and the commitment to supporting agricultural activity (Economic Activity, Objective C) in the General Plan. Any further development proposals considered in the Central Oahu area, such as Waiawa and Village Park, would require further substantial re-evaluation of key elements of the General Plan and Development Plans. Furthermore, we believe that Development Plan amendments should not be acted upon without an Environmental Impact Statement and without conformance to the General Plan (see attached copy of our memorandum to Mr. Donald A. Clegg, September 13, 1985).

Agricultural Viability

We understand that the applicant believes that the subject area is not capable of sustaining economically viable agricultural activities, and that there is no need to maintain the land in agricultural use from a corporate perspective. However, we also understand that the applicant's parent company

Mr. Kent M. Keith
December 5, 1985
Page -5-

intends to relocate the Dole pineapple cannery to the Kipapa Gulch area. This would suggest that there is still substantial confidence in the economic viability of pineapple production on Oahu.

We view important agricultural land as a valuable resource from a statewide perspective. Agricultural activities in Hawaii and elsewhere largely depend on an available supply of arable land at reasonable cost. Conditions such as scarcity and high cost of arable land and irrigation water, income from agricultural activities that is insufficient to meet production costs, and competing demands on the land and water resources by higher valued economic activities, may tend to reduce the economic viability of agriculture. However, the system of State land use districts is itself a major factor in agricultural viability, by protecting agricultural land from price appreciation which makes continued agricultural use economically infeasible. Once higher-valued activity replaces agricultural uses in an area, this essentially precludes the use of the land and other resources for agriculture for all time.

Section 205-2, Hawaii Revised Statutes, mandates the State Land Use Commission to give the greatest possible protection to those lands in the Agricultural District with a high capacity for intensive cultivation. Section 205-17, Hawaii Revised Statutes, provides decision-making criteria for the Land Use Commission to consider. The criteria include conformance to Chapter 226 (Hawaii State Plan), conformance to the applicable district standards (such as that relating to lands in the Agricultural District), and impact upon areas of state concern such as maintenance of agricultural resources. The State Land Use Commission's Rules of Practice and Procedure and District Regulations state in Part II of the District Regulations that lands in the Agricultural District shall not be taken out of this District unless the Commission finds that "...such action will not substantially impair actual or potential agricultural production in the vicinity of such lands, and/or such action is reasonably necessary for urban growth."

We are mindful that the applicant believes the subject property lacks the qualities needed for fresh market pineapple, sugarcane and other diversified crops. The applicant also identifies lower elevation fields, such as to the north and south of the project site, as already possessing or having the potential of having these qualities. Therefore, from an agricultural standpoint, if the subject property is permitted to be developed, the General Plan and relevant Development Plans should be amended to allow less growth in more agronomically

Mr. Kent M. Keith
December 5, 1985
Page -6-

suited areas such as the Eva plain (see attached copy of our memorandum to Dr. Willard T. Choy, November 16, 1984).

Conclusion

We feel that the State Land Use Commission should base a decision of the magnitude required by this petition on a regional land use plan which has been reviewed and adopted as public policy. In the absence of such a plan from either the landowner or a State agency, careful consideration should be given to the General Plan and the Development Plans of the City and County of Honolulu.

Thank you for the opportunity to comment.

JACK K. SUWA
Chairman, Board of Agriculture

Attachments

cc: LUC
DGP
James T. Funaki, Esq.

9 September 1986

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

Dear Mr. Suwa:

Mililani-Maui Residential Community
Environmental Impact Statement Preparation Notice (EISPN)
Mililani, Oahu, Hawaii TMK 9-5-02: 01

Thank you for your letter of 3 September 1986 regarding the EISPN for the proposed Mililani-Maui residential community.

The information, comments and concerns provided in your review of the EISPN will be discussed in the Draft EIS. Please do not hesitate to contact us if we can provide further information regarding the proposed residential development.

Sincerely,

HELBER, MASTERT, VAN HORN & KIMURA, Planners



Thomas A. Fee
Project Planner

GEORGE B. JANTON
Superintendent



STATE OF HAWAII
DEPARTMENT OF EDUCATION

P. O. BOX 208
HONOLULU, HAWAII 96810

OFFICE OF THE SUPERINTENDENT

September 2, 1986

Mr. Thomas A. Fee
Project Planner
HAWAII

Grosvenor Center
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Fee:

SUBJECT: Mililani Mauka Residential Community
Mililani, Oahu, Hawaii
TMK: 7-3-09:03 & 16

Our review of your proposed 4,200 single family units, 1,430 retirement units and 1,010 low-density apartment units, indicates that it may generate the following additional enrollment in our schools:

SCHOOL	GRADE	APPROXIMATE ENROLLMENT
Mililani 4th Elem. (New)	K-6	850 - 1400
Keeler Intermediate	7-8	200 - 400
Mililani High	9-12	350 - 700

Schools at all levels in this service area are operating at capacity. The two elementary schools and one intermediate school in the proposed development will be sufficient to meet the projected enrollment increase. Additional classrooms may be required to accommodate the additional enrollment at Mililani High School.

Please keep us informed of any changes to the project plans.

Sincerely,
Francis M. Hatanaka
Francis M. Hatanaka
Superintendent

FMH:JI

cc: OBS
G. Kuwada, Central Dist.

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

8 September 1986

Mr. Francis M. Hatanaka
Superintendent
Department of Education
State of Hawaii
P. O. Box 2360
Honolulu, Hawaii 96804

Dear Mr. Hatanaka:

Mililani-Mauka Residential Community
Environmental Impact Statement Preparation Notice (EISPN)
Mililani, Oahu, Hawaii TMK 9-5-02: 01

Thank you for your letter of 2 September 1986 regarding the EISPN for the proposed Mililani-Mauka residential community.

The information and comments you provided are appreciated and will be discussed in the Draft EIS.

Sincerely,

HELBER, HASTERT, VAN HORN & KIMURA, Planners

Thomas A. Fee

Thomas A. Fee
Project Planner

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SEP 4 1986

HELBER, HASTERT, VAN HORN
& KIMURA PLANNERS

HMBK

Grosvenor Center
733 Bishop Street
Suite 2590
Honolulu, Hawaii 96813

Telephone
(808) 465-3000

Helber, Hastert, Van Horn & Kimura, Inc.

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Helber, Hastert, Van Horn & Kimura, Inc.

1111 Kalia Road
Honolulu, Hawaii 96813

8 September 1986

Mr. Francis M. Hatanaka
Superintendent
Department of Education
State of Hawaii
P. O. Box 2360
Honolulu, Hawaii 96804

Dear Mr. Hatanaka:

Mililani-Mauka Residential Community
Environmental Impact Statement Preparation Notice (EISP/N)
Mililani, Oahu, Hawaii TMK 9-5-02: 01

Thank you for your letter of 2 September 1986 regarding the EISP/N for
the proposed Mililani-Mauka residential community.

The information and comments you provided are appreciated and will be
discussed in the Draft EIS.

Sincerely,

HELBER, HASTERT, VAN HORN & KIMURA, Planners



Thomas A. Fee
Project Planner

HELBER, HASTERT, VAN HORN & KIMURA, Planners
H-H-H-H-H-K
Government Center
1001
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Berkeley Street
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Honolulu, Hawaii 96813
Telephone (808) 546-2055
Telex 544488
FAX 544488
P.O. Box 2360
Honolulu, Hawaii 96804
Thomas A. Fee
Project Planner



STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3479
HONOLULU, HAWAII 96811

STATE OF HAWAII
DEPARTMENT OF HEALTH

IN REPLY, PLEASE REFER TO
E1760

September 11, 1986

Mr. Thomas A. Fee, Project Planner
Heiber, Mastert, Van Horn & Kimura
733 Bishop St., Suite 2590
Honolulu, Hawaii 96813

RECEIVED
SEP 13 1986

HEBER, MASTERT, VAN HORN
& KIMURA PLANNERS

Dear Mr. Fee:

Subject: Millilani Meuka Residential Community, Tax Map Key 7-3-09: 03 & 16

Thank you for allowing us to review and comment on the EIS preparation notice. We provide the following comments:

Wastewater Disposal

The EIS should address the impact of sewage from the proposed project on Millilani WWTP. Specifically, the following should be addressed:

1. The alternative of expanding the existing Millilani WWTP and the impact of effluent disposal on the Barber's Point Outfall; and
2. The alternative of abandoning Millilani WWTP and treating the sewage at Honouliuli WWTP. For the latter alternative, the impacts on the Millilani Interceptor, Honouliuli WWTP and Barber's Point Outfall should be addressed.

Noise

1. The proposed project must be designed to comply with the provisions of Title 11, Administrative Rules Chapter 43, Community Noise Control for Oahu. Noise from stationary equipment such as air conditioning/ventilation units and exhaust units must be attenuated to meet the allowable noise levels of the regulation based on zoning districts.
2. Noise from activities associated with the use of recreational facilities and schools can have adverse effects in terms of annoyances on adjacent residents. Areas planned for such usage should be designed to minimize noise impacts.
3. Residents of the project may be adversely affected by vehicular traffic noise from the H-2 Freeway. The use of noise barriers between the freeway and the residential units and special design and noise insulation treatment to the units may significantly lessen traffic noise impacts.

Mr. Thomas A. Fee
September 11, 1986
Page 2

4. Areas surrounding the proposed project location are presently utilized for agricultural purposes. Noise associated with these activities can have a negative impact on residential areas. Plans must be included for implementation of mitigative measures to minimize agricultural noise impacts.

5. Activities associated with the construction phase 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 regulations.

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 regulations and conditions issued with the permit.

6. 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.

Drinking Water

The document states that the anticipated water demand for the Millilani-Mauka development is 3.8 MGD. Additionally, it states that five new wells at 2.0 MGD each will be required. These new sources will require approval by the Department of Health.

The Department of Health is vested with the responsibility to assure that public water systems in the State are providing water which is in compliance with the State's drinking water regulations known as Chapter 20, Title 11, Administrative Rules, and are in compliance with all other applicable terms and conditions of Chapter 20. A public water system is defined as a system serving 25 or more individuals at least 60 days per year or having a minimum of 15 service connections. In the event that the new well is intended to serve these minimum numbers of persons or service connections, please be advised that the well and distribution system will be subject to the terms of Section 11-20-29 and Section 11-20-30 of Chapter 20 respectively.

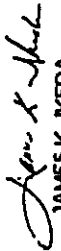
Briefly, Section 11-20-29 of Chapter 20 requires all new sources of potable water serving public water systems to be approved by the Director of Health prior to their use to serve potable water. Such approval is based primarily upon the satisfactory submission of an engineering report which adequately 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.

Mr. Thomas A. Fee
September 11, 1986
Page 3

Section 11-20-30 requires that new or substantially modified distribution systems for public water systems be approved by the Director of Health. Such approval depends upon the submission of plans and specifications for the project prior to construction and the demonstration that the new or modified portions of the system are capable of delivering potable water in compliance to all maximum contaminant levels as set down in Chapter 20 once the distribution system or modification is completed. Approval authority has been delegated to the Board of Water Supply for distribution systems under their jurisdiction.

The size, scope and location of this project makes water availability a critical issue. The EIS should address all aspects of this issue. The EIS should also address the loss of the recharge area for the aquifer and potential impact to area wells resulting from the conversion of agriculture land to urban-residential.

Sincerely yours,


JAMES K. IKEDA
Deputy Director for
Environmental Health

KS:ao

15 September 1986

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

Dear Mr. Ikeda:

Mililani-Maaka Residential Community
Environmental Impact Statement Preparation Notice (EISPN)
Mililani, Oahu, Hawaii TMK 9-5-02: 01

Thank you for your letter of 11 September 1986 (your reference: EPHSD) regarding the EISPN for the proposed Mililani-Maaka residential community.

We appreciate your comments on the proposed residential development and have forwarded them to our consulting engineers for further study. Your comments will be addressed in the Draft EIS.

Sincerely,

HELBER HASTERT, VAN HORN & KIMURA, Planners



Thomas A. Fee
Project Planner

cc: M&E Pacific, Inc.





STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P O BOX 421
HONOLULU, HAWAII 96809

OCT 31 1986 DOCUMENT NO.: 654

DEPARTMENT OF LAND AND NATURAL RESOURCES
1000 KALANIANA'OLANI DRIVE, SUITE 1000
HONOLULU, HAWAII 96813
TELEPHONE: (808) 586-1000
FACSIMILE: (808) 586-1001
TELETYPE: (808) 586-1002
INTERNET: (808) 586-1003
WWW: WWW.DLNRS.HAWAII.GOV

Helber, Hastert, Van Horn & Kimura, Planners
733 Bishop St., Ste. 2590
Honolulu, HI. 96813

Attn: R.R. Van Horn
Gentlemen:

SUBJECT: Comments on the Environmental Impact Statement
Preparation Notice (EISP) for the Proposed
Milliani Mauka Residential Community, Milliani,
Oahu, TMS: 9-5-02: 1

X-1-00

Thank you for the opportunity to participate as a consulting party with regard to the proposed Milliani Mauka Residential Community. We suggest the following concerns should be addressed in the Environmental Impact Statement (EIS).

The developer seeks an amendment to the County Development Plan to reclassify 1200 acres of agricultural land to residential, low density apartment, commercial, parks and recreation, and public and preservation designations to develop the Milliani Mauka Community. The land is classified as prime and unique agricultural land by the Department of Agriculture.

AQUATIC RESOURCES CONCERNS

From an aquatic resources standpoint, we have no objection to the proposal; it is not expected to adversely affect aquatic resource values of Waikakala and Kipapa Gulches/Streams. However, the forthcoming EIS should address increased anticipated wastewater flow and runoff from the development, and include appropriate mitigating measures to reduce erosion and the release of pollutants into the affected gulches.

FORESTRY CONCERNS

This project's northeast boundary abuts the Ewa Forest Reserve. Although it is not State land, it is still forest (DOPAW) may well be affected if any brush fires in the area should occur. We will reserve further comments till we review their impact statement.

Helber, Hastert,
Van Horn & Kimura

HISTORIC SITES CONCERNS

Our review of the subject petition and the attached archaeological reconnaissance (Chiniago, 1985) has resulted in our concurrence with the conclusions of the consulting archaeologist who states that if any structural remains of an archaeological or historical nature ever existed on the subject property, pineapple cultivation has long since erased any such evidence (1985:2). As the current survey format does not include any specific documentation to the location of the survey area, we recommend that the applicant request that the archaeological consultant submit to our office, for review and filing, a locational map of the surveyed area and any other material (i.e. photos and/or sketches).

In the event that any previously unidentified sites or remains such as artifacts, shell, bone, or charcoal deposits or human burials, rock or coral alignments, pavings, or walls are encountered, work in the immediate area should be stopped and our office contacted at 548-7460 until we are able to assess the impact and make further recommendations for mitigative activity, if warranted.

RECREATION CONCERNS

There are no State Parks interests. We note that community parks are being planned in compliance with county standards. Our only concern is that public trail right-of-way needs should be addressed for access to Waikakala and Kipapa Valleys and the ridge mauka of the subject land.

WATER AND LAND DEVELOPMENT CONCERNS

The project is located within the Pearl Harbor Ground Water Control Area, as designated by the Department of Land and Natural Resources (DLNR) under Chapter 177, HRS and administered by the DLNR under Administrative Rules, Title 13, Chapter 166. A water use permit from DLNR will be required if project plans call for the development of ground-water resources, or require the modification or exchange of ground-water use. The EIS should fully address the additional demand for potable water and the anticipated impact to groundwater resources.


Helber, Haster, Van Horn & Kimura

-3-

DOC. NO.: 654

Thank you for the opportunity to review and comment during the preparation phase of the EIS.

Very truly yours,


Susumu Ono, Chairperson
Board of Land and Natural Resources
cc: Department of General Planning
City and County of Honolulu

12 November 1986

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

Dear Mr. Ono:

Mililani-Maaka Residential Community
Environmental Impact Statement Preparation Notice (EISP/N)
Mililani, Oahu, Hawaii TMK 9-3-02: 01

Thank you for your letter of 31 October 1986 (your reference: Document No. 654) regarding the EISP/N for the proposed Mililani-Maaka residential community.

Your comments are appreciated and will be discussed in the Draft EIS.

Sincerely,

HELBER, HASTERT, VAN HORN & KIMURA, Planners


Thomas A. Fec
Project Planner



DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT

GEORGE E. ARYKOSHI
DIRECTOR
KENT M. KEITH
DEPUTY DIRECTOR
ADAMANT E. DUNN
SPECIAL ASSISTANT
ROGER A. ULVEFELT
SPECIAL ASSISTANT

DIVISION OF PLANNING AND ECONOMIC DEVELOPMENT
1500 KALANIANA'OLA BLVD., SUITE 2100, HONOLULU, HAWAII 96813
TELEPHONE: 521-2100
FACSIMILE: 521-2100
TELETYPE: 521-2100

Ref. No. P-5000

September 5, 1986

Mr. Mark Hastert
Helber, Hastert, Van Horn & Kimura,
Planners
Grosvenor Center, P.O. Box 2590
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

RECEIVED
SEP 9 1986
HELBER, HASTERT, VAN HORN
& KIMURA PLANNERS

Dear Mr. Hastert:

Subject: EISPN for Miliilani-Mauka Residential Community, Oahu

We have reviewed the subject EIS preparation notice (EISPN) and have the following comments to offer.

1. Alternative uses of the area designated for university and university-associated facilities should be addressed in the Draft EIS. Service requirements and impacts on resources for a university or other educational institution would differ from alternative uses, i.e., residential.
2. The cumulative impact of land use changes from agricultural to urban uses in Central Oahu may have significant implications for the sustainable yield of the groundwater resource in the area. The current land use of the proposed development area provides a high net recharge to the groundwater. The Draft EIS should discuss not only the water requirements of the proposed development, but also the cumulative effect of the land use changes on the water resources of the Pearl Harbor Basin.
3. Page 12 indicates that General Plan amendments that would change population guidelines for Central Oahu/Bam are being prepared by the Department of General Planning. Should these General Plan amendment proposals not be accepted, how would the proposed development conform to the current official public policy guidelines on population for Central Oahu?

Thank you for the opportunity to comment on the subject document.

Very truly yours,

Kent M. Keith
Kent M. Keith

cc: Office of Environmental Quality Control

15 September 1986

Mr. Kent M. Keith, Director
Department of Planning and Economic Development
State of Hawaii
P.O. Box 2339
Honolulu, Hawaii 96804

Dear Mr. Keith:

Miliilani-Mauka Residential Community
Environmental Impact Statement Preparation Notice (EISPN)
Miliilani, Oahu, Hawaii TMK 9-5-02: 01

Thank you for your letter of 3 September 1986 (your reference: P-5000) regarding the EISPN for the proposed Miliilani-Mauka residential community.

Your comments are appreciated and will be discussed in the Draft EIS.

Sincerely,

HELBER, HASTERT, VAN HORN & KIMURA, Planners

Thomas A. Fec
Thomas A. Fec
Project Planner

GEORGE S. ABOTON
GOVERNOR



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
805 PUNAHONA STREET
HONOLULU, HAWAII 96813

WAYNE J. YAMASAKI
DIRECTOR

DEPUTY DIRECTOR
JONATHAN K. SHIMADA, Ph.D.
WALTER M. HO
CHRISTO B. SOON
ADAM D. WICKERT

BY REPLY REFER TO:
STP 8.1556

DOT'S TESTIMONY BEFORE THE
STATE LAND USE COMMISSION CONCERNING
THE PETITION OF MILILANI TOWN, INC. TO RECLASSIFY
1,205.4 ACRES FROM AGRICULTURAL
LAND USE TO URBAN LAND USE

September 10, 1986

RECEIVED
SEP 16 1986

NEIDER, MATHEI, KAY HOOK
& TINKER PLANNERS

Mr. Thomas A. Fee, Project Planner
HHVH and K
Grosvenor Center, PRI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Fee:

Mililani Mauka Residential Community
Mililani, Oahu

Submitted herewith is a copy of our department's testimony before the State Land Use Commission concerning the petition of Mililani Town, Inc., to reclassify 1,205.4 acres from Agriculture to Urban. The concerns expressed in the testimony should be addressed in the EIS document for the subject residential community development.

Should you have any questions, please contact Dan Tanaka at 548-6526 of our Statewide Transportation Planning Office.

Very truly yours,

Wayne J. Yamasaki
Wayne J. Yamasaki
Director of Transportation

Enclosure

Traffic problems generated by the Petitioner's proposed development together with other developments in Central Oahu and Ewa have been one of the major concerns of the DOT. With the overwhelming number of dwelling units being proposed in Central Oahu and Ewa, this transportation problem could become a very crippling one. However, the DOT does not believe that all of this development could occur at one time. Historically, only an average of about 1,000 new units have been sold each year in Central Oahu and Ewa. Therefore, unless this historic trend changes drastically, the DOT does not see this enormous transportation problem occurring in the near future.

The DOT recognizes that there are problems today and there will be further problems as new developments occur. The DOT's conceptual plan for handling these problems is to maximize use of the existing highway facilities in order to transport more persons per hour than the existing facilities can presently handle. This requires a major shift in travel mode by the general public. Persons now travelling by themselves in an automobile will have to begin sharing rides (carpooling with several persons being carried in one vehicle) and others will have to begin riding buses.

For this major shift in travel mode to occur, physical improvements, such as special facilities for car-pools and buses, and park-and-ride facilities, must be provided. These physical improvements together with other improvements such as new interchanges and improvements to existing interchanges and existing highway facilities can be implemented as the need arises. As more homes are built, another increment of transportation improvements can be implemented.

The first few increments of highway improvements are already underway:

1. Planning and design of a new interchange on E-2 at the Millilani Cemetery Road (Waipio Interchange) will be started very shortly.
2. Planning and design of a new interchange on E-1 at Palwa Street (Palwa Interchange) will also be started very soon by Amfac, the developers of Waikole.
3. The widening of E-1 from the Palalial Interchange to Kunia Interchange, to provide High Occupancy Vehicle (HOV) lanes from near Campbell Industrial Park to Waiawa Interchange in Waipahu, will be started soon.
4. The widening of E-1 from Waiawa Interchange to Halawa Interchange, to provide HOV lanes, will also be started soon.
5. The planning and design of the widening of Kamehameha Highway, fronting the Waikole development opposite Crestview and Seaview, has been started by Amfac, the developers of Waikole.

Future improvements include:

1. The extension of the HOV lane to Millilani Town.
2. The extension of existing HOV lanes closer to downtown Honolulu.
3. Contraflow HOV lanes, where possible, on H-1.
4. A separate busway, along the old O.R. & L. alignment, which could eventually be upgraded when the need arises and more is known about the limits and technology of the City and County of Honolulu's Mass Transit System.
5. A separate busway, connecting Millilani Town to the separate busway along the O.R. & L. alignment.

The DOT's conceptual plan for physical improvements provides an opportunity to continuously monitor growth in Central Oahu and Ewa and to either accelerate or delay the next increment of highway improvements to match whatever transportation needs are generated by the observed growth. The conceptual plan is, therefore, very flexible and allows the DOT to implement improvements as the need arises.

The physical improvements that have been described are only one element of a total program to solve the transportation needs of the community. The solution requires the cooperation and participation by all segments of the community-government, private enterprise and the general public.

Government, with constraints in manpower and funding, will provide, physical improvements such as HOV lanes, busways, increased and upgraded bus service and the initiation of incentive programs to encourage ridesharing.



Private enterprise must do its share in encouraging and participating in ridesharing programs for its employees. Private developers must do their part by providing park-and-ride facilities within their developments, providing manpower and funds for a rideshare coordinator for their development or for a rideshare authority whose primary function is to promote and facilitate ridesharing in the community. Private developers can also help relieve transportation problems by having their developments create jobs rather than only residences. This will counteract the current trend of people living in Central Oahu and Ewa and commuting to their jobs in downtown Honolulu. Developers can also participate in the costs of needed highway improvements when government funding is not available. The DOT is exploring the concept of creating transportation improvement districts to authorize private participation in these types of improvements.

The general public must do its share by participating in ridesharing and by riding buses. Government must promote this concept by showing the public the benefits and must create incentives for participation and disincentives for nonparticipation.

The DOT's conceptual plan is not "set in concrete". There are many details that need to be worked out. The plan was developed with the idea of stimulating discussion about the many alternatives available and to encourage people to do something about the transportation questions in Central Oahu and Ewa. The DOT plans to meet with various segments of the community to get their reaction toward its plan.

The DOT has also just recently introduced legislation to further promote discussion of its conceptual plan and to secure funds for more detailed studies of:

1. The problems in Central Oahu and Ewa,
2. the concept of a ridesharing authority to promote ridesharing, and
3. the concept of transportation improvement districts to allow private participation in funding transportation improvements.

For the specific petition before the Land Use Commission, the DOT has several areas of concern:

1. Millilani Interchange: The present configuration is inadequate to accommodate traffic generated by the proposed land use change. The development of loop ramps is favored at this time. The design must be coordinated and approved by the Highways Division. The improvements should be at the expense of the developer and be a condition of the land use change.

2. H-2 Capacity: With the full development proposed by the petitioner, additional capacity must be provided.

3. Cumulative Effects of Further Central Oahu and Ewa Development: The DOT is extremely concerned about the collective effects of Millilani Town and other large developments in Central Oahu and Ewa on the downstream sections of the highway system. The Pearl City corridor is extremely congested and will continue to worsen. The

18 September 1986

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

Dear Mr. Yamasaki:

Miilani-Maui Residential Community
Environmental Impact Statement Preparation Notice (EISP/N)
Miilani, Oahu, Hawaii TMK 9-3-02: 01

Thank you for your letter of 10 September 1986 (your reference: STP 8.1556D) regarding the EISP/N for the proposed Miilani-Maui residential community.

We appreciate your comments on the proposed residential development and will discuss your concerns in the Draft EIS.

Sincerely,

HELBERT, HASTERT, VAN HORN & KIMURA, Planners



Thomas A. Fee
Project Planner

HELBERT
HASTERT
VAN HORN
& KIMURA
Planners

HEMV-18K

Customer
Center
PH
733
Kalia
Street
Suite
2000
Honolulu
Hawaii
96813
Telephone
(808) 540-2000
Telex
COMMUN
HAWAII (UN)

highway program will be unable to fund all the necessary improvements in a timely manner. Different methods to obtain developer assistance, such as transportation improvement districts, are being considered.

Because of these concerns, the DOT has recommended that certain conditions be imposed on the developer:

1. The Petitioner shall fund and construct the necessary improvements to the Miilani Interchange, including two new loop ramps and any other improvements needed to accommodate traffic generated by the development on a schedule acceptable to and subject to the approval of the State DOT.
2. The Petitioner shall appoint and fund a community transportation manager whose function is to promote and facilitate ride-sharing and bus riding by the Miilani town community. The Petitioner shall also construct and maintain a park-and-ride facility and fund other activities to encourage transit use and ride-sharing. This condition shall also be implemented on a schedule acceptable to and subject to the approval of the State DOT.

No conditions are being recommended regarding the B-2 Capacity and the Cumulative Effects of Further Central Oahu and Eva Development because these issues still need to be further discussed and resolved with the concept of the transportation improvement district.

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



FRANK F. FARR
MAIL ROOM

DONALD A. CLEGG
Chief Planning Officer

GENE CONNELL
Senior Chief Planning Officer

BM/DGP 8/86-9381

August 27, 1986

HEVW&K
Grosvenor Center
PBI Tower, Suite 2590
733 Bishop Street
Honolulu, Hawaii 96813

Attention: Thomas A. Fee, Planner

Dear Mr. Fee:

Environmental Impact Statement Preparation Notice
(EISP) for Re: Mililani Mauka Residential Community

Please be advised that this department's evaluation of the Mililani Mauka EISP will be handled by Mr. Walter Lee, Planner of the Plans Revision Branch. Should you have any questions, please call Mr. Lee at 527-6015.

Sincerely,

Donald Clegg
DONALD A. CLEGG
Chief Planning Officer

cc: Walter Lee

4 September 1986

Mr. Donald A. Clegg
Chief Planning Officer
Department of General Planning
City and County of Honolulu
630 South King Street
Honolulu, Hawaii 96813

Dear Mr. Clegg:

Mililani-Mauka Residential Community
Environmental Impact Statement Preparation Notice (EISP)
Mililani, Oahu, Hawaii TMK 9-5-02: 01

Thank you for your letter of 27 August regarding the EISP for the proposed Mililani-Mauka residential community.

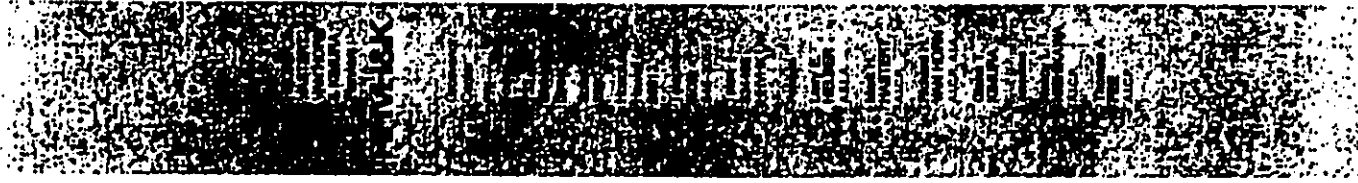
We will be working closely with Mr. Walter Lee of your department throughout the Development Plan process.

Sincerely,

HELBER, HARTERT, VAN HORN & KIMURA, Planners

Thomas A. Fee
Thomas A. Fee
Project Planner

X1-35



DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
480 SOUTH KING STREET
HONOLULU, HAWAII 96813 (808) 524-4433



FRANK P. FASE
DIRECTOR

JOHN P. WHALEN
DIRECTOR

LUB/86-4790(BVM)

September 25, 1986

RECEIVED
SEP 29 1986

HELMER, BUCKLEY, VAN WAGEN
& TOWNSEND PLANNERS

Mr. Mark Hastert
Helber, Hastert, Van Horn
and Kimura, Planners
Grosvenor Center, PRL Tower
Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Hastert:

Environmental Impact Statement
Preparation Notice (EISPM)
Milliani Mauka, Residential Community
Tax Map Key 7-3-09: 03 and 16

X1-36

We have reviewed your EISPM and have the following suggestions and questions:

1. Community Facilities

The EIS should address the relation of the proposed High Technology Park and the proposed College or University. Does the University of Hawaii - Manoa have any plans for developing such a site? If so, how would the University of Hawaii support such an educational center both in terms of teaching personnel and laboratory facilities.

2. Water

- a. A Water Master Plan should be submitted.
- b. The location of existing reservoirs, transmission lines, and deep wells which would be used for the development should be mapped.

Mr. Mark Hastert
Page 2

- c. The location of the proposed water reservoirs, transmission lines, and deep wells should also be mapped.
- d. The supply of water available within the Department of Land and Natural Resources (DLNR) established ground water control area should be noted. The following information should be provided: (1) existing well locations together with declared capacities and DLNR preserved use amounts; (2) estimated volume of exported or imported water; and (3) existing and proposed water usage. Note if water from Waiahole Ditch will be used.
- e. Are any of the wells to be used contaminated with pesticides? If contaminated wells are to be used, what are the plans for purifying the water? If contaminated well clean-up becomes necessary, how would it be funded?

3. Sewerage

- a. Are there plans to shut down the Milliani Wastewater Treatment Plant (WWTP)? If so, would the sewerage system then be connected to the Waipahu Wastewater Pump Station (WWPS) and the Honouliuli WWTP?
- b. If the system were connected to the Waipahu WWPS and Honouliuli WWTP, the capacities of the facilities would become a major concern. What are the capacities of these facilities, and what would be necessary in terms of funding and construction to upgrade the WWPS and WWTP to accommodate this and other Central Oahu development proposals? A region-wide analysis of the sewerage system should be included in the EIS.

4. Noise

- a. The EIS should include maps of noise intensities resulting from Wheeler Air Force Base aircraft operations and from H-2 Freeway automobile traffic. We are especially concerned with the intensity of traffic noise at the retirement community/single-family residential site adjacent to the H-2 Freeway.

5. Traffic

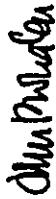
- a. You have indicated that evening Milliani-bound off-ramp traffic on the H-2 Freeway already experiences Level of Service F congestion conditions. Level of Service estimates for morning Honolulu-bound traffic at the

Mr. Mark Hastert
Page 3

Mililani Interchange should also be estimated. Queuing times at the Mililani Interchange should also be included in the EIS.

We apologize for the tardiness of our comments; however, we hope that these comments will be helpful to you in the preparation of the EIS.

Very truly yours,


JOHN P. WHALEN
Director of Land Utilization

JPW:sj
0437B

cc: 06P

15 October 1986

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

Dear Mr. Whalen


Mililani-Mauka Residential Community
Environmental Impact Statement Preparation Notice (EISPN)
Mililani, Oahu, Hawaii TMK 9-5-02: 01

Thank you for your letter of 25 September 1986 (your reference: LUB/86-4790 (BWM)) regarding the EISPN for the proposed Mililani-Mauka residential community.

Your comments have been forwarded to our engineering consultants for review and will be addressed in the Draft EIS.

Sincerely,

HELBER, HASTERT, VAN HORN & KIMURA, Planners


Thomas A. Fee
Project Planner

cc: M & E Pacific, Inc.

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



FRANK E. FARR
DIRECTOR

TOM T. NEKOTA
DIRECTOR

RECEIVED
SEP 11 1986

HELBER, HASTERT, VAN HORN
& KIMURA PLANNERS

September 11, 1986

Mr. Thomas A. Fee
Project Planner
c/o Helber, Hastert, Van Horn & Kimura
Grosvenor Center, PFI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Fee:

Subject: Environmental Impact Statement Preparation Notice
for the Millilani Mauka Residential Community
Tax Map Key 7-3-09: 3 & 16

We have reviewed the Environmental Impact Statement Preparation Notice (EISP) for the Millilani Mauka Residential Community and offer the following comments.

We have determined that the recreational plan for the proposed development in the EISP is conceptually acceptable. The recreational needs of the project have been addressed by the establishment of public and private parks, as shown on the master plan.

It will be necessary to coordinate with our department in the detail planning of the sites proposed to be dedicated to the City for public park purposes. Lands proposed for dedication must meet City standards and public dedication requirements so that we can provide the Millilani Mauka Resident Community with adequate recreational facilities and programs.

Should you have any questions, please call Mr. Jason Yuen of our Advance Planning Section at 527-6315. Thank you for the opportunity to comment on the preparation notice for the Millilani Mauka Residential development.

Sincerely,

Tom Nekota

TOM T. NEKOTA, Director

TTM:ei

18 September 1986

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

Dear Mr. Nekota:

Millilani-Mauka Residential Community
Environmental Impact Statement Preparation Notice (EISP)
Millilani, Oahu, Hawaii TMK 9-5-02- 01

Thank you for your letter of 11 September 1986 regarding the EISP for the proposed Millilani-Mauka residential community.

Your statement that the "recreational plan for the proposed development in the EISP is conceptually acceptable" is noted and will be referenced in the Draft EIS. We will coordinate the detailed planning of the identified park sites with your department at the appropriate time.

Sincerely,

HELBER, HASTERT, VAN HORN & KIMURA, Planners

Thomas A. Fee

Thomas A. Fee
Project Planner

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



FRANK P. FARR
Director

RUSSELL L. SMITH, JR.
Director and Chief Engineer
ENV 86-184

September 2, 1986

RECEIVED
SEP 4 1986

HELBER, HASTERT, VAN HORN
& KIMURA - PLANNERS

Mr. Thomas A. Fee
Project Planner
Helber, Hastert, Van Horn & Kimura
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Fee:

Re: EISPM for the Milliani-Mauka Residential
Community (TMK: 7-3-09: 03 and 16)

We are responding to your letter dated August 20, 1986, concerning the EISPM
for the proposed project.

1. The existing Milliani Town trunk sewer from the treatment plant to the proposed site is adequate to serve the proposed development as described.
2. The existing Milliani WTP is planned to be phased out of operation in the near future; hence, enlargement of the treatment facility is not needed.
3. The existing Milliani effluent disposal line is connected to the Honolulu sewer system at Waipahu sewage pump station. The capacity of this link to serve the mauka residential community will have to be evaluated.
4. In addition to the Milliani effluent disposal line, the capacity of the 25 mgd Honolulu WTP should be evaluated to determine whether excess capacity exists to serve the mauka residential community.
5. A preliminary drainage master plan should be submitted to the Drainage Section, Division of Engineering, to substantiate the feasibility of diverting runoff to Kipapa Gulch.

Very truly yours,

Russell L. Smith, Jr.
RUSSELL L. SMITH, JR.
Director and Chief Engineer

8 September 1986

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

Dear Mr. Smith:

Milliani-Mauka Residential Community
Environmental Impact Statement Preparation Notice (EISPN)
Milliani, Oahu, Hawaii TMK 9-3-02: 01

Thank you for your letter of 2 September 1986 (your reference: ENV 86-184) regarding the EISPN for the proposed Milliani-Mauka residential community.

Your comments have been forwarded to our engineering consultants for review and will be addressed in the Draft EIS.

Sincerely,

HELBER, HASTERT, VAN HORN & KIMURA, Planners

Thomas A. Fee
Thomas A. Fee
Project Planner

cc: M & E Pacific, Inc.
EDP Hawaii Inc.

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU

1435 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96813 - AREA CODE (808) 943-3111

FRANK F. FAN
MAYOR

DOUGLAS G. GIBB
CHIEF
WARREN FERREIRA
DEPUTY CHIEF



OUR REFERENCE DI-JS

RECEIVED
SEP 3 1986

August 28, 1986

HEIDER, HASTERT, VAN HORN
& KIMURA PLANNERS

Mr. Thomas A. Fee, Project Planner
Heiber, Hastert, Van Horn & Kimura, Planners
Grosvenor Center, PNI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Fee:

Subject: Mililani Mauka Residential Community
Mililani, Oahu, Hawaii
TMK 7-3-09: 03 & 16

We have reviewed the documents submitted and do not have any
objections to the proposed project at this time. Thank you
for giving us the opportunity to comment.

Sincerely,

DOUGLAS G. GIBB
Chief of Police

By *David Heukolani*
DAVID HEUKOLANI
Assistant Chief of Police
Administrative Bureau

FRK:MM:sb

FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU

1435 S. BERETANIA STREET, ROOM 305
HONOLULU, HAWAII 96813



FRANK F. FAN
MAYOR

FRANK K. RAHOJANGI
FIRE CHIEF

RECEIVED
SEP 11 1986

September 10, 1986

HEIDER, HASTERT, VAN HORN
& KIMURA PLANNERS

Mr. Thomas A. Fee, Project Planner
Heiber, Hastert, Van Horn & Kimura
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Fee:

Mililani Mauka Residential Community
TMK 7-3-09:03 & 16

We have reviewed the EISPM for the above subject and have no additional
comments.

Should you have any questions, please contact Battalion Chief Kenneth Word at
943-3848.

Sincerely,

Frank K. Rahojangi
FRANK K. RAHOJANGI
Fire Chief

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU

630 SOUTH BERETANIA

HONOLULU, HAWAII 96843



September 8, 1986

FRANK F. FASI, Mayor
DORIS B. GOTH, Chairman
ERNEST A. HAYLER, Vice Chairman
MELTON J. KILGORE
SISTER W. DANLATH AH CHOCK, O.S.F.
RUSSELL L. SMITH, JR.
WAYNE J. YAMAGUCHI
KAZU HAYASHIDA
Manager and Chief Engineer

Mr. Thomas A. Fee
Helber, Hastert, Van Horn &
Kimura
Grosvenor Center, P.O. Box 2590
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Fee:

Subject: Your Letter of August 20, 1986 on the EIS
Preparation Notice for the Millilani Mauka
Residential Community, TMK: 7-3-09:03 and 16

RECEIVED
SEP 10 1986

HELBER, HASTERT, VAN HORN
& KIMURA PLANNERS

Thank you for consulting with us on the proposed residential development at Millilani.

We offer the following comments for your considerations:

1. The discussion on anticipated water demand should indicate the locations of the sources for the anticipated 3.8 mgd average daily demand of the proposed expansion of Millilani Town.
2. On page 7, the two storage reservoirs (3.0 mg each) mentioned do not conform to the Water Master Plan. The Water Master Plan submitted in July 1986 proposes three reservoirs, a 3.5, a 1.5 and a 1.0 million gallon. The EIS should be in consonance with the approved Water Master Plan.

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

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

15 September 1986

Mr. Kazu Hayashida
Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843

Dear Mr. Hayashida:

Millilani-Mauka Residential Community
Environmental Impact Statement Preparation Notice (EISPN)
Millilani, Oahu, Hawaii TMK 9-3-02: 01

Thank you for your letter of 8 September 1986 regarding the EISPN for the proposed Millilani-Mauka residential community.


We have forwarded your comments to our consulting engineers for their review. Your comments will be addressed in the Draft EIS.

Sincerely,

HELBER, HASTERT, VAN HORN & KIMURA, Planners

Thomas A. Fee
Project Planner

cc M&E Pacific, Inc.

HAWAIIAN TEL 

Hawaiian Telephone Company
P.O. Box 2200
Honolulu, Hawaii 96841
Telephone (808) 546-4511

September 5, 1986

Helber, Hastert, Van Horn & Kimura, Planners
Grosvner Center, PBI Tower
733 Bishop Street, Suite 2500
Honolulu, Hawaii 96813

Attention: Mr. Thomas A. Fee
Re: Mililani Mauka Residential Community
Mililani, Oahu, Hawaii
TMK 7-3-09:03 & 16

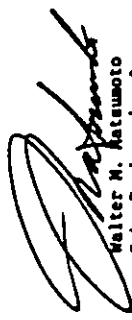
RECEIVED
SEP 10 1986
HELBER, HASTERT, VAN HORN
& KIMURA PLANNERS

Thank you for allowing us to review and comment on the Environmental Impact Statement Preparation Notice (EISP/N) for the Mililani-Mauka Residential Community Project.

The preliminary engineering study that was conducted by M & E Pacific, Inc. to determine the utility needs of the proposed development covers Hawaiian Telephone Company's concerns and requirements.

We would appreciate your office keeping us informed on the progress of this development because of the long lead time required by Hawaiian Telephone to plan, engineer and procure switching equipment and outside plant cables to provide telecommunication services.

If we could be of further assistance to you please call Nelson Yrisarry at 834-6222 or myself at 834-6221.

Sincerely,

Walter M. Matsumoto
Oahu Engineering &
Construction Manager

15 September 1986

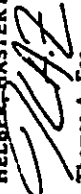
Mr. Walter M. Matsumoto
Oahu Engineering &
Construction Manager
Hawaiian Telephone Company
P.O. Box 2200
Honolulu, Hawaii 96841

Dear Mr. Matsumoto:

Mililani-Mauka Residential Community
Environmental Impact Statement Preparation Notice (EISP/N)
Mililani, Oahu, Hawaii TMK 9-5-02: 01

Thank you for your letter of 5 September 1986 regarding the EISP/N for the proposed Mililani-Mauka residential community.

We appreciate your concern about the long lead time required by Hawaiian Tel to install the necessary telecommunications equipment, and plan to keep your office informed as the project progresses through the development process.

Sincerely,

HELBER, HASTERT, VAN HORN & KIMURA, Planners
Thomas A. Fee
Project Planner

cc: M&E Pacific, Inc.



Brenner Munger Ph.D. PE
Manager
Environmental Department
(808) 548 6200

Mr. Thomas A. Fee
Project Planner
Helber, Hastert, Van Horn
& Kimura Planners
Grosvenor Center, PRI Tower
Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Fee:

Subject: Mililani Mauka Residential Community Environmental
Impact Statement (EIS) Preparation Notice

We have reviewed the above subject EIS and have the following
comments:

1. In Figure 2, it appears that one of HECO's 138 KV overhead
lines pass through the single family residential area at the
mauka end of the development. The EIS does not address
whether these overhead lines will remain or be relocated. If
they will be relocated developer should contact HECO.
2. The discussion on electrical systems data on Page 8 is inade-
quate. This data was provided by HECO to M&E Pacific, Inc.
in our letter of July 9, 1985 (see Enclosure 1). This data
is still pertinent and correct and should be used in the EIS.

Sincerely,

Brenner Munger

Enclosures

A Hawaiian Electric Industries Company



Robert D. Ladd
Manager
Distribution Engineering

A & E Pacific, Inc.
Suite 500, Pauahi Tower
1001 Bishop Street
Honolulu, Hawaii 96813

Attention: Mr. James S. Kunaqai, Ph.D.
Vice President

Gentlemen:

Subject: Mililani Mauka Development
Electrical & Communications Study
HECO Request No. PJ36822

This letter responds to your letter of June 14, 1985, subject as
above, which requested us to respond to several questions regarding
future electrical service to the proposed Mililani Mauka
Development. The following answers are keyed to the
lettered/numbered questions in your letter.

- A1. We transmit a print of a Hawaiian Electric Company (HECO) map
which shows the routes of our two 46 kv circuits that cross the
proposed development area and the two 138 kv circuits that lie
to the east of the area. All circuits are covered by perpetual
easements. Concerning the 46 kv "A" and "B" circuits as
delineated on the map, the "A" line from Waiolu to Kipapa
Substation has been relocated once at our expense. All future
relocations for this segment would be at the developers
expense. The "B" line has a perpetual easement with no
relocation clause. Further relocations of any portion of the
"B" line would also be at the developers expense.
- A2. Both the 46 kv "A" and "B" lines will serve the substation that
in turn will serve the development. It is highly desirable to
have two separate sources of power to the substation, one as
primary and one as backup, to better insure continuity of
service.
- A3. HECO now has an adequate reserve capacity to serve the proposed
mauka development load.
- A4. HECO now has a System Generating Capability of 1203 megawatts
of power. The system peak load in 1984 was 935 megawatts. By
the 1990's, additional generating capability may be available.

A Hawaiian Electric Industries Company

September 19, 1986

RECEIVED
SEP 23 1986

WELBER, HASTERT, VAN HORN
& KIMURA PLANNERS

H & E Pacific, Inc.
July 2, 1955
Page Two

Subject: Milliani Mauka Development
Electrical & Communications Study
HECO Request No. P136842

51. Based on the sketchy data provided to date on the proposed development, a very rough estimate of power demand is 22.5 megawatts.
52. A "low profile" substation may be requested by developers for aesthetic purposes. A level substation lot of approximately 16,000 to 18,000 square feet with dimension of about 120 feet by 120 feet will be required to accommodate a "low profile" substation with room for ultimately 4 each 1C bay transformers. We are obligated to install a "standard type" substation which requires a level lot with an area of between 12,000 and 13,000 square feet. Should the developer choose to have a "low profile" substation, he will have to provide free the additional land area required and pay for any additional costs in excess of the cost of the "standard type substation."
53. Yes, land acquisitions and equipment procurement must go hand in hand with the start of the development design. Early coordination and planning is essential to select an optimum substation site and to layout the proposed routes of the 46 kv feeders thereto as well as future distribution circuiting.
54. Generally speaking, the substation site should be located as close to the center of the electrical load as reasonably feasible. A specific site can be negotiated once we obtain and review plans for the area. Normally HECO pays the cost for the 46 kv overhead line extension from the "A" and "B" lines to the substation. Should the decision be made to place these 46 kv line extensions underground, the developer will be charged the difference in costs between an overhead and underground installation.
55. Based on very preliminary data available for this development, we have computed a rough cost estimate of 5 million dollars in 1951 dollars for a nonrefundable customer contribution based on the estimated on-site cost for installation of electrical facilities by HECO which the developer will need to pay.
56. Generally speaking the answer is yes as whether a primary loop-feed distribution system will be provided with 120/240 volts, single phase for residential units and 120/406 volts, 3-phase secondary service to the larger loads.

X
1
4

H & E Pacific, Inc.
July 2, 1955
Page Three

Subject: Milliani Mauka Development
Electrical & Communications Study
HECO Request No. P136842

In summary we have attempted to provide you with the best responses possible based on the sketchy data we have received to date on the Milliani Mauka Development. We would appreciate receiving more finite data, plans and schedules once these become available. This will enable us to further refine the answers provided above. For the time being, I will be your primary point of contact for all coordination required on this project.

Sincerely,

Murch D. Wildrick

Murch D. Wildrick
Director for Project Administration
Maps and Records
Distribution Engineering Department

HUM:3439N

Attachment

cc: R. D. Ladd/M. F. Muench
C. Y. K. Chun
F. Karimoto/G. Okura
E. K. Yoshimi
J. R. Elliott
Y. Daron/J. Fernandez
M. Kashiwabara
K. Ching
W. D. Wildrick

HEI

HEI

15 October 1986

Mr. Brenner Munger, Manager
Environmental Department
Hawaiian Electric Company, Inc.
PO Box 2750
Honolulu, Hawaii 96840-0001

Dear Mr. Munger:

Mililani-Mauike Residential Community
Environmental Impact Statement Preparation Notice (EISPN)
Mililani, Oahu, Hawaii TMK 9-5-02-01

Thank you for your letter of 19 September 1986 regarding the EISPN for
the proposed Mililani-Mauike residential community.

We have forwarded your comments onto our consulting engineers and
will address your comments in the Draft EIS.

Sincerely,

HELBER, RASVERT, VAN HORN & KIMURA, Planners



Thomas A. Fee
Project Planner

cc:MAE Pacific, Inc.

NORTH SHORE NEIGHBORHOOD BOARD NO. 27
P. O. BOX 487
HALEIWA, HAWAII 96712



RECEIVED
SEP 19 1986
ELDER, MASHEI, VAN BORN
& TINKLA PLANNERS

September 17, 1986

Mr. Thomas A. Fee
Project Planner
H.H.V.H. & K.
Grosvener Center
PBI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

SUBJECT: MILLIANI MAUKA RESIDENTIAL COMMUNITY

Dear Mr. Fee:

Thank you for the EISPW for the Milliani Mauka Residential Community dated August 20, 1986.

As I explained on the telephone to you, the North Shore Neighborhood Board No. 27 does not get involved with "matters" outside of our jurisdiction unless it has a direct impact on this area or our residents.

Most sincerely,

Maryl M. Anderson

Maryl M. Anderson
Chairman *et al.*

cc: Milliani Neighborhood Board No. 25
Neighborhood Commission

CHAPTER XI

**COMMENTS AND RESPONSES RECEIVED DURING
PREPARATION OF THE DRAFT EIS**

Amfac Property Development Corp. Waikele Petition for Land Use District Boundary Amendment. March 1985.

Barrett, Bill. Mililani Sales Office Sales and Marketing Report: 1968-1984. Mililani Town, Inc. October 23, 1984.

Belt, Collins and Associates. Environmental Impact Statement for the Proposed Mililani Town Expansion. Prepared for the City and County of Honolulu, Department of Land Utilization. May 1978.

_____. Revised EIS for the Proposed Solid Waste Processing Recovery Facility. August 1983.

_____. Draft EIS for the Hawaii Technology Park. October 1985.

Castle and Cooke, Inc., Diversified Agriculture Task Force. Hierarchy of Agricultural Lands Study: Central Oahu Lands. March 1984.

Char & Associates. "Terrestrial Flora and Fauna Survey of Proposed Mililani-Mauka Project, Island of O'ahu." Prepared for Helber, Hastert, Van Horn & Kimura. August 1985.

Chiniago, Inc. Letter report on findings of a literature search and archaeological survey of the Mililani-Mauka project site. July 15, 1985.

Community Resources, Inc. Potential Year 2005 Employment Levels for Oahu's Central, Leeward, and North Shore Areas. Prepared for Mililani Town, Inc. November 1985.

Eckbo, Dean, Austin and Williams, Inc. West Oahu College Site Selection Evaluation. Prepared for the University of Hawaii. September 1972.

EDP Hawaii Inc. "Preliminary Drainage Report for Mililani Mauka Land Use Application." October 1986.

Environmental Communications, Inc. Final EIS for the Proposed Waiawa Development. January 1987.

Environmental Impact Study Corp. Revised EIS for Leeward Sanitary Landfill at Waimanalo Gulch Site and Ohikolo Site. May 1984.

Evans, John D., Jr. "Beyond the Checkmarks" An Inventory and Analysis of Responses to the Mililani/Waipio/Melemanu Community Opinion Survey of February 1985. Prepared for the Mililani/Waipio/Melemanu Neighborhood Board No. 25. August 1985.

GACI, Inc. Ewa Marina Community Final Supplement Environmental Impact Statement Increment I. March 1984.

_____. Supplemental Environmental Impact Statement Ewa Marina Community Increment I. Honouliuli, Ewa, Oahu, Hawaii. TMK: 9-1-12; Por. 5. March 1984

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Hawaii, State of, Department of Education. Enrollment Projection of the Public Schools in Hawaii 1986 - 1991. Honolulu. April 1986.

Hawaii, State of, Department of Health. "Title 11, Administrative Rules, Chapter 59, Ambient Air Quality Standards." (n.d.)

_____. "Title 11, Administrative Rules, Chapter 60, Air Pollution Control". (n.d.)

_____. "Title 11, Administrative Rules, Chapter 43, Community Noise Control for Oahu". November 6, 1981.

_____. "Title 11, Administrative Rules, Chapter 42, Vehicular Noise Control for Oahu". October 27, 1981.

_____. Water Quality Management Plan for the City and County of Honolulu. Honolulu. December 1980.

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_____. Title 15, Hawaii Land Use Commission Rules. Honolulu. October 1986.

Hawaii, State of, Department of Social Services and Housing, Hawaii Housing Authority. State Housing Plan Technical Reference Document. October 1981.

Hawaii, State of, Department of Transportation. "State Transportation Functional Plan". Honolulu. June 1984.

Hawaii, State of, Hawaii Housing Authority. "State Housing Functional Plan". Honolulu. June 1984.

Hawaii, State of, Hydrologic Advisory Committee. Recommendations for Groundwater Use Regulation. A Report to the Department of Land and Natural Resources, State of Hawaii. Honolulu. February 1980.

Hawaii, State of, Land Evaluation and Site Assessment Commission, Office of the Legislative Reference Bureau. Report on the State of Hawaii Land Evaluation and Site Assessment System. February 1986.

Hawaii, State of, University. "State Higher Educational Functional Plan". Honolulu. June 1984.

Hawaii, State of, University, Land Study Bureau. Detailed Land Classification-Island Oahu. Honolulu. December 1972.

Helber, Hastert, Van Horn and Kimura Planners. "Planning Engineering and Environmental Considerations Relating to the Reclassification of 1,200 acres of Land Located at Mililani, Oahu, Hawaii". Prepared for Mililani Town, Inc. September 20, 1985.

_____. "Preliminary Market Study for a Proposed Retirement Community at Mililani Town, Oahu." March 1985.

Honolulu, City and County of. Departmental and Agency Reports of the City and County of Honolulu for Fiscal Year July 1, 1984 - June 30, 1985. Honolulu. (n.d.).

_____. Residential Development Implications of the Development Plans. August 1985.

Honolulu, City and County of, Department of General Planning. General Plan Five-Year Review: Final Report. February 1982.

Kusao, Tyrone. Central Oahu Development Plan Amendment Application for T.M.K. 9-5-02:1, Mililani Town. Prepared for Mililani Town, Inc. July 1986.

_____. General Plan Amendment Application Relating to the Implementation of the Mililani Town Master Plan. Prepared for Mililani Town, Inc. February 1984.

_____. Housing Market Analysis: A Supplementary Study for General Plan Amendment Application Relating to Implementation of Mililani Town Master Plan. Prepared for Mililani Town, Inc. May 1984. Revised December 1986.

M&E Pacific, Inc. Engineering reports for infrastructure and utility needs related to the proposed Mililani-Mauka development. August 1985 and October 1986.

Mililani Town, Inc. Mililani-Mauka Planning Program Newsletter. Six issues from October 1984 to June 1985.

Oceanic Properties, Inc. Petition for Land Use District Boundary Amendment and Verification. May 1983.

Parsons, Brinckerhoff, Quade and Douglas, Inc. Loop Ramp Study, Mililani-Mauka, Mililani, Hawaii. Prepared for Mililani Town, Inc. January 1985.

_____. Traffic Impact Study: Mililani Town Master Plan. May 1984.

_____. "Central and Leeward Oahu Transportation Study". May 1986.

Phillips, Brandt, Reddick and Assoc. (Hawaii), Inc. Hawaii High Technology Park A Petition for a Development Plan Amendment. June 1982.

Root, Barry D. "Air Quality Study for Proposed Mililani Town Developments, Oahu, Hawaii." December 8, 1986.

Shimabukuro, Endo & Yoshizaki, Inc. Leeward Sanitary Landfill at Waimanalo Gulch PER and Operational Plan. May 1986.

United States, Department of Agriculture, Soil Conservation Service in cooperation with the University of Hawaii Agricultural Experiment Station. Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii. August 1972.

=====**CHAPTER XII**=====

REFERENCES

CHAPTER XIII

**COMMENTS AND RESPONSES RECEIVED DURING
PREPARATION OF THE FINAL EIS**

Sixty (60) copies of the Draft Mililani-Mauka Environmental Impact Statement (DEIS) were officially received by the Office of Environmental Quality Control (OEQC) on December 22, 1986 (p. XIII-2). Notice of the DEIS was published in the December 23, 1986 issue of the OEQC Bulletin and all sixty copies of the report were distributed to interested public agencies, organizations and individuals (pps. XIII-3 to 4). In addition, five (5) copies of the DEIS (including an original, signed copy) were delivered to the "accepting agency," the Honolulu Department of General Planning. As of February 2, 1987, a total of 26 comments had been received (See below). All comments were responded to and both comments and responses are reprinted on the following pages (starting on XIII-5).

Agencies, Organizations and Individuals Submitting Comments to the Draft Mililani-Mauka Environmental Impact Statement:

Federal Agencies

Department of Agriculture, Soil Conservation Service
Department of the Army, U.S. Army Engineer District, Honolulu
Department of the Interior, Fish and Wildlife Service
Department of the Navy, Naval Base Pearl Harbor

State Agencies

Department of Accounting and General Services
State Public Works Engineer
Department of Agriculture
Department of Defense
Department of Education
Department of Health
Department of Land and Natural Resources
Department of Planning and Economic Development
Department of Transportation
Department of Social Services and Housing
Hawaii Housing Authority
University of Hawaii at Manoa
Environmental Center
Water Resources Research Center

County Agencies

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

Public Utilities

Hawaiian Electric Company, Inc.



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

John Ushiee

LETTER IN UPPERCASE
SECTION
TELEPHONE NO
548-6915

December 22, 1986

Dear Reviewer:

Attached for your review is an Environmental Impact Statement (EIS) that was prepared pursuant to Chapter 343, Hawaii Revised Statutes and Chapter 11-200, Administrative Rules, EIS Rules:

TITLE: Millilani-Mauka Residential Community

LOCATION: Millilani, Oahu

CLASSIFICATION: Applicant Action

Your comments or acknowledgments of no comments on the EIS are welcomed. Please submit your reply to the accepting authority or approving agency:

Mr. Donald A. Clegg, Chief Planning Officer

Department of General Planning, C&C Hnl.

650 South King Street

Honolulu, Hawaii 96813

Please send a copy of your reply to the proposing party:

Mr. Thomas A. Fee

Helber, Hastert, Van Horn & Kimura, Planners

Grosvenor Center, PFI Tower

733 Bishop Street, Suite 2590

Honolulu, HI 96813

Your comments must be received or postmarked by: January 22, 1987.

If you have no further use for this EIS, please return it to the Office of Environmental Quality Control.

Thank you for your participation in the EIS process.



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

John Ushiee

LETTER IN UPPERCASE
SECTION
TELEPHONE NO
548-6915

December 26, 1986

Mr. Thomas A. Fee
Helber, Hastert, Van Horn
& Kimura, Planners
Grosvenor Center, PFI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Fee:

Subject: Draft Environmental Impact Statement for the Millilani-Mauka Residential Community, Millilani, Oahu

The Draft EIS was officially received by the Office of Environmental Quality Control on December 22, 1986 and was published in the December 23, 1986 OEQC Bulletin. The deadline for comments and the end of the 30-day public review period is January 22, 1987. We have requested all written comments be directed to the City and County of Honolulu Department of General Planning with copies to you.

Copies of the statement have been sent to the agencies, libraries, and organizations on the attached distribution list.

Should you have any questions regarding this EIS, please do not hesitate to contact Faith Miyamoto at 548-6915.

Sincerely,

Letitia N. Uyebara

Letitia N. Uyebara
Director

Attachment
cc: DGP

DISTRIBUTION LIST

- () E.A.
 () APPLICANT ACTION
 () AGENCY ACTION
- (X) EIS
 (X) APPLICANT ACTION
 () AGENCY ACTION

Title: Mililani-Kauia Residential Community
 Location: Mililani, Oahu
 Proposing Agency/Applicant: Mililani Town, Inc.
 Accepting Authority/Approving Agency: City & County of Honolulu Dept. of General Planning
 Deadline for Comments: January 22, 1987
 Date Sent/By: DEC 22

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Dept. of Hawaiian Home Lands (a)*	1 X	
Dept. of Health	1 X	
Dept. of Land and Natural Resources	1 X	
DLNR State Historic Preservation Officer	3 X	
Dept. of Planning and Economic Development	1 X	
DPED Library	1 X	
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Dept. of Transportation	1 X	
State Archives	3 X	
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Land Use Commission		
UNIVERSITY OF HAWAII		
Environmental Center		
Marine Programs (a)*	5 X	
Water Resources Research Center	1 X	
FEDERAL		
Army-DAFE (Facilities Eng.-USASCH)		
Environmental Protection Agency (a)*	1 X	
Navy		
Soil Conservation Service	1 X	
U.S. Army Corps of Engineers	1 X	
U.S. Coast Guard	1 X	
U.S. Fish and Wildlife Service	1 X	
U.S. Geological Survey (a)*	1 X	
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Total Received: 50		
Total Distributed: 60		
File Copy: 1		

Copy of Distribution List Sent to: DGP, Halber, Hasterl, Van Horn & Kimura, Planners
 Date: 12-22-86

(a)* Copy desired only if project involves the agency's responsibilities.

NEWS MEDIA	NO. COPIES	REMARKS
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CITY AND COUNTY OF HONOLULU (b)**		
Board of Water Supply	1 X	
Building Dept.	1 X	
Dept. of Housing and Community Development	1 X	
Dept. of General Planning	1 X	
Dept. of Land Utilization	1 X	
Dept. of Parks and Recreation	1 X	
Dept. of Public Works	1 X	
Dept. of Transportation Services	1 X	
Fire Dept.	1 X	
Municipal Reference and Records Center (Oahu only)	1 X	
Police Dept.	1 X	
COUNTY OF HAWAII (b)**		
Planning Dept.		
Dept. of Parks and Recreation		
Dept. of Public Works		
Dept. of Research and Development		
Dept. of Water Supply		
University of Hawaii - Hilo Campus Library		
COUNTY OF MAUI (b)**		
Planning Dept.		
Dept. of Parks and Recreation		
Dept. of Public Works		
Dept. of Water Supply		
Economic Development Agency		
Maui Community College Library		
COUNTY OF KAUAI (b)**		
Planning Dept.		
Dept. of Public Works		
Dept. of Water Supply		
Kauai Community College Library		
NON-GOVERNMENTAL AGENCIES		
American Lung Association		
Hawaiian Electric Company	1 X	
Office of Hawaiian Affairs	1 X	
LIBRARIES		
U.H. Hamilton Library, Hawaiian Collection	1 X	
Legislative Reference Bureau	1 X	

(b)** Copy desired only if project is in respective county.

<u>LIBRARIES</u>	<u>NO. COP</u>	<u>REMARKS</u>
State Main Library	3 X	
<u>REGIONALS:</u>		
Kaimuki Regional Library	1 X	
Kaneohe Regional Library	1 X	
Pearl City Regional Library	1 X	
Hilo Regional Library	1 X	
Waialua Regional Library	1 X	
Lihue Regional Library	1 X	
<u>OAHU:</u>		
Aiea Library		
Ala Haina Library		
Ewa Beach Community-School Library		
Hawaii Kai Library		
Kahuku Community-School Library		
Kaliua Library		
Kalihi-Palms Library		
Liliha Library		
Manoa Library		
McCully-Moiliili Library		
Mililani Library	1 X	
Wahiawa Library		
Waiatus Library		
Waianae Library		
Waikiki-Kapahulu Library		
Waimanalo Community-School Library		
Waipahu Library		
<u>HAWAII</u>		
Bond Memorial (Kohala) Library		
Honolulu Library		
Honokaa Library		
Kailua-Kona Library		
Kaunoi Community-School Library		
Kealahou Library		
Laupahoehoe Community-School Library		
Mountain View Community-School Library		
Pahala Community-School Library		
Pahoa Community-School Library		
Theima Parker Memorial Library/Waimea Area Library		
<u>MAUI</u>		
Kahului Library		
Lahaina Library		
Makawao Library		
<u>MOLOKAI</u>		
Molokai Library		
<u>LANAI</u>		
Lanai Community-School Library		
<u>KAUAI</u>		
Hanalei Library		
Kapa'a Library		
Koloa Community-School Library		
Waimea Library		

Mililani/Waiolo/Melemanu
 Neighborhood Board #25 X
 P.O. Box 3116
 Mililani Town, HI 96789

LIBRARY OF CONGRESS

cc: T. Fee

UNITED STATES
DEPARTMENT OF
AGRICULTURE

SOIL
CONSERVATION
SERVICE

P. O. BOX 50004
HONOLULU, HAWAII
96850

January 20, 1987

RECEIVED

JAN 21 1987

HELBER, HASTERT, VAN HORN
& KIMURA PLANNERS

Mr. Donald A. Clegg
Chief Planning Officer
Department of General Planning
City and County of Honolulu
650 S. King Street
Honolulu, HI 96813

Dear Mr. Clegg:

Subject: Draft EIS - Milliani-Mauka, Residential Community
Milliani, Oahu, Hawaii

We reviewed the subject draft environmental impact statement and have no
comments to offer.

Thank you for the opportunity to review the document.

Sincerely,


THOMAS A. FEE
State Conservationist

cc: Thomas A. Fee
Helber, Mastert, Van Horn & Kimura, Planners
Grosvener Center, PBI Tower
733 Bishop Street, Suite 2550
Honolulu, HI 96813

January 29, 1987

Mr. Richard N. Duncan,
State Conservationist
Soil Conservation Service
U.S. Department of Agriculture
P.O. Box 50004
Honolulu, Hawaii 96850

Dear Mr. Duncan:

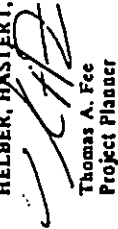
Milliani-Mauka Residential Community
Environmental Impact Statement (EIS)
Milliani, Oahu, Hawaii
TMK: 9-5-01: por. 1; 9-5-02: por. 1

Thank you for your letter of January 20, 1987 to Mr. Donald A. Clegg, Chief
Planning Officer, Honolulu Department of General Planning, regarding the
referenced report.

Your letter will be reproduced in the Final EIS together with this response.

Sincerely,

HELBER, HASTERT, VAN HORN & KIMURA, Planners


Thomas A. Fee
Project Planner

TAF/lh

cc: Honolulu Department of General Planning

26P 1/87 220



DEPARTMENT OF THE ARMY RECEIVED
U. S. ARMY ENGINEER DISTRICT, HONOLULU
BUILDING 230
FT. SHAFTER, HAWAII 96858 - 5470
JAN 21 PM 2:58
JANUARY 13, 1987

REPLY TO
ATTENTION OF:

DEPT. OF
GENERAL PLANNING
C & C HONOLULU

RECEIVED
JAN 20 1987

HELBER, MASTERT, VAN HORN
& KIMURA PLANNERS

Mr. Donald A. Clegg, Director
Department of General Planning
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Clegg:

Thank you for the opportunity to review and comment on the draft EIS for Milliani-Mauka Residential Community, Milliani, Oahu. The following comments are offered:

- a. As previously stated in our letter dated September 4, 1986, on the above subject, a Department of the Army permit will not be required for the project.
- b. The areas are designated Zone C, area of minimal flooding by the Federal Insurance Administration. According to the City and County of Honolulu storm drainage standards, March 1986, discharges for areas greater than 100 acres should be from Plate 6 of the drainage standards.
- c. Pages E-8, E-11. The gage station number should read 2128 not 2180.
- d. Page E-20. The Y-axis on the graph should read 270, 280 and 290 and not 670, 680, and 690.

Sincerely,

Kisauw Cheung
Kisauw Cheung
Chief, Engineering Division

January 30, 1987

Mr. Kisauw Cheung,
Chief, Engineering Division
U.S. Army Engineer District, Honolulu
Building 230
Ft. Shafter, Hawaii 96858

Dear Mr. Cheung:

Milliani-Mauka Residential Community
Environmental Impact Statement (EIS)
Milliani, Oahu, Hawaii
TMKs 9-5-01: por. 1; 9-5-02: por. 1

Thank you for your letter of January 13, 1987 to Mr. Donald A Clegg, Chief Planning Officer, Honolulu Department of General Planning, regarding the referenced report.

Your corrections to the Preliminary Drainage Report (Appendix E) are noted.

Your letter will be reproduced in the Final EIS together with this response. Sincerely,

HELBER, MASTERT, VAN HORN & KIMURA, Planners
Thomas A. Fec
Thomas A. Fec
Project Planner

TAF/lh

cc. Honolulu Department of General Planning

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100



United States Department of the Interior

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

ES
Room 6307
06 JAN 1987

RECEIVED

JAN 7 1987

HELBER, HASTERT, VAN HORN
& KIMURA PLANNERS

Mr. Donald A. Clegg
Chief Planning Officer
Department of General Planning
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Re: Environmental Impact Statement, Millieni-Mauka Residential
Community, Mililani, Oahu

Dear Mr. Clegg:

We have reviewed the subject Environmental Impact Statement (EIS)
and offer the following comments.

The DEIS has not addressed a key issue raised in our September 4,
1986 letter to you concerning impacts of the proposed action on
the water quality of adjacent streams. Specifically, we once
again recommend that the EIS include a discussion of potential
water quality impacts to Waikakalua and Kipepa streams from
runoff from the proposed development.

We appreciate this opportunity to comment.

Sincerely yours,

Ernest Kosaka

Ernest Kosaka
Project Leader
Fish and Wildlife Enhancement

cc: Helber, Hastert, Van Horn
& Kimura, Planners
DLNR



Save Energy and You Serve America!

February 2, 1987

Mr. Ernest Kosaka, Project Leader
Office of Environmental Services
Fish and Wildlife Service
United States Department of the Interior
300 Ala Moana Boulevard
P.O. Box 50167
Honolulu, Hawaii 96850

Dear Mr. Kosaka:

Millieni-Mauka Residential Community
Environmental Impact Statement (EIS)
Mililani, Oahu, Hawaii
TMKs 9-5-01: por. 1; 9-5-02: por. 1

Thank you for your letter of January 6, 1987 to Mr. Donald A. Clegg, Chief
Planning Officer, Honolulu Department of General Planning, regarding the
referenced report.

The Final EIS now includes a discussion of potential water quality impacts to
Waikakalua, Kipepa and Waialea Streams from runoff generated from the
proposed development. (Section 4.7)

For your information, the Aquatic Resources Division of the Department of
Land and Natural Resources (DLNR) has noted that the project is not expected
to adversely affect aquatic resource values in the Waikakalua and Kipepa
Gulches, Waialea Stream, and Pearl Harbor, providing mitigating measures to
control erosion, and proposed wastewater disposal and storm water drainage
improvements are complied with. (See DLNR letter, p. XIII-13)

Your letter will be reproduced in the Final EIS together with this response.

Sincerely,

HELBER, HASTERT, VAN HORN & KIMURA, Planners

Thomas A. Fife

Thomas A. Fife
Project Planner

TAF/lh

cc: Honolulu Department of General Planning



DEPARTMENT OF THE NAVY
 COMMANDER
 NAVAL BASE PEARL HARBOR
 BOX 118
 PEARL HARBOR, HAWAII 96822-0118

5090
 Ser 002(09P2)/151
 30 JAN 1987

Mr. Donald A. Clegg
 Chief Planning Officer
 Department of General Planning
 City and County of Honolulu
 650 South King Street
 Honolulu, HI 96813

RECEIVED

JAN 29 1987
 MELBER, MASTUZI, VAN HORN
 & KIMURA PLANNERS

Dear Mr. Clegg:
 DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)
 FOR THE PROPOSED MILLILANI-MAUKA RESIDENTIAL COMMUNITY
 MILLILANI, OAHU, HAWAII - DECEMBER 1986

The subject Draft EIS has been provided by the State of Hawaii Office of Environmental Quality Control by transmittal of December 22, 1986 for review and comment.

The Navy notes that Millilani Town Inc. (MTI) is looking to the Pearl Harbor Ground Water Control Area as a source of water for Millilani Mauka, and the Draft EIS specifically refers to the availability of water from the allocation recently released by Oahu Sugar. The Navy also draws much of its water from the Pearl Harbor aquifer, and while it is not legally subject to DWR authority, it has worked closely with the DWR to reach agreement on reasonable levels of Navy water use.

At the present time, Navy usage is in the general area of 22.67 MGD, and the DWR has concurred in this level of use. However, if Navy mission obligations change and water requirements increase, the Navy may have to draw additional water from the Pearl Harbor aquifer, in the exercise of its traditional water rights, without regard to administrative limitations established by the DWR. To date, an excellent working relationship between the DWR and the Navy has prevented any conflict, and conflict is considered unlikely in the future. Nevertheless, the final EIS should contain a thorough evaluation of the impact of the withdrawal of potable water for Millilani Mauka upon the Pearl Harbor Ground Water Control Area, and the availability of alternative water sources.

The U. S. Navy would also ask that precautions be taken during site preparation and construction, should this project be implemented, to prevent erosion and tributary flow of siltation into streams that empty into Pearl Harbor. Storm runoff into Maikela Stream is mentioned on Pages VI-8 and VI-9.

XIII-8

5090
 Ser 002(09P2)/151

The U. S. Navy looks forward to receiving a copy of the final EIS. Mr. Bill Liu of this command is the U.S. Navy point of contact and can be reached at 471-3703.

Sincerely,

I. C. CRANE
 Captain, CEC, U.S. Navy
 Facilities Engineer
 By direction of the Commander

Copy to:
 Mr. Thomas A. Fee
 Holbert, Hastert, Van Horn & Kimura, Planners
 Crosswener Center, PRI Tower
 735 Bishop Street, Suite 2590
 Honolulu, HI 96813

February 2, 1987

Commander, Naval Base Pearl Harbor
Department of the Navy
Naval Base Pearl Harbor
Pearl Harbor, Hawaii 96860-5020

Attn: Captain T.C. Craze, Facilities Engineer

Dear Captain Craze:

Milliani-Mauka Residential Community
Environmental Impact Statement (EIS)
Milliani, Oahu, Hawaii
TMKs 9-5-01; por. 1; 9-5-02; por. 1

Your letter was received on February 2, 1987, ten days after the end of the thirty-day public review period (ending on January 23, 1987). Our comments to your concerns are as follows:

A. Impacts on the Pearl Harbor Ground Water Control Area (GWCA).
Your comment regarding the Navy's existing potable water withdrawals from the Pearl Harbor GWCA is noted. Your comment concerning the Navy's prerogative to override "administrative limitations established by the DLNR" is also noted.

Regarding your request for a discussion of impacts to the Pearl Harbor GWCA and the availability of alternative water sources, your attention is directed to Section 6.2. This section discusses the existing condition of the aquifer, probable impacts as a result of the proposed action as well as mitigating measures to reduce adverse impacts. Mitigating actions include: reduction of exports from the GWCA; increase in imports to the GWCA; and the acquisition of existing allocations within the GWCA.

As you are aware, DLNR is the agency charged with managing the GWCA. They are aware of the water demands of the proposed action and are presently re-evaluating the availability of groundwater within the basin.

B. Erosion and Sedimentation

The potential impacts of erosion and sedimentation are discussed in Section 6.4. The applicant is aware of your concern regarding the impact of sedimentation on Pearl Harbor and will take the necessary precautions to avoid impacts to the harbor.

We hope that your concerns have been adequately addressed in our letter. Your comments, together with our response, will be reprinted in the Final EIS.

Sincerely,

HELBER, HASTERT, VAN HORN & KIMURA, Planners



Thomas A. Fee
Project Planner

TAF/lh

cc: Honolulu Department of General Planning

RECEIVED

(P)1003.7

JAN 23 1987

HELBER, HASTERT, VAN HORN
& KIMURA PLANNERS

JAN 19 1987

Mr. Donald A. Clegg
Chief Planning Officer
Department of General Planning
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Clegg:

Subject: Mililani-Mauka Residential Community

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

Very truly yours,

J. Tomiaga
TEUANE TOMIAGA

State Public Works Engineer

CA:jk
cc: Mr. Thomas A. Fee

January 29, 1987

Mr. Teuane Tomiaga,
State Public Works Engineer
Department of Accounting and General Services
State of Hawaii
Division of Public Works
P.O. Box 119
Honolulu, Hawaii 96810

Dear Mr. Tomiaga:

Mililani-Mauka Residential Community
Environmental Impact Statement (EIS)
Mililani, Oahu, Hawaii
TMKs 9-3-01; por. 1; 9-3-02; por. 1

Thank you for your letter of January 19, 1987 to Mr. Donald A. Clegg, Chief Planning Officer, Honolulu Department of General Planning, regarding the referenced report.

Your letter will be reproduced in the Final EIS together with this response.

Sincerely,

HELBER, HASTERT, VAN HORN & KIMURA, Planners

THAF

Thomas A. Fee
Project Planner

TAF/lh

cc: Honolulu Department of General Planning

JOHN WAHLEE
GOVERNOR



RECEIVED

27 JUN 20 PM 2:04

DEPARTMENT OF AGRICULTURE
1428 So. King Street
Honolulu, Hawaii 96814-2512
HONOLULU January 16, 1987

SUZANNE D. PETERSON
CHAIRPERSON, BOARD OF AGRICULTURE
TADASHI TOJO
DEPUTY TO THE CHAIRPERSON

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

DEP 1/87 202

MEMORANDUM

To: Mr. Donald A. Clegg, Chief Planning Officer
Department of General Planning
City and County of Honolulu

Subject: Draft Environmental Impact Statement (DEIS) for
Milliani-Mauka Residential Community
Milliani Town, Inc.
TMK: 9-5-01: por. 1
Area: Approximately 1,200 acres

RECEIVED
JAN 29 1987
HELBERT, HASTERT, VAN HORN & KIMURA PLANNERS

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

The DEIS has satisfactorily addressed most of the concerns found in our letter of September 3, 1986, to Mr. Mark Hastert (DEIS, page XI-18). However, the following issue remains unanswered:

The EIS should address the cumulative impact of Central Oahu developments requiring General Plan and Development Plan amendments on the agricultural resources of the island.

Perhaps this is more appropriately an issue that the City and County of Honolulu and/or the State should address. Whatever the case, it would be prudent to establish relevant policies now rather than continue amending, on a piecemeal basis, existing plans and policies which affect the future of agriculture and agricultural lands, and the direction, magnitude, and distribution of urban growth in Central Oahu.

Thank you for the opportunity to comment.

Suzanne D. Peterson

SUZANNE D. PETERSON
Chairperson, Board of Agriculture

cc: DPED
DLU
OEGC
LUC

January 30, 1987

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

Dear Ms. Peterson:

Milliani-Mauka Residential Community
Environmental Impact Statement (EIS)
Milliani, Oahu, Hawaii
TMKs 9-5-01: por. 1; 9-5-02: por. 1

Thank you for your letter of January 16, 1987 to Mr. Donald A. Clegg, Chief Planning Officer, Honolulu Department of General Planning, regarding the referenced report. Our comments are as follows:

We appreciate your concerns regarding the need for information on the cumulative impact of proposed Central Oahu developments on the agricultural resources of the island. Castle & Cooke, Inc., as one of the State's largest agribusinesses, is especially cognizant of the need to protect the agricultural resource.

The gradual phase-out of pineapple production at the project site is part of a long range plan to maintain profitability of the Wahiawa Plantation. As you are aware, the shift in market demand - from canned fruit to fresh fruit - requires the use of lower elevation fields with drip irrigation capability. Alternative agricultural uses of the project site have been studied and no viable replacement crops have been identified. The phased expansion of the Milliani community into the mauka fields thus becomes the only economically viable use of the land. We concur with your assessment of the role that State and County agencies should take in establishing relevant policies to prevent "piecemeal" amendments to existing plans and policies. As you note, cumulative region- or industry-wide assessments of the type suggested in your letter are more appropriately conducted by public agencies.

We hope the information provided in this letter has addressed your concerns. Your comments together with this response will be reprinted in the Final EIS.

Sincerely,

HELBERT, HASTERT, VAN HORN & KIMURA, Planners

THAZ

Thomas A. Fee
Project Planner

TAF/ih

cc: Honolulu Department of General Planning

RECEIVED

JAN 10 1987

HELBER, HASTERT, VAN HORN
& KIMURA PLANNERS

DEPARTMENT OF DEFENSE
3949 DIAMOND HEAD ROAD
HONOLULU, HAWAII 96816-4495

HIEENG

JAN 9 1987

Mr. Donald L. Clegg, Chief Planning Officer
Department of Planning
City & County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Clegg:

Mililani-Hauka Residential Community
Mililani, 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 M. Matsuda
Major, Hawaii Air
National Guard
Contr & Engr Officer

cc: Helber, Hastert, Van Horn & Kimura, Planners

January 29, 1987

Major Jerry M. Matsuda
Hawaii Air National Guard
Contr & Engr Officer
Office of the Adjutant General
Department of Defense
State of Hawaii
3949 Diamond Head Road
Honolulu, Hawaii 96816-4495

Dear Major Matsuda:

Mililani-Hauka Residential Community
Environmental Impact Statement (EIS)
Mililani, Oahu, Hawaii
TMKs 9-5-01; par. 1; 9-5-02; par. 1

Thank you for your letter of January 9, 1987 to Mr. Donald A. Clegg, Chief Planning Officer, Honolulu Department of General Planning, regarding the referenced report.

Your letter will be reproduced in the Final EIS together with this response.
Sincerely,

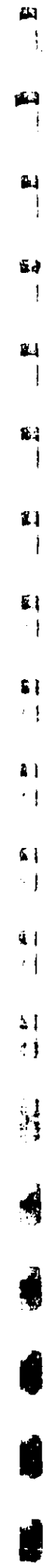
HELBER, HASTERT, VAN HORN & KIMURA, Planners



Thomas A. Fee
Project Planner

TAF/lh

cc: Honolulu Department of General Planning



John Valhee
SUPERINTENDENT



STATE OF HAWAII
DEPARTMENT OF EDUCATION

P. O. BOX 2009
HONOLULU, HAWAII 96813

January 9, 1987

OFFICE OF THE SUPERINTENDENT

Charles T. Toguchi

RECEIVED

JAN 16 1987

HELBER, HASTERT, VAN HORN
& KIMURA PLANNERS

Mr. Donald A. Clegg, Chief Planning Officer
Department of General Planning
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Clegg:

SUBJECT: Milliani-Mauka Residential Community-EIS

Our review of the proposed project indicates that the student enrollment generated by the development will be as follows:

School	Grade	Approximate Enrollment
Two (2) New Elementary Schools	K-6	950-1750
One (1) New Intermediate School	7-8	250-450
Milliani High School	9-12	400-750

The projections are based on the proposed 5,630 single family and 1,010 apartment and townhouse units. The two elementary and one intermediate school sites will be adequate to accommodate the projected student enrollment. Milliani High School will need additional classroom facilities to meet the grade 9-12 requirements.

Should there be any questions, please contact Mr. Richard Inouye at 737-4743.

Sincerely,
Charles T. Toguchi
Charles T. Toguchi
Superintendent

CTT:dk
cc Mr. Thomas A. Fee
Central Dist
085

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

January 29, 1987

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

Dear Mr. Toguchi:

Milliani-Mauka Residential Community
Environmental Impact Statement (EIS)
Milliani, Oahu, Hawaii
TMKS 9-5-01: par. 1; 9-5-02: par. 1

Thank you for your letter of January 9, 1987 to Mr. Donald A. Clegg, Chief Planning Officer, Honolulu Department of General Planning, regarding the referenced report.

The revised projection of student enrollments you provided has been incorporated into the Final EIS.

Your letter will be reproduced in the Final EIS together with this response.

Sincerely,

HELBER, HASTERT, VAN HORN & KIMURA, Planners

THAF
Thomas A. Fee
Project Planner

TAF/lh

cc Honolulu Department of General Planning



John C. Lewin, H.D.
DIRECTOR OF HEALTH

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

RECEIVED
JAN 20 1987

HELBERT, HYSTERT, VAN HORN & KIMURA
PLANNERS

January 20, 1987

February 2, 1987

Mr. John C. Lewin, M.D.
Director of Health
State of Hawaii
Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801

Dear Dr. Lewin:

Mililani-Mauka Residential Community
Environmental Impact Statement (EIS)
Mililani, Oahu, Hawaii
TMKs 9-3-01: por. 1; 9-3-02: por. 1

Thank you for your letter of January 20, 1987 to Mr. Donald A. Clegg, Chief Planning Officer, Honolulu Department of General Planning, regarding the referenced report.

The development of the 1,200 acre Mililani-Mauka site will reduce the available recharge area of the Pearl Harbor Groundwater Control area by approximately one percent (p.VI-6). It should be noted that the actual impact on the groundwater resource is not only a function of area but of location, soil and topographical characteristics as well. The principal component of recharge is rainfall. Most of the rainfall/recharge takes place in the upper reaches of the Koolau Forest Reserve where rainfall approaches 300 inches per year (versus the 40 inch to 75 inch range experienced at the project site). Thus, although the project site comprises approximately one percent of the surface of the recharge area, its actual impact to the daily recharge of the aquifer will be significantly less.

Your letter will be reproduced in the Final EIS together with this response.

Sincerely,

HELBER, HYSTERT, VAN HORN & KIMURA, Planners

Thomas A. Fee
Project Planner

TAF/lh

cc: Honolulu Department of General Planning

MEMORANDUM

To: Mr. Donald A. Clegg, Chief Planning Officer
Department of General Planning, City & County of Honolulu

From: Director of Health

Subject: Draft Environmental Impact Statement for Mililani-Mauka Residential Community, Mililani, Oahu

Thank you for the opportunity to review the subject document. The water demand for the Mililani-Mauka is estimated at 3.8 MGD for average daily consumption. Five new wells and three storage reservoirs will be required to service the proposed project. On September 11, 1986, the Department of Health advised Mr. Thomas Fee, Project Planner, of the new source approval requirements for the five new wells. These comments have been incorporated into the Draft EIS.

The Drinking Water Program continues to be concerned about the loss of recharge area for the Pearl Harbor Aquifer in converting the land from agricultural to urban development. This concern should be discussed in the Final EIS.

JOHN C. LEWIN, M.D.

cc: Mr. Thomas A. Fee ✓

JOHN WAHREE
DIRECTOR OF LAND



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 631
HONOLULU, HAWAII 96806

JAN 22 1987

DOC. NO.: 2370B

Honorable Donald A. Clegg
Chief Planning Officer
Department of General Planning
City and County of Honolulu
650 South King St.
Honolulu, Hawaii 96813

RECEIVED
JAN 26 1987

ELI, MASHI, VAN BUN
& TUBALI NUMBERS

Dear Mr. Clegg:

SUBJECT: Review of Environmental Impact Statement (EIS)
for Milliani-Mauka Residential Community
Milliani, Ewa, Oahu
TMK: 9-5-01: 1 (por) and 9-5-02: 1 (por)

We have reviewed the EIS for the proposed Milliani-Mauka Residential Community and offer the following comments for your information:

Aquatic Resources Concerns

The project is not expected to adversely affect aquatic resources values in the Waikakalua and Kipapa Gulches, Waiale Stream, and Pearl Harbor, provided mitigating measures to control erosion, and proposed wastewater disposal and storm runoff drainage improvements are complied with.

Historic Sites Concerns

The EIS covers a Development Plan amendment to change the above numbered parcels from Agricultural to Residential.

In November of 1985, our office reviewed LUC A85-598 and concurred that no sites were present, but requested further documentation (maps and photos). At that time, the parcel involved was identified as 9-5-02: 1. We still have not received the documentation, and we would like to obtain it.

In view of the long-standing agricultural use of the property, we still concur with a determination of "no effect".

Honorable Donald A. Clegg

- 2 -

DOC. NO.: 2370B

Water and Land Development Concerns

The project is located within the Koolau Subzone of the Pearl Harbor Ground Water Control Area which is regulated under Chapter 177, HRS, and our Department's Administrative Rule, Chapter 166 of Title 13. If the project does not have an allocation of water use from the Honolulu Board of Water Supply, a permit from the Department of Land and Natural Resources (DLNR) will be required for development of ground water resources, or modification/exchange of existing ground water use.

Section 6.2.1 of the EIS refers to the State Board of Land and Natural Resources recertification (December 14, 1984) of Oahu Sugar Company's water use allocation from 115 mgd to 92.5 mgd, a reduction of 22.5 mgd, "thus freeing water for urban developments such as Milliani-Mauka and the Hawaii Technology Park" (Pg. VI-5). However, current (as of December 1986) water availability in the Koolau Subzone is as follows:

	Sustainable Yield (mgd)	Total Authorized (mgd)	Available (mgd)
Koolau Subzone	200	199.910	0.090

With only 0.090 mgd presently available, Section 6.2.1 should be updated and revised accordingly.

Thank you for consulting us.

Very truly yours,

William W. Paty
WILLIAM W. PATY, Chairperson
Board of Land and Natural Resources

cc: Mr. Thomas A. Fee

February 2, 1987

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

Dear Mr. Paty:

Milliani-Maeka Residential Community
Environmental Impact Statement (EIS)
Milliani, Oahu, Hawaii
TMKs 9-5-01: por. 1; 9-5-02: por. 1

Thank you for your letter of January 22, 1987 to Mr. Donald A. Clegg, Chief
Planning Officer, Honolulu Department of General Planning, regarding the
referenced report. Our responses are as follows:

Aquatic Resources
Your comments are noted.

Historic Sites

Your comments are noted. At your request, we have enclosed a copy of a
January 7, 1985 letter transmitting a map of the survey area to DPED. Since
there were no sites identified in the archaeological reconnaissance survey,
photographs of the area were not taken. We hope this information will
satisfy your request.

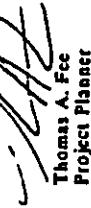
Water and Land Development

Section 6.2.1 of the EIS has been updated and revised.

Your letter will be reproduced in the Final EIS together with this response.

Sincerely,

HELBER, HASTERT, VAN HORN & KIMURA, Planners



Thomas A. Fee
Project Planner

TAF/lh

Enclosure

cc: Honolulu Department of General Planning

OKUMURA TAKUSHI FUNAKI & WEE
ATTORNEYS AT LAW
A LAW CORPORATION

MARIE OKUMURA
PAUL T. FUNAKI
YOUNG S. WEE
ALBERT M. L. WONG
BROOKER C. H. LEE

SUITE 1400
CASCADORA CENTER
733 KING ST. EAST
HONOLULU, HAWAII 96813
TELEPHONE: 808/543-8800
CABLE ADDRESS: COUNSELLOR

January 7, 1986

Ms. Nancy Kilonsty
Department of Planning and
Economic Development
Land Use Division
Kamamalu Building
250 South King Street
Honolulu, Hawaii 96813

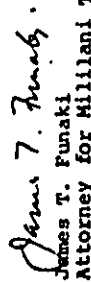
Dear Ms. Kilonsty:

This refers to your inquiry in late December 1985 for
a map of the area covered under archaeological survey conducted
by Chiniago, Inc. for the Milliani-Maeka lands in Land Use
Commission Docket No. AB5-598.

Enclosed please find two (2) copies of map covering the
aforesaid archaeological survey. I trust that you will
forward the map to the appropriate persons at Department
of Land and Natural Resources which initiated the request for
such a matter.

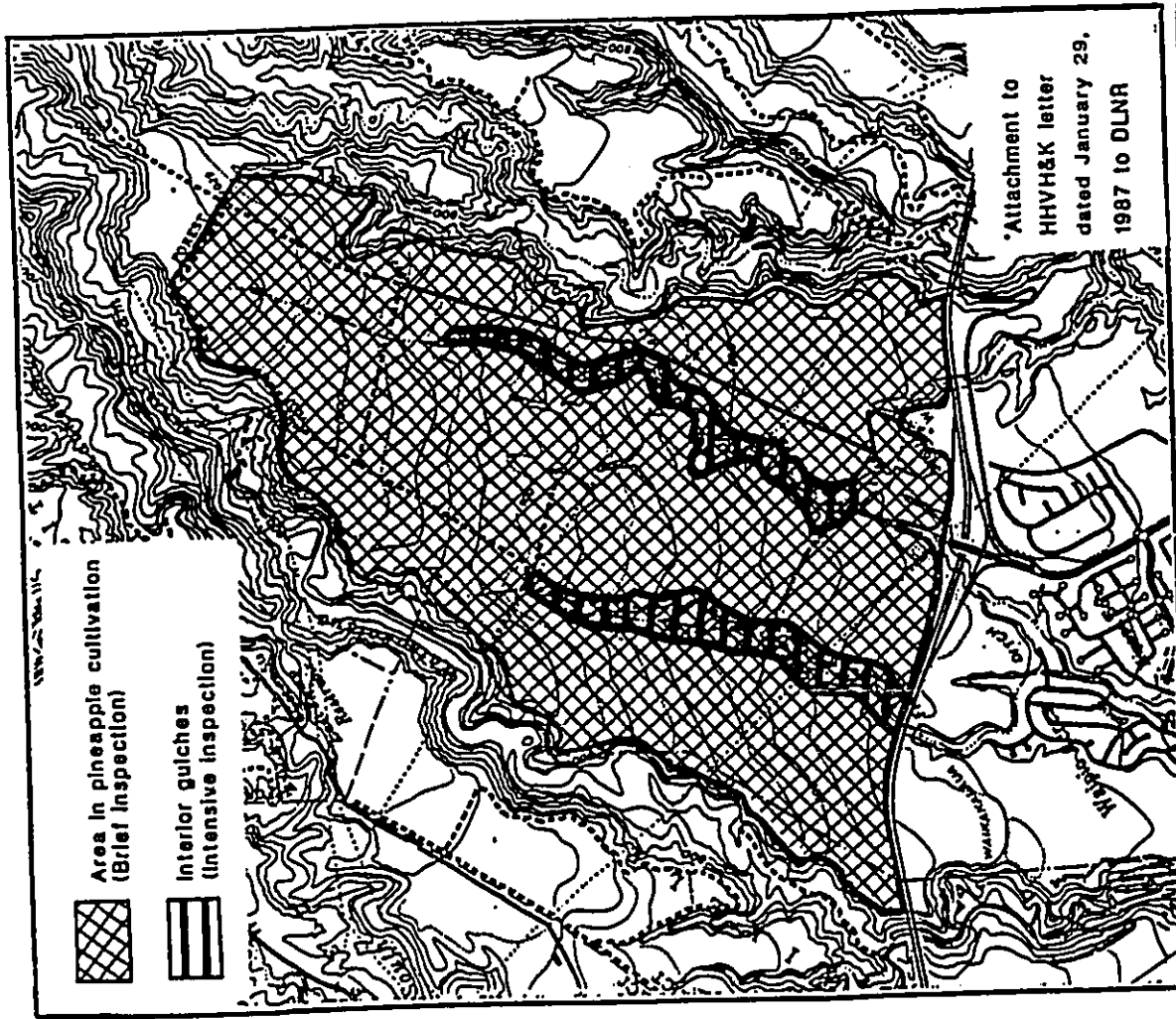
Yours very truly,

OKUMURA TAKUSHI FUNAKI & WEE
ATTORNEYS AT LAW
A LAW CORPORATION


James T. Funaki
Attorney for Milliani Town, Inc.

JTF/nmm
Enclosures
cc: Wallace Miyahira w/enclosure
Mark Hastert w/enclosure

Attachment to
HHVH&K letter
dated January 29,
1987 to DLNR



*Attachment to
HHVH&K letter
dated January 29,
1987 to DLNR

0' 1600'

 HELBER, HASTERT, VAN HORN & KIMURA
Professional Surveyors
1000 N. W. 10th St., Suite 100, Ft. Lauderdale, FL 33304

Archeological Survey
MILILANI-MAUKA
Chinago, Inc.

The Honorable Donald Clegg
Page 2
January 19, 1987

Water Supply

The discussion on water supply in Chapter VI should relate the anticipated water demand for Mililani-Haiku, both the 3.8 MGD average day demand and the 5.7 MGD maximum day demand, to the present 235 MGD maximum sustainable yield of the Pearl Harbor Ground Water Control Area. This should include a disclosure of the present available yield, the anticipated available yield, and whether the available yield can accommodate Mililani-Haiku's water demand. The Final EIS should also recognize future water demands from any subsequent Mililani expansion and/or possible increased water consumption from existing users.

On page VI-6 of the DEIS, the applicant indicates that all applicable approvals will be acquired from the appropriate State and County agencies prior to construction. The probable cumulative impacts of water withdrawal from the Pearl Harbor Basin are also discussed on the same page. The DEIS states, "The proposed 1,200-acre project represents less than 0.02 percent of the estimated 130 square miles of noncrop area overlying the Waianae and Koolau aquifers within the Pearl Harbor Ground Water Control Area." Burhoff will be directed to the on-site gulches whereby "a significant portion ... infiltrates into the ground." Additional information on the cumulative impacts of development projects already approved for Central Oahu is an important consideration, but was not provided and should be expanded upon.

Surface Water Runoff

Chapter IV-7 and Appendix B acknowledge that the project will increase the volume and flow rate of surface water runoff from the 1,200 acre site. However, there is no analysis of the increased sediment, nutrient, and pesticide load in the runoff into Kipapa Gulch, Maile Stream and finally Pearl Harbor. Pearl Harbor is a valuable estuarine ecosystem and is designated Class 2 waters by the State to be protected for the propagation and sustenance of fish, shellfish and wildlife, and also for recreational uses. It contains several ponds, marshes, mudflats and settling basins on the perimeter of the West and Middle Lochs which constitute important habitat and feeding grounds for endangered Hawaiian waterbirds - stilts, coots, gallinules and looloo. Pearl Harbor also contains a National Wildlife Refuge consisting of two separate units; the Pearl City Unit and the West Loch Unit. As an estuary, it is an important breeding ground for the Mahu which are used as bait by the Hawaii fishing industry. Increased surface water runoff from this development, as well as other existing and proposed upland developments may adversely affect the Pearl Harbor ecosystem. These CDA coastal ecosystem and economic concerns should be addressed in the Final EIS.

Ref. No. P-5752

January 19, 1987

RECEIVED

JAN 28 1987

WELLES, MASTUIT, YAM HOKI
& CONSULTANTS

The Honorable Donald Clegg
Chief Planning Officer
Department of General Planning
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Clegg:

Subject: Draft Environmental Impact Statement (DEIS) for
Mililani-Haiku Residential Community, Mililani, Oahu

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

Background Information

The applicant proposes to develop approximately 1,200 acres south of Mililani Town in Central Oahu for the following Development Plan land use categories: Residential, Low Density Apartment, Commercial, Parks and Recreation, Public and Preservation. The property is currently under pineapple cultivation and within the State Agricultural District.

The subject DEIS is part of an application to amend the Central Oahu Development Plan from the present City and County Agricultural designation. The proposed Mililani-Haiku Residential Community boundary amendment was previously denied by the Land Use Commission (LUC) on June 25, 1986, Docket No. A85-588. The position of the Department of Planning and Economic Development for this earlier boundary petition supported partial reclassification (60 acres) to the State Urban District with conditions.

Housing

The DEIS states on page II-20, "the applicant intends to provide at least 10 percent of the total number of units planned for Mililani-Haiku at prices affordable to households in the low-mid gap group categories." More detail is needed to assess what "low-mid gap group categories" of the population are involved, what the anticipated cost of the units will be, and when the units will actually become available.

The Honorable Donald Clees
Page 4
January 19, 1987

Alternatives Considered

Two alternative uses for portions of the project site, a retirement community and college/university, were explored and are discussed on page 11-21 of the DEIS.

Retirement Community - Market demand for a retirement community was assessed and provided in Appendix C of the DEIS. While this study did determine sufficient marketability for a project of this type, a mainland developer/operator of retirement communities felt the feasibility for the project was "overrated."

College/University - Approximately 100 acres of the site have been selected for the location of a college/university campus. Although no public or private institution has committed to locating on the project site, it is reported that discussions are underway. The need for an additional college or university campus in Central Oahu should be further substantiated.

Central Oahu Population Growth

The General Plan objective for population growth in the year 2005 would allow a population between 122,176 and 135,539 persons. The DEIS estimates on page 111-12 that "The additional population attributable to the proposed Mililani-Huaka development (approximately 21,000) would exceed this range." The applicant feels that this is a broad guideline and should not be used as a determining factor. The DEIS goes on to state that a General Plan amendment is pending which would allow for population growth of this size in Central Oahu.

Aircraft Noise

The current policy of the State Department of Transportation is the recommendation of the use of the 60 Ldn noise contour as the demarcation beyond which noise sensitive uses should be discouraged. The Final EIS should address the compatibility of the proposed project to the existing and future aircraft operations at Wheeler Air Force Base.

The Hawaii State Plan

Section 104, HRS, refers to Priority Guidelines of the Hawaii State Plan, not objectives, policies and implementing actions. This clarification should be made on page 111-2.

The Honorable Donald Clees
Page 5
January 19, 1987

Water Quality

The proposed new well sources located near the 1,190-foot elevation are made of agricultural fields. Therefore, pesticide contamination of the proposed wells is not anticipated. Should the well water be contaminated, the DEIS states that additional source development or water treatment will be funded by the developer. The possible contamination of groundwater from agricultural as well as urban uses in Central Oahu should be further discussed. Water quality monitoring procedures to ensure early detection of pesticides should also be discussed.

Historical and Archaeological Resources

Page IV-28 of the DEIS states, "In the event that any previously unidentified sites or remains are encountered, work in the immediate area will cease until the State Historic Preservation Officer has been notified and is able to assess the impact and make further recommendations for mitigative activity, if warranted."

Waikakala and Kipepe Valley Trails

The DEIS does not appear to address public access to the Waikakala and Kipepe Valley Trails, nor the trails on the surrounding ridge tops. A statement indicating the intention of the applicant should be provided.

Improvements to Mililani Interchange

Pages VI-1 thru VI-4 clearly indicate that development of the Mililani-Huaka Residential Community will dramatically impact existing traffic conditions and transportation facilities. The DEIS recommends several methods to improve access to and from H-2 including ramp widening, additional loop ramps on both sides of H-2, an additional land in each direction between the Mililani and Waiala Interchanges, and installation of traffic signals. The Final EIS should indicate when and how these improvements will be funded.

The cumulative impacts to downstream traffic conditions and the need for a transportation coordinator, as previously recommended by DPED to the LUC, should be addressed.

Mitigation of Agricultural Impacts

The DEIS states on page IV-11, that the production of pineapple on the project site will be phased out as development progresses and that, "Pineapple lands to be converted to urban uses have been replaced through lease arrangements with Waiala Sugar Company." Additional information should be provided to determine where these replacement lands are located, whether they are equivalent in productivity, and how long these fields will be in production. It should be noted that relocation of pineapple production will not replace agricultural lands lost irrevocably to urban development.

The Honorable Donald Clegg
Page 5
January 19, 1987

Thank you for the opportunity to comment on the subject document.
We would also appreciate receiving a copy of the final EIS.

Sincerely,

Roger A. Ulveling

cc: Mr. Mark Hastert
Hulber, Hastert & Kimura, Inc.
bcc: Coastal Zone Management
Land Use Division

February 2, 1987

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

Dear Mr. Ulveling:

Mililani-Maaka Residential Community
Environmental Impact Statement (EIS)
Mililani, Oahu, Hawaii
TMKS 9-3-01: par. 1; 9-3-02: par. 1

Thank you for your letter of January 19, 1987 to Mr. Donald A. Clegg, Chief Planning Officer, Honolulu Department of General Planning, regarding the referenced report. Our comments are as follows:

A. Housing

As noted in the EIS, the major market projected for the Mililani-Maaka community will be similar to that of Mililani Town - the "middle market". Current home prices in Mililani range from a low of \$35,000 (leasehold condominium apartments) to a high of over \$200,000 ("executive" homes). The average sales price of a new single family home in Mililani in 1985 was \$154,367. (This was slightly greater than the Oahu-wide average of \$147,093).

The leasehold condominium apartments referred to above (Mililani Terrace Apartments) were built in cooperation with the City and County of Honolulu as part of a continuing effort to provide affordable housing to island families.

The provision of affordable housing* by private developers (such as the applicant) must be closely coordinated with the appropriate State and County agencies. Definitions of particular subgroups (i.e. gap-group, moderate- and low-income, etc) change with fluctuations in the economy resulting in changes in available incomes. Targeting houses to meet the demands of these groups, well in advance of making actual deliveries, is thus akin to "shooting at a moving target." The need for housing expressed by a particular subgroup also changes over time. Therefore, long range projections of costs and deliveries are not warranted. The applicant is cognizant of its responsibility to provide affordable housing and will make every effort to coordinate its activities with the appropriate government agencies to see that this responsibility is executed. At this time in the planning process, it is difficult to predict what the anticipated costs of these housing units will be or when they will be provided. As the proposed action moves through the State and County land use processes however, the applicant will be able to provide more detailed information on costs and availability.

* referred to here as all housing not provided in the open market - subject to income restrictions and other conditions as directed by government agencies.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

B. Water Supply
As noted in Section 6.2.1 of the EIS, the "available" yield of the Koolau subdistrict of the Pearl Harbor Ground Water Control Area (GWCA) is 0.090 mgd. As noted in the EIS (p. VI-7) several methods are available to assure adequate water supply for the proposed action. These include detaining pumping rights from other sources within the basin; reducing the quantity of water transported out of the basin to compensate for the mauka area water requirement; and/or importing water to the basin.

The dynamics of ground water recharge are complex and beyond the scope of this report. The cumulative impact of urbanization on the sustainable yield of the Pearl Harbor Aquifer are more appropriately the responsibility of the State and County water agencies (DLNR and BWS).

As you are aware, the Pearl Harbor GWCA was designated for State regulation by the Board of Land and Natural Resources (BLNR) in September 1979 under authority of Chapter 177, HRS, and the DLNR Regulation 9. The BLNR was charged with protecting the sustainable yield of the Pearl Harbor Aquifer. Thus it is ultimately the responsibility of BLNR to insure that the aquifer is not overdrawn. The DLNR is aware of the proposed action and is presently re-evaluating the availability of water within the Pearl Harbor GWCA.

As an aside, the long term outlook for the sugar industry - a major user of water from the Pearl Harbor GWCA (93.5 mgd in 1984) will, conservatively, follow past trends. Increased operational and management efficiency accompanied with a gradual withdrawal from outlying fields will continue to reduce agricultural demands on the Pearl Harbor GWCA.

C. Surface Water Runoff

Your comments concerning the potential water quality impacts of surface water generated at the project site are noted. The Final EIS has been revised to include a discussion of these potential impacts. (Section 4.7).

It should be noted that the Aquatic Resources Division of the DLNR has stated that "The project is not expected to adversely affect aquatic resource values in the Waikakalua and Kipapa Gulches, Waikete Stream, and Pearl Harbor, providing mitigating measures to control erosion, and proposed wastewater disposal and storm runoff drainage improvements are compiled with." (p. XIII-13)

D. Water Quality

The contamination of ground water in Central Oahu has been well documented in numerous reports and studies. The proposed source, storage and distribution system to serve Mililani-Mauka must be approved by the Director of the Department of Health (DOH) except when approval authority is delegated to the Board of Water Supply (BWS). Upon completion, the entire water system will be dedicated to the BWS. As you are aware, both the DOH and BWS have taken lead roles in designing and implementing water quality monitoring procedures to ensure early detection of water pollutants.

E. Waikakalua and Kioapa Valley Trails

Lands mauka of the project site are under different private ownership, thus the provision of access to mauka trails is beyond the control of the applicant. The Waikakalua and Kipapa valley walls are very steep and access to the valley floors is difficult. Any existing agricultural roadways providing access to the valley floors will be investigated for future public access subject to safety consideration and the permission of adjacent landowners.

F. Improvements to the Mililani-Mauka Interchange

The applicant will be funding the improvements to the Mililani Interchange as noted on page VI-3 of the EIS. As noted on page VI-2, the existing interchange capacity will be exceeded at approximately 64 percent build-out of Mililani-Mauka (4,200 units). Assuming historical production rates (about 400 units/year) and a 1991 start for the mauka project, major improvements will be required to the interchange by 2001.

The applicant has taken the lead in addressing regional transportation problems. A detailed analysis of projected development in Central and Leeward Oahu and its impact on traffic congestion in the H-1 transportation corridor was conducted by the applicant and presented to State and County transportation agencies (Central and Leeward Oahu Transportation Study - 1986). This report was discussed in the EIS and the executive summary was included as Appendix F.

As noted in the EIS, the Mililani Mauka project will include a 6-acre "park-and-ride" facility. This will be an area where residents of Mililani will be able to park (or be dropped off) and join car and van pools and City express buses for their commute to work. A community transportation manager will be hired to promote and facilitate ride-sharing and bus riding by the Mililani community.

G. Mitigation of Agricultural Impacts

As noted on page I-3 of the EIS, pineapple production has been shifted to more productive lands in the Whitmore/Halemano area. These lands are comprised of former sugar lands, released through lease renegotiations with Waihua Sugar Company, and previously followed pineapple lands. Castle and Cooke, Inc. has designated these lands as part of their prime agricultural landholdings and they expect these fields will remain in production for the foreseeable future.

H. Aircraft Noise

As noted on page IV-3, the Air Force and the Army are in the process of conducting noise studies to determine off-base impacts of Wheeler aircraft operations. A noise study conducted on the immediately adjacent property (site of the proposed Hawaii Technology Park) found ambient noise levels to be in the 45-50 Ldn range (Section 4.9). Data recently supplied by the Corps of Engineers corroborates the Hawaii Technology Park noise study findings indicating that, in general, ambient noise levels on the Mililani-Mauka site are less than 50 Ldn.

Mr. Roger A. Ulveling
February 2, 1987
Page 4

The applicant recognizes the important contribution to the State and local economy made by the military. Personnel and dependents of the major military installations on Oahu provide a significant segment of the overall market demand for houses in Mililani, as well as other Central Oahu developments. The applicant is and will continue to coordinate the development of the mauka site with the applicable Air Force and Army agencies and will make every effort to see that their concerns are addressed.

We hope that your concerns have been adequately addressed in this letter. Your letter together with our response will be reproduced in the Final EIS.

Sincerely,

HELBER, HASTERT, VAN HORN & KIMURA, Planners



Thomas A. Fee
Project Planner

TAF/lh

cc: Honolulu Department of General Planning

John D. Waihee
Executive Director



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

RUSSELL N. FUKUMOTO
EXECUTIVE DIRECTOR

BY REPLY REFER

TO:
87:PLNG/256

January 20, 1987

RECEIVED
JAN 23 1987

HELBER, HASTERT, VAN HORN
& KIMURA PLANNERS

Mr. Donald A. Clegg, Chief Planning Officer
Department of General Planning
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Clegg:

Thank you for the opportunity to review and comment on the draft Environmental Impact Statement for Mililani-Mauka Residential Community on Oahu.

The Hawaii Housing Authority has no comments to offer at this time regarding this project.

Sincerely,

RUSSELL N. FUKUMOTO
Executive Director

cc: Mr. Thomas A. Fee
Helber, Hastert, Van Horn & Kimura, Planners

January 29, 1987

Mr. Russell N. Fukumoto,
Executive Director
Hawaii Housing Authority
State of Hawaii
Department of Social Services and Housing
P.O. Box 17907
Honolulu, Hawaii 96817

Dear Mr. Fukumoto:

Mililani-Mauka Residential Community
Environmental Impact Statement (EIS)
Mililani, Oahu, Hawaii
TMKs 9-5-01; por. 1; 9-5-02; por. 1

Thank you for your letter of January 20, 1987 to Mr. Donald A. Clegg, Chief Planning Officer, Honolulu Department of General Planning, regarding the referenced report.

Your letter will be reproduced in the Final EIS together with this response.
Sincerely,

HELBER, HASTERT, VAN HORN & KIMURA, Planners

Thomas A. Fee
Project Planner

TAF/lh

cc: Honolulu Department of General Planning

5913

STP 8.1821

January 29, 1987

RECEIVED
JAN 29 1987

HEIDER, KATZEL, VAN HORN
& COMPANY PLANNERS

Mr. Donald Clegg
Chief Planning Officer
Department of General Planning
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Clegg:

Millilani-Mauka Draft EIS

After reviewing the subject draft EIS, we have the following comments to offer:

1. The present configuration of Millilani Interchange and H-2 cannot accommodate the entire traffic generated by the proposed development. Additional carrying capacity must be provided.
2. We are extremely concerned about the collective effects of Millilani Town and other large developments in Central Oahu and Kua on the downstream sections of the highway system. The Pearl City Corridor is extremely congested and traffic on the H-1/H-2 Junction (Waiala Interchange) will continue to deteriorate. The highway program may not be able to fund all the necessary improvements in a timely manner if all proposed developments are approved. Therefore, different methods to obtain developer assistance are being considered.

Because of these concerns, we are recommending that the following conditions be imposed on the developer:

1. The Developer shall fund and construct the necessary improvements to the Millilani Interchange, including two new loop ramps and any other improvements needed to accommodate traffic generated by the development. The plans of the improvements and their construction schedule will be acceptable and subject to the approval of the State DOT. Timing of improvements should be

consistent with the actual traffic growth. Monitoring of the traffic by conducting traffic studies can be used as the basis for binding the developer to the completion of roadway improvements prior to approval of further units.

2. The Developer shall appoint and fund a community transportation manager whose function is to promote and facilitate ridesharing and bus riding by the Millilani town community. The Developer shall also construct and maintain a park-and-ride facility and fund other activities to encourage transit use and ridesharing. This condition shall also be implemented on a schedule acceptable and subject to the approval of the State DOT.

Thank you for this opportunity to provide comments.

Very truly yours,



Edward Y. Hirata
Director of Transportation

EH:ko

cc: HWY, STP(dt)
Mr. Thomas A. Fee,
Heiber, Bastert, Van Horn & Kimura

February 2, 1987

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

Dear Mr. Hirata:

Mililani-Maui Residential Community
Environmental Impact Statement (EIS)
Mililani, Oahu, Hawaii
TMKs 9-5-01; por. 1; 9-5-02; por. 1

Thank you for your letter of January 29, 1987 to Mr. Donald A. Clegg, Chief Planning Officer, Honolulu Department of General Planning, regarding the referenced report. Our comments are as follows:

The applicant is cognizant of the regional transportation problem facing Oahu motorists. Because of the direct relationship between residential development and traffic generation, the applicant is proposing a number of capacity-increasing and demand-reduction strategies to mitigate the traffic impacts of the mauka development.

As you are aware, the applicant will be increasing the capacity of the Mililani Interchange (p. VI-3) to accommodate the increased traffic generated by the mauka development. The applicant will also be participating in the funding of the proposed Waipio Interchange. In addition, discussions between your agency and the applicant have begun regarding the feasibility of realigning a segment of Kamehameha Highway between Mililani and Crestview.

The applicant will appoint and fund a community transportation manager (as indicated in your letter) who will promote and facilitate ridesharing and bus riding by the Mililani Town community. The applicant will also construct and maintain a park-and-ride facility and will promote other activities to encourage transit use and ridesharing. The applicant will reconvene the Mililani-Maui advisory committee in the near future and designate a transportation subcommittee to provide community input into the design and implementation of demand reduction programs.

The applicant realizes the importance of close coordination of its transportation planning with that of your agency and the County Department of Transportation Services (DTS).

We hope the information presented in this letter has addressed your concerns. You comment together with this response will be reprinted in the EIS.

Sincerely,

HELBER, HASTERT, VAN HORN & KIMURA, Planners


Thomas A. Fee
Project Planner

TAF/lb
cc: Honolulu Department of General Planning



University of Hawaii at Manoa

January 21, 1987

Environmental Center
Crawford 317 • 2550 Campus Road
Honolulu, Hawaii 96822
Telephone (808) 948-7281

RE: 0456

Mr. Donald A. Clegg, Chief Planning Officer
Department of General Planning
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

RECEIVED

JAN 23 1987

HELEN, MARY, VAN WONG
& KIMBERLY PLUMMER

Dear Mr. Clegg:

Draft Environmental Impact Statement
Milliani-Mauka Residential Community
Milliani, Oahu

The above cited document addresses the environmental impacts relative to the development of a residential community on 1200 acres of agriculturally designated land in Milliani, Oahu. The review was prepared with the assistance of Blon Griffin, Anthropology; Jon Matsuoka, Social Work; Frank Scott, Agriculture and Research Economics; and Michael Tokushige, Environmental Center.

Impacts on the Physical Environment, Chapter IV

Page IV-6.4.6. We suggest that a more detailed description be provided in the Final EIS of the Soil Conservation Service (SCS) soil classifications for the project area, including the number of acres of each soil type and productivity classifications of I to VIII. SCS Classifications are generally more detailed and site specific than those provided by the Land Study Bureau (LSB).

Page IV-10.4.6. The Castle and Cooke Agricultural Land Hierarchy study is in Appendix I, not Appendix J.

Page IV-10.11.4.6. Probable impacts and mitigating measures should address (1) potential alternative crops in addition to pineapple and (2) probable effects on the future of agriculture on Oahu if the subject land is taken out of agriculture. Much of the required information is provided in the Agricultural Land Hierarchy Study, but relevant findings should be highlighted in the body of the EIS Report. While it is likely that the subject land is not essential for agriculture, nevertheless the EIS should address this issue in a thorough, objective, and comprehensive manner.

Socio-Economic Benefits and Impacts, Chapter V

Page VI.3. The socio-economic impacts of the proposed development are discussed with respect to economy, employment, population and housing. Generalized statements are made with regard to property tax valuations, and the percentage of people employed in various industries in the existing Milliani development. The discussion on housing is seriously flawed

AN EQUAL OPPORTUNITY EMPLOYER

Mr. Donald A. Clegg

-2-

January 21, 1987

however as there is no indication of the estimated price of the houses to be built and consequently no way to evaluate the potential market and hence social impact.

The general assumption is made that many of the potential home owners will find work at the Hawaii Technology Park, West Beach or Kuliama. Of the jobs that will be generated from West Beach and Kuliama, a high number will be of the low pay-service type. It is difficult to predict if these jobs will provide incomes sufficient for home buying in this area. No information is available as to the expected income or number of jobs at the Hawaii Technology Park.

The DEIS suggests that many of the present "renters" will be the future home buyers. It should be noted however that people rent for a variety of reasons, including short term stays in the islands, changing business commitments, and lack of qualified income to purchase. To judge how many renters will become buyers one would certainly need to know the price of the houses as well as the incomes and occupations of the renters. No such data is given.

Impacts on Public Facilities and Services, Chapter VI

Page VI-9.6.5. The Draft EIS states that if Waipahu incinerator cannot handle the waste produced, then Palalii sanitary landfill will be the alternative disposal site. The Final EIS should indicate what the estimated solid waste load will be from this project, the amounts that can be handled by the Waipahu incinerator and Palalii landfill and how the projects waste will impact these disposal sites.

Page VI-12.6.10. The discussion of the effects of the proposed development on the schools in the Milliani-Mauka area is particularly vague. Information should be provided in the Final EIS as to current enrollments at the various schools that would be affected by this development and their potential ability, in terms of available land area, to expand to meet the new enrollment needs. Frequently such expansion involves a considerable time lag between the time the facility is needed and the time construction is actually completed and the classrooms occupied. Table 10 lists public school enrollment projections for the project but the projections are so broad as to be quite meaningless from a planning or evaluating perspective. The only recognition of High School needs is found in a single sentence that states that additional classrooms may be required to accommodate the additional enrollment at Milliani High School. It should be recognized that intermediate and High School needs cannot be easily and quickly met when major enrollment changes occur. Laboratory and Shop facilities are extremely costly and difficult to expand quickly. High enrollment frequently strains these types of facilities and may significantly reduce the effectiveness of the students education in these areas. Crowded campuses and facilities also encourage negative social behaviors and may lead to higher vandalism and crime rates on the campus' involved. We are pleased to note that close coordination with the DOE is being maintained as this is a community issue of great concern.

Mr. Donald A. Clegg

-3-

January 21, 1987

Water System P. VI-5.6

The Draft EIS discusses the need for additional wells from the Pearl Harbor basal water lens to provide potable water for the project. Mention is also made of the need to channel runoff water to Kipapa Gulch. The project will reduce the infiltrate area, due to paving and housing construction, and thereby increase runoff. Efforts should be made to encourage recharge through artificial ponds or other water diversions to minimize direct flows to the gulch and sea.

We appreciate the opportunity to comment on this DEIS.

Sincerely,

Jacquelin N. Miller

Acting Associate Director

cc DEQC

Stephen Lau

Thomas A. Fee

Bion Griffin

Jon Matsuoka

Frank Scott

Michael Tokushige

February 2, 1987

Ms. Jacquelin N. Miller
Acting Associate Director
Environmental Center
University of Hawaii at Manoa
State of Hawaii
Crawford 317
2550 Campus Road
Honolulu, Hawaii 96822

Dear Ms. Miller:

Mililani-Manuka Residential Community
Draft Environmental Impact Statement (DEIS)
Mililani, Oahu, Hawaii
THMs 9-5-01; por. 1; 9-5-02; por. 1

Thank you for your letter of January 21, 1987 to Mr. Donald A. Clegg, Chief Planning Officer, Honolulu Department of General Planning regarding the referenced report. Our response to your comments is as follows:

A. Impacts on the Physical Environment, Chapter IV

1. Request for SCS soil classification for the project site, including acreages for each soil type and related productivity classification.
Response. Your comment is noted and we have included this information in Section IV, pp. 6-9 of the EIS.

2. Request for discussion of potential alternative crops in addition to pineapple and probable effects on the future of agriculture on Oahu if the subject land is taken out of agriculture.
Response. The Hierarchy of Agricultural Lands Study (Appendix I) was prepared in March 1984 by Castle & Cooke, Inc. to review and update long-range regional land use policies and plans for Castle & Cooke's Central Oahu lands as they relate to agriculture' (p. I-3). The report analyzed climate, crop suitability, soils, terrain and water availability to evaluate long-term agricultural policy. The study pointed out that sugar, pineapple and diversified crops each have specific ecological ranges for economical cultivation and, each have an economical production zone. The drier, lower and intermediate elevation fields which have high insolation (sunlight) and economical irrigation capability are considered to be the best economical production zones and therefore, the company's prime agricultural lands. The moisture stress prevalent in the higher elevation fields which include the project site (incurred by plants during periods of low rainfall where alternative irrigation is unavailable), the lack of available irrigation water, soil condition (i.e. moisture content of soil and its propensity to compact), and problems with control of nematodes (a microscopic organism that

feeds on the roots of pineapple and a wide variety of other plants) are cited as major reasons for the withdrawal of agricultural operations at the Miliilani-Mauka site.

The report analyzed the potential of diversified crops on the site, including vegetable crops (leafy vegetables, tomatoes, melons and cucumbers), ornamental greenhouse crops (foliage plants and flowers), papayas, and macadamia nuts. Vegetable crop farming in the mauka fields is unsuitable because of susceptibility to moisture stress, to fungus and bacteria that thrive in moist soils (including nematodes) and birds and vermin that are prevalent in the forest reserves bordering the upper fields. Ornamental greenhouse crops are usually grown in specialized media and not soil. They also require areas with high insulation and a supply of clean irrigation water--features which are not characteristic of the subject site. Commercial production of papayas could be hampered by the prevalence of the mosaic virus in Central Oahu. Drip irrigation is required for the economical production of both papayas and macadamia.

In summarizing the report, the authors note that one conclusion has been firmly established: "On Oahu, any meaningful diversified crop activity would require irrigation." As noted, the Miliilani-Mauka site cannot be economically irrigated and therefore is not suitable for diversified crop production.

Notwithstanding these findings of agricultural unsuitability, the entire site has been identified as "important agricultural land" by the LESA Commission and the gradual withdrawal of agricultural uses at the site will either require a reevaluation of the amount of "important agricultural lands" needed on the island of Oahu and/or the inclusion of additional (previously unidentified) lands to replace the loss of the project area.

B. Socio-Economic Benefits and Impacts, Chapter V

1. Request for information on estimated price of houses to be built and potential housing market.

Response: The exact prices of the proposed Miliilani-Mauka housing product are difficult to predict at the present time, largely due to the uncertainties involved in identifying the period in which home sales would commence (due to the exigencies of the land use regulatory approval process). As noted on pps. II-20 and V-3, the homes (and associated values) in Miliilani-Mauka will be comparable to those in the completed Miliilani Town. The homes will continue to be priced to attract those in the middle of the homebuying market" (p. II-20). Currently, Miliilani Town Inc. (MTI) offers a number of different housing products ranging from a 760 square foot, 2-bedroom, 1-bath, single family "starter home" currently selling for an average price of \$123,000, to 2,000 square-foot-plus, 3 and 4 bedroom, "Executive" homes priced in excess of \$300,000. In 1985, the average sales price of a new single family detached house in Miliilani was \$154,562 (this was slightly more than the Oahu-wide average as reported by the Research Section of the Bank of Hawaii for the comparable product: \$147,093). The Miliilani Terrace Apartments, consisting of one- and two-bedroom leasehold condominium apartments, have recently been developed and marketed by MTI in

cooperation with the City and County of Honolulu in an effort to meet the needs of the low and moderate income housing market.

2. Clarification of "assumption" regarding employment of potential home owners and "suggestions" that present "renters" will be the future homebuyers.

Response: A major finding of the Central and Leeward Oahu Transportation Study (Appendix F) prepared by the applicant was that continued residential development in Central Oahu will require a faster rate of employment growth in the area (the high employment/moderate residential growth scenario). An employment study (Potential Year 2001 Employment Levels for Oahu's Central, Leeward, and North Shore Areas) prepared in conjunction with the transportation study projected a significant increase in primary employment opportunities within tourism and high technology industries within the employment study area (p. V-2).

It is projected that the growth in primary jobs and the related growth in secondary support services will provide significant impetus for continued housing development at Miliilani. Moreover, because of the amenities offered within this planned community, homebuyers will continue to be attracted to the area from other areas of Oahu, such as from urban Honolulu.

Renters occupy approximately 58 percent of the Oahu housing stock (the balance--42 percent--being owner-occupied). The continued production of housing at Miliilani is unlikely to change the proportion of renters in the housing market for many of the reasons cited in your letter. The act of renting is also conventionally considered a "life-cycle" phase--young singles or recently-married couples may choose to rent (or live at home) until such time as their incomes and savings increase to the point at which they can afford to buy a home (and in doing so share in the significant tax savings inherent in home ownership). Thus, at least from the "life-cycle" perspective, renters are potential homebuyers. Information from area real estate brokers indicates a number of repeat purchasers within the Miliilani area. A couple may first rent or purchase one of the smaller starter homes within Miliilani. Within a few years, as incomes and family size increase, the family often "trades-up" to larger, more expensive homes or, in the case of renters, a decision to purchase may be made.

C. Impacts on Public Facilities and Services, Chapter VI

1. Request for information on: (a) estimated solid waste generation; (b) amounts that can be handled by the Waipahu incinerator and Pataliai landfill; and, (c) impact of project waste on these sites.

Response: Your comment has been noted and we have included the information in Section 6.5 of the EIS.

2. Request for expanded discussion of the effects of the proposed development on schools in the Miliilani-Mauka service area.

Response: The applicant, in close coordination with the Department of Education (DOE), has identified the need for two elementary schools and one

Ms. Jacqueline N. Miller
February 2, 1987
Page 4

intermediate school to meet the needs of the Mililani-Maui community (p. VI-12). Sites for these facilities have been identified (Figure 3, p. II-9) and will be preserved for school uses. In addition, the DOE projects that additional classrooms will be required at the Mililani High School as a result of project development. Your comments concerning the complexities involved in educational facilities planning are noted and have been confirmed by DOE facilities planners. The applicant is aware of the importance of lead-time for the planning of such facilities and will continue to work closely with DOE facilities planners to keep them advised of development scheduling.

D. Water System

1. *Efforts should be made to encourage recharge (of storm runoff) through artificial ponds or other water diversions to minimize direct flows to the gulch and to the sea.*

Response: It should be noted that the Department of Public Works has accepted the Preliminary Drainage Report presented in the EIS as Appendix E (p. E-27) in their report. The use of retention basins at the project site is of limited use, primarily due to the relatively small upstream tributary area. Two basins are proposed for the site (see Figure 8) located within the two gulches transecting the site. These basins will serve to dampen peak runoff flows and thereby reduce downstream impacts. In closing, it should be noted that the Waikakala, Kipapa and Waikole Stream beds, together with smaller tributary gulches, provide a major infiltrate area for groundwater recharge and will continue to do so.

We hope we have adequately addressed your concerns. We again thank you for your thorough review of the Draft EIS and the comments provided. Please do not hesitate to contact us if we can be of further assistance. Your letter together with our response will be reproduced in the Final EIS.

Sincerely,

HELBER, HASTERT, VAN HORN & KIMURA, Planners


Thomas A. Fee
Project Planner

TAF/lh

cc: Honolulu Department of General Planning



University of Hawaii at Manoa

Water Resources Research Center
Holmes Hall 283 - 2540 Dole Street
Honolulu, Hawaii 96822

22 January 1987

Mr. Donald A. Clegg
Chief Planning Officer
Department of General Planning
City & County of Honolulu
650 South King Street
Honolulu, HI 96813

Dear Mr. Clegg:

SUBJECT: Draft Environmental Impact Statement, Milliani Mauks,
Milliani, Oahu, Hawaii

We have reviewed the subject DEIS and offer the following general comment regarding runoff and its disposal thereof.

We are entering a new era in which urban development is increasingly taking place in recharge areas of the sensitive Pearl Harbor basal aquifer, which heretofore was in agricultural use. This trend will of course, reduce infiltrative surfaces by covering them with impermeable buildings and pavement. It seems probable, therefore, that some means of retention to facilitate recharge would be desirable as opposed to existing practices of removing runoff as expeditiously as possible. Retention of course will reduce problems downstream also, inasmuch as urbanization tends to increase damaging peak flow among other things. Not all runoff can be retained because some storms discharge so much water that they cannot be held. But what is needed is a change in thinking from "runoff" as something to be gotten rid of as rapidly as possible before it does any damage, to "water" how can we control and use it for our benefit? This will require innovative and creative ideas because of its departure from past standard operating procedures.

Thank you for the opportunity to comment. This material was reviewed by WRRC personnel.

Sincerely,

Edwin T. Murebayashi
EIS Coordinator

ETM:jm

cc: T.A. Fee, HHVH & K

AN EQUAL OPPORTUNITY EMPLOYER

February 2, 1987

Mr. Edwin T. Murebayashi,
EIS Coordinator
University of Hawaii at Manoa
Water Resources Research Center
Holmes Hall 283
2540 Dole Street
Honolulu, Hawaii 96822

Dear Mr. Murebayashi:

Milliani-Mauks Residential Community
Environmental Impact Statement (EIS)
Milliani, Oahu, Hawaii
TMKs 9-5-01: por. 1; 9-5-02: por. 1

Thank you for your letter of January 22, 1987 to Mr. Donald A. Clegg, Chief Planning Officer, Honolulu Department of General Planning, regarding the referenced report.

We concur with your comments about reconceptualizing storm water from something that must be quickly disposed of to a potential resource (for ground water replenishment, recreation and aesthetic purposes, etc.).

The use of retention basins at the project site is of limited use, primarily due to the limited upstream tributary area. Two basins are proposed for the site (see Figure 8) located within each of the two gulches. As you pointed out, those basins will serve to dampen peak runoff flows and thereby reduce downstream impacts. In closing, it should be noted that the Waikakala, Kipapa and Waialeale streambeds, together with small tributary gulches, currently provide a major infiltrate area for groundwater recharge, and will continue to do so.

Your letter will be reproduced in the Final EIS together with this response.

Sincerely,

HELBER, BASTERT, VAN HORN & KIMURA, Planners

Thomas A. Fee
Project Planner

TAF/lh

cc: Honolulu Department of General Planning

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

PB 87-29

January 15, 1987

RECEIVED

JAN 15 1987

HELBERT, HASTERT, VAN HORN & KIMURA PLANNERS

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

FROM: HERBERT K. MURAOKA
DIRECTOR AND BUILDING SUPERINTENDENT

SUBJECT: DRAFT EIS
MILILANI-MAUKA RESIDENTIAL COMMUNITY

We have reviewed the draft EIS for the proposed
Mililani-Mauka Residential Community and have no comments.

Thank you for the opportunity to review the draft EIS.

HERBERT K. MURAOKA
Director and Building Superintendent

cc: J. Thomas A. Fee (Helber, Hastert,
Van Horn & Kimura, Planners)
J. Harada

January 29, 1987

Mr. Herbert K. Muraoka,
Director and Building Superintendent
Building Department
City and County of Honolulu
630 South King Street
Honolulu, Hawaii 96813

Dear Mr. Muraoka:

Mililani-Mauka Residential Community
Environmental Impact Statement (EIS)
Mililani, Oahu, Hawaii
TMKs 9-5-01: por. 1; 9-5-02: por. 1

Thank you for your letter of January 15, 1987 to Mr. Donald A. Clegg, Chief
Planning Officer, Honolulu Department of General Planning, regarding the
referenced report.

Your letter will be reproduced in the Final EIS together with this response.

Sincerely,

HELBERT, HASTERT, VAN HORN & KIMURA, Planners



Thomas A. Fee
Project Planner

TAF/lh

cc: Honolulu Department of General Planning

RECEIVED

JAN 13 1987

HELBER, HASTERT, VAN HORN
& KIMURA PLANNERS

HONOLULU FIRE DEPARTMENT
1455 S. Beretania Street, Room 305
Honolulu, Hawaii 96814

January 12, 1987

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

FROM : FRANK K. KAHOOHANOHANO, FIRE CHIEF

SUBJECT: DRAFT EIS, HILILANI-HAUKA RESIDENTIAL COMMUNITY

We have reviewed the Draft EIS for the Hililani-Hauka Residential Community. In addition to a proposed ladder company at the Mahiwa Fire Station, we are projecting the need for additional facilities and equipment at Waiawa Ridge and Waialeale. This will further enhance fire protection capabilities for the proposed development in addition to the surrounding area.

Should you have any questions, please contact Battalion Chief Kenneth Word at local 3838.

Frank K. Kahooohanano
FRANK K. KAHOOHANO
Fire Chief

FKK/KAK:sv

cc: Mr. Thomas Fee
Helbert, Hastert, Van Horn and Kimura, Planners
Grosvenor Center, PBI tower
733 Bishop Street, Suite 2550
Honolulu, Hawaii 96813

January 29, 1987

Mr. Frank K. Kahooohanano, Fire Chief
Fire Department
City and County of Honolulu
1455 S. Beretania Street, Room 305
Honolulu, Hawaii 96814

Dear Mr. Kahooohanano:

Hililani-Hauka Residential Community
Environmental Impact Statement (EIS)
Mililani, Oahu, Hawaii
TMKs 9-5-01: por. 1; 9-5-02: por. 1

Thank you for your letter of January 12, 1987 to Mr. Donald A. Clegg, Chief Planning Officer, Honolulu Department of General Planning, regarding the referenced report.

The information you provided is appreciated and has been incorporated into the Final EIS.

Your letter will be reproduced in the Final EIS together with this response. Sincerely,

HELBER, HASTERT, VAN HORN & KIMURA, Planners

Thomas A. Fee

Thomas A. Fee
Project Planner

TAF/lh

cc: Honolulu Department of General Planning

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



DONALD A. CLEGG
Chief Planning Officer
600 SOUTH KING STREET
HONOLULU, HAWAII 96813
MM/DGP 1/87-1-55

January 22, 1987

RECEIVED

JAN 22 1987
MILILANI, MAUI, HI, 96706
GENERAL PLANNING

Mr. Thomas Fee
HHVHK
Grosvenor Center
PRI Tower, Suite 2590
733 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Fee:

Draft Environmental Impact Statement for the Millilani
Maui Residential Community, Millilani, Oahu

The Department of General Planning has reviewed the Draft
Environmental Impact Statement (DEIS) for the Millilani Maui
Residential Community. The department offers the following
comments:

Maui

According to the DEIS, the proposed project's population
estimate runs roughly 20% below that of the existing Millilani
Town. However, the projected water consumption is estimated at
nearly 20% more (in terms of average daily consumption) than
presently used by Millilani residents. It is not clear why such
a higher consumption rate is expected for the Millilani Maui
development.

Traffic

The DEIS notes that the Millilani Maui development will
have adverse impact on traffic not only in the Millilani area,
but also along the H-1 and H-2 corridors extending into the
PUC. We recognize that all major corridors on Oahu are
severely congested during peak hours hence any construction of
houses on Oahu will increase traffic congestion. We also
recognize that the solution is not to stop building houses but
rather to deal with the traffic problem. Several methods of

Mr. Thomas Fee
HHVHK
Page 2
January 22, 1987

keeping traffic volumes at an acceptable level are proposed in
the report; however, virtually all of these mitigating measures
would involve some inconvenience to the public at large (e.g.,
rationing gasoline or prohibiting single occupant vehicles on
certain public roads). Moreover, some suggestions involve
placing an additional financial burden on the public either
directly through charging a toll on vehicles entering the PUC
or indirectly through higher taxes in order to pay for a Pearl
Harbor highway tunnel or double-decking the H-1 freeway. While
the DEIS notes that this situation may be improved in the short
term due to publicly funded improvements to H-1, the report
does not seem to place any responsibility for potential
long-term impacts on the applicant's development. The Final
Environmental Impact Statement (FEIS) should outline specific
programs to be implemented or financed by the developer to
reduce regional traffic impacts caused by the proposed
development.

Thank you for the opportunity to review this document.

Sincerely,

Donald Clegg
DONALD A. CLEGG
Chief Planning Officer

February 2, 1987

Mr. Donald A. Clegg,
Chief Planning Officer
Department of General Planning
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Clegg:

Mililani-Mauka Residential Community
Environmental Impact Statement (EIS)
Mililani, Oahu, Hawaii
TMK's 9-5-01: por. 1; 9-5-02: por. 1

Thank you for your letter of January 22, 1987 regarding the referenced report. Our comments are as follows:

- 1. Water**
The current average daily water consumption of Mililani Town is approximately 3.11 mgd. Given an existing residential population of 26,500, this equates to per capita consumption of approximately 120 gpd. The mauka development will ultimately house 21,000 residents. Projected water demand is determined in accordance with Board of Water Supply standards and is estimated at 3.8 mgd or approximately 180 gpd - a 50% increase in per capita consumption over the existing Mililani Town. The difference in consumption rates is therefore attributed to the margins built into the BWS standards.
- 2. Traffic**
We concur with your assessment that many of the mitigating measures proposed in the DEIS will ultimately involve some inconvenience to the public at large. This of course is not a problem unique to Oahu, but one shared by major metropolitan areas across the country. Hawaii is unique however, to the extent that the burden for developing and implementing demand reduction strategies falls on the residential sector rather than the business sector.
Regarding mitigation plans and programs, the applicant will be developing a park-and-ride facility at the project site. The facility should accommodate up to 600 vehicles at the 6-acre site. A community transportation manager will be hired to promote and facilitate ridesharing and bus riding by the Mililani community.
The applicant will be participating in the funding of the proposed Waipio Interchange and is discussing the possibility of realigning a segment of Kamehameha Highway between Mililani and Crestview in an effort to increase the capacity of the transportation system. As noted in the EIS, the applicant will also be funding the construction of the Mililani Interchange improvements.

Mr. Donald A. Clegg
February 2, 1987
Page 2

The applicant will be reconvening the Mililani-Mauka Community Advisory Committee shortly and intends to establish an advisory subcommittee on transportation. This group will provide community input into the development of specific programs to address the transportation problems and will work closely with the Neighborhood Board and community groups to involve a broad cross section of the community.

As you are aware, the State DOT has recently conducted an analysis of short and longer range transportation needs in the H-1 and H-2 corridors, and has recommended a phased set of improvements to increase the carrying capacity of the transportation system in those corridors. The applicant will continue to coordinate its activities with DOT and the City Department of Transportation Services.

We hope the information provided herein has addressed your concerns. Your letter and our response will be reproduced in the Final EIS.

Sincerely,

HELBER, HASTERT, VAN HORN & KIMURA, Planners



Thomas A. Fee
Project Planner

TAF/ih

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

800 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE: 933-6181



MICHAEL W. MOON
DIRECTOR

ROBERT M. HASTERT
CHIEF PLANNING OFFICER

January 14, 1987

RECEIVED
JAN 23 1987

MEMORANDUM

TO: Donald A. Clegg, Chief Planning Officer
Department of General Planning

FROM: Mike Moon

SUBJECT: Environmental Impact Statement for the Millilani-Mauka Residential Community
THK: 9-5-01: Por. I and 9-5-02: Por. I

HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

We appreciate the opportunity to review and comment upon the draft Environmental Impact Statement (EIS) for the proposed Millilani-Mauka Residential Community.

The Department's primary concern relates to the provision of housing opportunities for a range of income groups. The EIS states that the developer intends to target at least ten percent of the total number of units to be built in Millilani-Mauka for households in the low-mod to gap group income categories. The Department's current policy is to request that this set-aside be targeted solely to households of low- and moderate income or that the developer contribute in-kind toward the development of such housing. However, this policy is presently under review and the developer will be notified of any changes.

The Department also recommends that the EIS reevaluate the feasibility and marketability of the proposed retirement community in light of the proposed development of a similar community of much larger scale (4,000 units) at Gentry's proposed Waiala development. The retirement community at Waiala will compete for prospective residents from essentially the same primary market areas as Millilani-Mauka's retirement community and could have a major impact on its feasibility.

Thank you for the opportunity to provide these comments.

cc: Mr. Thomas A. Fee

Robert M. Moon
MIKE MOON

January 30, 1987

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

Dear Mr. Moon:

Millilani-Mauka Residential Community
Environmental Impact Statement (EIS)
Millilani, Oahu, Hawaii

THKs 9-5-01: por. I; 9-5-02: por. I

Thank you for your letter of January 14, 1987 to Mr. Donald A. Clegg, Chief Planning Officer, Honolulu Department of General Planning, regarding the referenced report.

Your comment concerning the proposed retirement community is noted. As discussed in the Draft EIS, the concept of a retirement community at Millilani-Mauka was originally suggested by members of the Millilani-Mauka Advisory Committee - the community organization providing input into the Millilani-Mauka master planning process. Although the preliminary market study (Appendix B) indicated market support, subsequent discussions with retirement community operators have indicated that this demand was overstated. In light of the scale of the proposed retirement community planned at Waiala, we concur with your assessment regarding the feasibility of developing a retirement community at Millilani-Mauka. The applicant will continue to assess the situation and will provide such housing if future market conditions warrant.

Your letter will be reproduced in the Final EIS together with this response.

Sincerely,

HELBER, HASTERT, VAN HORN & KIMURA, Planners

Thomas A. Fee
Thomas A. Fee
Project Planner

TAF/lb

cc: Honolulu Department of General Planning

DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
850 SOUTH KING STREET
HONOLULU, HAWAII 96813 (808) 538-6121

FRANK P. FARI
041004



LU12/86-7194 (BWH)

JOHN P. WHALEN
DIRECTOR

January 14, 1987

RECEIVED
JAN 16 1987
WHEELER, WASTNER, VAN ANKEN
& KUMAHARA PLANNERS

MEMORANDUM

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

FROM: JOHN P. WHALEN, DIRECTOR

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)
MILILANI MAUKA, RESIDENTIAL COMMUNITY
TAX MAP KEYS: 9-5-01: PORTION 1 AND 9-5-02: PORTION 2

We have reviewed your Draft EIS and have the following comments:

1. Tax Map Key (TMK)

The TMK numbers in the EIS Preparation Notice request for comments were listed as TMKs 7-3-09: 03 and 16. Please clarify the change.

2. Aircraft Noise

The aircraft noise levels from Wheeler Air Force Base operations are not estimated, although the text indicates that the projected noise levels will be well within Federal and State guidelines for average noise exposures for residential areas. The estimated Ldn levels should be noted.

3. Sewerage

It is indicated that the existing Mililani effluent line to Waipahu WWS will be able to accommodate the additional flows with the installation of equalization basins to control the

DONALD A. CLEGG, CHIEF PLANNING OFFICER
Page 2

flow into the line. Are any equalization basins of this scale currently in use in Hawaii? How reliable are these equalization basins?

4. Water

The DEIS notes that much of the water demand could be satisfied by reductions of sugar operations in the area, and that the Oahu Sugar Company's water allocation has been recertified to 92.5 mgd from 115 mgd, thereby freeing water for urban development.

It should be noted that there are some questions regarding water quality, since some plantation water sources are more saline than what is suitable for domestic use. It should also be noted that not all of the 22.5 mgd may be recoverable, if water quality standards are to be maintained.

Thank you for the opportunity to comment.

John P. Whalen
JOHN P. WHALEN
Director of Land Utilization

JPM:sl
0642B

cc: ✓ Thomas A. Fee

1 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32

Mr. John P. Whalen
February 2, 1987
Page 2

As applied to Mililani, the dampening of flow by utilizing an equalization basin is primarily directed at reducing peak flows during wet weather periods which enable the Mililani effluent line to accommodate projected wet weather flows. Currently, there are no equalization basins of this type used in Hawaii. However, the use of flow equalization is common in the continental United States, and according to EPA (EPA Technology Transfer Seminar Publication, Flow Equalization, May 1974), "an increasing number of plant designs are incorporating the use of equalization facilities for upgrading existing plants and construction of new plants."

Flow equalization for wastewater treatment plants and collection systems has been successfully employed in the following cities:

1. Ypsilanti Township, Michigan
2. Fond Du Lac, Wisconsin
3. Walled Lake-Novii, Michigan
4. Oakland County, Michigan
5. Newark, New York

The reliability of the equalization facility will depend on both the proper design of the storage basin to absorb the diurnal peak and the regular maintenance of automated pumping and aeration equipment. Maintenance is predicted to be similar to that of a typical wastewater pump station.

4. WAIEE
Your comments are noted.

Your letter will be reproduced in the Final EIS together with this response.

Sincerely,

HELBER, HASTERT, VAN HORN & KIMURA, Planners


Thomas A. Fee
Project Planner

TAF/ih

Enclosure
cc: Honolulu Department of General Planning

February 2, 1987

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

Dear Mr. Whalen:

Mililani-Mauka Residential Community
Environmental Impact Statement (EIS)
Mililani, Oahu, Hawaii

TMKs 9-5-01; por. 1; 9-5-02; por. 1

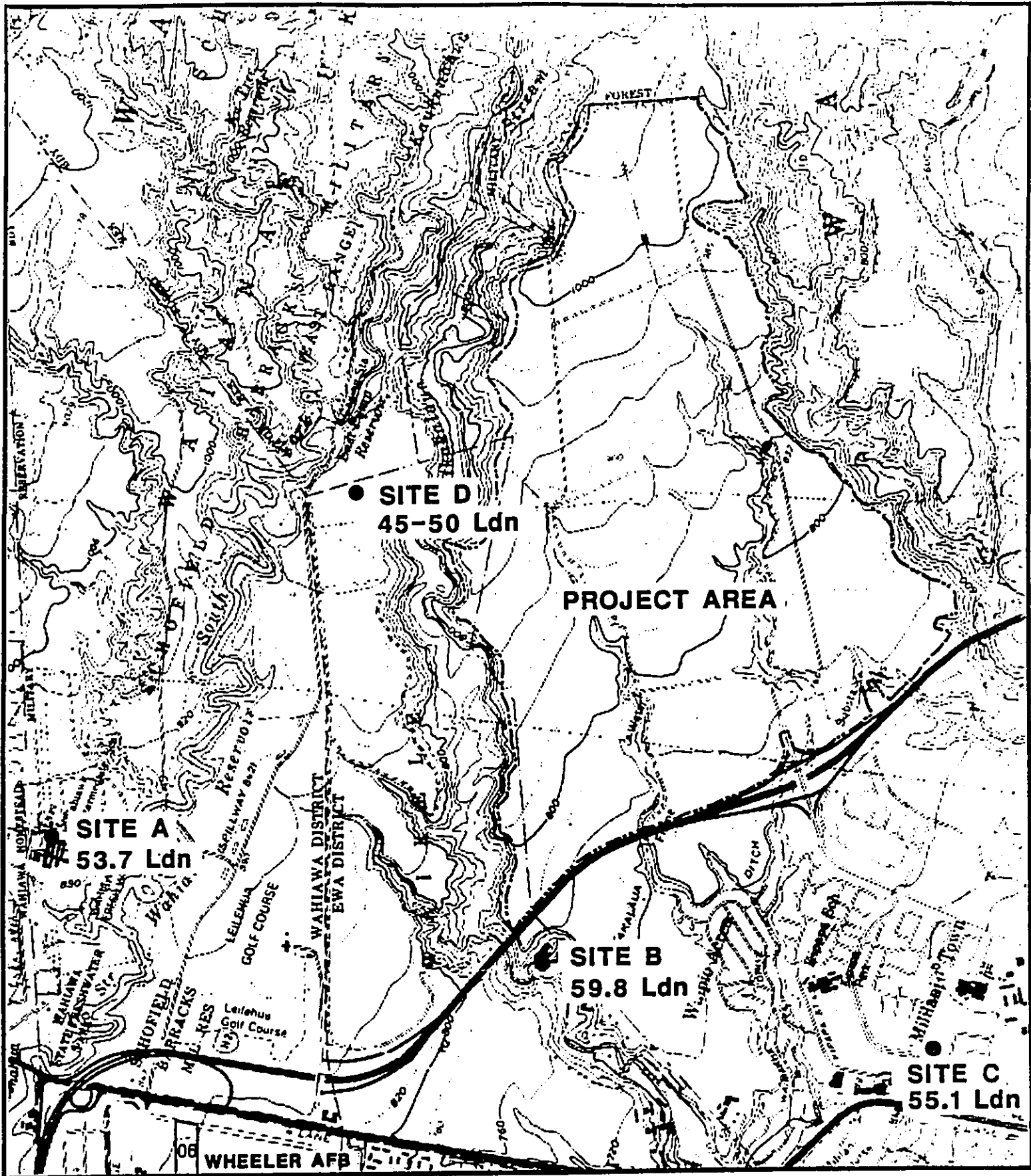
Thank you for your letter of January 14, 1987 to Mr. Donald A. Clegg, Chief Planning Officer, Honolulu Department of General Planning, regarding the referenced report. Our comments are as follows:

1. Tax Map Kc4
The TMK numbers in the EIS Preparation Notice were in error. The correct TMKs as indicated in the EIS are as follows: 9-5-01; por. 1 and 9-5-02; por. 1.

2. Aircraft Noise
Existing Ldn levels (average sound level) for the majority of the site are estimated at between 45-50 Ldn. As noted in the Draft EIS, higher sound levels are experienced adjacent to the H-2 Freeway. The Air Force and Army are in the final stages of completing noise studies for Wheeler AFB. The final reports are due to be released in approximately 3 months and were not available for our review. However, some baseline data was related to us from the Army Corps of Engineers. The Corps collected baseline noise information from a number of sites in the Mililani area to be used to calibrate/validate computer generated noise contours for the forthcoming noise study.

This data, presented on the attached map, is augmented by the Hawaii Technology Park data (Site D) referenced in the Draft EIS. As can be seen by the sound pattern, all values were less than 60 Ldn with the lowest sound levels coming from the mauka areas of the Hawaii Technology Park (45-50 Ldn). The highest reading, 59.8 Ldn (Site B), is largely attributable to adjacent roadway noise.

3. Sewerage
Generally, the main purpose of flow equalization is to dampen the diurnal wastewater flow fluctuation, thus achieving a nearly constant flow rate at the downstream end. Flow equalization provides a more uniform discharge and loading of organics, nutrients, and other suspended and dissolved matter to downstream wastewater collection systems and treatment processes, normally resulting in better treatment plant performance.



Noise Levels in Vicinity

0 2000'



Figure: 1

MILILANI-MAUKA

HELBER, HASTERT, VAN HORN & KIMURA PLANNERS
 GROSVENOR CENTER • PFI TOWER • 733 BISHOP STREET SUITE 2600
 HONOLULU, HAWAII 96813 TELEPHONE: (808) 548-2088

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



FRANK F. PARR
DIRECTOR

TOM T. HELOTA
DIRECTOR

RECEIVED
JAN 13 1987

HELBER, HASTERT, VAN HORN
& KIMURA PLANNERS

JANUARY 9, 1987

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

FROM: HIRAH K. KAWAKA, DIRECTOR

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT
MILILANI-MAUKA RESIDENTIAL COMMUNITY
TAX MAP KEY 9-5-01: POR. 1 AND 9-5-02: POR. 1

XIII-39

We have determined that the Environmental Impact Statement for the proposed Mililani-Mauka Residential Community is acceptable.

The recreational needs of the project have been addressed by the establishment of public and private parks as shown on the master plan. The locations of the parks are conceptually acceptable.

The applicant is aware that coordination with our department in the detail planning of lands proposed to be dedicated for public park purposes will be required. Should you have any questions, please call Mr. Jason Yuen of our Advance Planning Section at extension 6315.

Hirah K. Kawaka
HIRAH K. KAWAKA, Director

HKK:el

cc: Mr. Thomas A. Fee - Helber, Hastert, Van Horn & Kimura, Planners

January 29, 1987

Mr. Hiram K. Kamaka, Director
Department of Parks and Recreation
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Kamaka:

Mililani-Mauka Residential Community
Environmental Impact Statement (EIS)
Mililani, Oahu, Hawaii
TMK's 9-5-01: por. 1; 9-5-02: por. 1

Thank you for your letter of January 14, 1987 to Mr. Donald A. Clegg, Chief Planning Officer, Honolulu Department of General Planning, regarding the referenced report.

Your letter will be reproduced in the Final EIS together with this response.

Sincerely,

HELBER, HASTERT, VAN HORN & KIMURA, Planners

Thomas A. Fee

Thomas A. Fee
Project Planner

TAF/ib

cc: Honolulu Department of General Planning

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU

1435 SOUTH BERTANIA STREET
HONOLULU, HAWAII 96814

FRANK P. PAN
MAYOR



DOUGLAS G. GIBB
CHIEF
WARREN FERREIRA
DEPUTY CHIEF

OUR REFERENCE ES-LK

January 13, 1987.

RECEIVED
JAN 15 1987

HELBER, HASTERT, VAN HORN
& KIMURA, PLANNERS

TO: DONALD A. CLEGG, CHIEF PLANNING OFFICER
DEPARTMENT OF GENERAL PLANNING
FROM: DOUGLAS G. GIBB, CHIEF OF POLICE
HONOLULU POLICE DEPARTMENT
SUBJECT: ENVIRONMENTAL IMPACT STATEMENT FOR THE
MILILANI-MAUKA RESIDENTIAL COMMUNITY

XIII-40

We have reviewed the environmental impact statement for the Mililani-Mauka Residential Community, which was forwarded to us by the Hawaii Office of Environmental Quality Control on December 22, 1986.

As indicated in our earlier comments, a population increase of over 20,000 in this area will result in a considerable rise in calls for police service. This will obviously tax the resources of the Wahiawa Station. In the long run, it will require a substantial augmentation of the personnel and equipment assigned to the area in order to maintain appropriate levels of service.

Traffic and safety problems are our other major concerns. As the environmental impact statement indicates, traffic conditions may improve in the short run but are expected to deteriorate in the long run. This is not encouraging, given the problems already evident on the freeways. We are concerned about the ability of the police to handle the traffic, the increasing demands on the police for traffic control and enforcement as the road system becomes more clogged, and the difficulty that police and other emergency services will have in responding to calls as traffic congestion grows. We can only urge that more attention be given to traffic problems and their safety aspects while there is still time to do something about them.

Douglas G. Gibb
DOUGLAS G. GIBB
Chief of Police

cc: Mr. Thomas A. Fee

January 29, 1987

Mr. Douglas G. Gibb, Chief of Police
Police Department
City and County of Honolulu
1435 S. Bertania Street
Honolulu, Hawaii 96814

Dear Chief Gibb:

Mililani-Mauka Residential Community
Environmental Impact Statement (EIS)
Mililani, Oahu, Hawaii
TMKs 9-5-01: por. 1; 9-5-02: por. 1

Thank you for your letter of January 13, 1987 to Mr. Donald A. Clegg, Chief Planning Officer, Honolulu Department of General Planning, regarding the referenced report.

We note your concern about the impact of the project on police personnel and equipment and the ability of the roads to handle the traffic of a growing Central Oahu region. The applicant is very aware of the growing traffic problem in the region and will be working closely with State and County transportation officials to minimize these impacts.

Your letter will be reproduced in the Final EIS together with this response.

Sincerely,

HELBER, HASTERT, VAN HORN & KIMURA, Planners

Thomas A. Fee

Thomas A. Fee
Project Planner

TAF/jh

cc: Honolulu Department of General Planning

26P 1/17 34

DEPARTMENT OF PUBLIC WORKS

CITY AND COUNTY OF HONOLULU RECEIVED

650 SOUTH KING STREET
HONOLULU, HAWAII 96813

JAN 11 1987



RECEIVED
JAN 11 1987

HELBER, MASTERT, VAN HORN
& KIMURA PLANNERS

January 5, 1987

RUSSELL S. SMITH JR.
DIRECTOR OF PUBLIC WORKS
GENERAL PLANNING 14-0004
C & C HONOLULU

MEMORANDUM

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

FROM: ALFRED J. THIEDE, ACTING DIRECTOR AND CHIEF ENGINEER

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR
MILILANI-HAUKA, TMK: 9-5-01: POR. 1;
9-5-02: POR. 2

XIII-41

We have the following comments on the draft EIS:

Engineering:

The proposed drainage improvements are acceptable.

Sanitary Sewers:

The September 2, 1986 letter (ENV 86-184) states that the Mililani Town Trunk Sewer is adequate to serve the proposed development. However, if the recently submitted Developed Plan Amendment for Unit 64 of Mililani Town is adopted, the adequacy of the trunk sewer will have to be reevaluated. It may be that a relief line will have to be constructed before Mililani Hauka can be connected.

Alfred J. Thiede
ALFRED J. THIEDE
Acting Director and Chief Engineer

January 30, 1987

Mr. Alfred J. Thiede,
Acting Director and Chief Engineer
City and County of Honolulu
Department of Public Works
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Thiede:

Mililani-Hauka Residential Community
Environmental Impact Statement (EIS)
Mililani, Oahu, Hawaii
TMK's 9-5-01: por. 1; 9-5-02: por. 1

Thank you for your letter of January 5, 1987 to Mr. Donald A. Clegg, Chief Planning Officer, Honolulu Department of General Planning, regarding the referenced report.

Our engineering consultant (M & E Pacific, Inc.) has reviewed your comment regarding the impact of Unit 64 on the adequacy of the Mililani Town Trunk Sewer. They have determined that the addition of both Unit 63 and 64 (a total of 102 single family residences) will have an insignificant impact on the trunk sewer's capacity to serve the Mililani Mauka development.

Your letter will be reproduced in the Final EIS together with this response.

Sincerely,

HELBER, MASTERT, VAN HORN & KIMURA, Planners

Thomas A. Fee

Thomas A. Fee
Project Planner

TAF/lb

cc: Honolulu Department of General Planning

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
540 SOUTH KING STREET
HONOLULU, HAWAII 96813



FRANK PARR
DIRECTOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALON, JR.
DEPUTY DIRECTOR

TE7808
PLA.0537

JANUARY 27, 1987

RECEIVED

FEB 3 1987

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8 1000A PLANNING

MEMORANDUM

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

FROM: JOHN E. HIRTEN, DIRECTOR

SUBJECT: MILILANI-MAUKA RESIDENTIAL COMMUNITY
TRM: 9-5-01: Por. 1
9-5-02: Por. 2

JOHN E. HIRTEN

cc: Mr. Thomas A. Fee

Donald A. Clegg, Chief
Planning Officer
January 27, 1987
Page Two

5. Street lighting standards should be spaced in accordance with the criteria set forth in the IES Lighting Handbook.

We appreciate this opportunity to comment on this project.

If you have any questions, please contact Kenneth Hirata of my staff at 527-5009.

This is in response to the Office of Environmental Quality Control's letter of December 22, 1986.

We have reviewed the Draft EIS for the subject project and have the following comments:

1. The impacts of projected traffic at the project's completion along the internal roadway system should be assessed and should be used as the basis to determine appropriate roadway widths of all major internal streets.
2. Roadway widths which have been previously agreed upon with the civil engineering consultant should be included in the EIS.
3. The method of determining the proportion of internal trips should be stated and based on comparative internal trip rates of other similar developments.
4. Major intersections within the subject subdivision should be analyzed to determine the need for traffic signals.

February 2, 1987

Mr. John E. Hirtten, Director
Department of Transportation Services
City and County of Honolulu
Honolulu Municipal Building
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Hirtten:

Mililani-Mauka Residential Community
Environmental Impact Statement (EIS)
Mililani, Oahu, Hawaii
TMKS 9-3-01: par. 1; 9-5-02: par. 1

Thank you for your letter of January 27, 1987 to Mr. Donald A. Clegg, Chief Planning Officer, Honolulu Department of General Planning, regarding the referenced report. Your letter was received on February 2, 1987, ten days after the end of the thirty-day public review period (ending January 23, 1987). Our comments are as follows:

- A. Impact of Traffic Movements Within Internal Roadways
The major emphasis on traffic impact analyses to date has been to assess the impact of the proposed action on existing and future transportation facilities within the region. This level of analysis is consistent with the general nature of planning at the Development Plan level. As the development moves closer to the zoning and subdivision stages of the development process, more detailed, on-site traffic impact analyses will be conducted, with input from your department.
- These studies will assess the impacts of projected traffic along internal roadways and intersections to determine appropriate roadway widths and the need for signalization.
- B. Roadway Widths Previously Assessed Upon With Civil Engineering Consultant
The major roadway (Meheula Parkway extension) is presently planned as a 108-foot right-of-way (ROW). The ROW for the collector streets is currently being analyzed by the civil engineering consultant with input from your department.
- C. Method of Determining Internal Trips
Total trip ends generated by the proposed action were computed using traffic generation rates based on national studies compiled by the Institute of Transportation Engineers (p. G-7). Estimates regarding the proportion of external to internal trips were made based on the professional experience of the traffic engineers. A comparison of Mililani-Mauka and Makakilo (both single access residential

developments) indicates that the external trips (Daily and Peak Hour) may be slightly overstated in the Mililani-Mauka studies (see Table below).

COMPARISON OF EXTERNAL TRIPS
MILILANI-MAUKA VERSUS MAKAKILO

External Trips/ Dwelling Unit	Mililani-Mauka ²	
	Makakilo ¹	Mililani-Mauka ²
Daily	6.0	6.24
AM Peak	0.43	0.47
PM Peak	0.38	0.45

1. 1985 Traffic Counts from Station C106. Assume 3,000 dwelling units.
2. Table 6, p. G-9

D. Street Lighting Standards
Your comment is noted and has been forwarded to the civil engineer.

We hope that your concerns have been adequately addressed in our letter. Your comments, together with our response, will be reprinted in the Final EIS.

Sincerely,

HELBER, HASTERT, VAN HORN & KIMURA, Planners

Thomas A. Fee
Project Planner

TAF/lh

cc: Honolulu Department of General Planning



COPY

January 15, 1987

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

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

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR THE
PROPOSED MILLILANI-MAUKA RESIDENTIAL COMMUNITY,
TMK: 9-5-01: POR. 1 AND 9-5-02: POR. 1

Thank you for the opportunity to review the EIS for the proposed residential development at Millilani. We offer the following comments:

1. The revised Millilani Town Master Plan dated December, 1986 is currently being reviewed for approval.
2. On page VI-5, please note that the Hawaii Technology Park will receive water from the proposed Mahiava Corporation Yard Well and not from the Millilani Town Wells.
3. On page IV-13, Section 4.7.2, it should be stated that the ground water recharge for the Pearl Harbor Ground Water Control Area (PHGWCA) may decrease by as much as 10% of the PHGWCA sustainable yield as established by the State Department of Land and Natural Resources (DLNR).
4. The Millilani area is part of the PHGWCA which is controlled by DLNR. Therefore, permission to drill wells and withdraw water from the ground water basin (permitted use) must be obtained from DLNR and coordinated with the Board of Water Supply.

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

Kazu Hayashida

KAZU HAYASHIDA

cc: Mr. Thomas A. Fee

January 29, 1987

Mr. Kazu Hayashida,
Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania
Honolulu, Hawaii 96843

Dear Mr. Hayashida:

Millilani-Mauka Residential Community
Environmental Impact Statement (EIS)
Millilani, Oahu, Hawaii
TMKs 9-5-01: por. 1; 9-5-02: por. 1

Thank you for your letter of January 15, 1987 to Mr. Donald A. Clegg, Chief Planning Officer, Honolulu Department of General Planning, regarding the referenced report.

The information and comments you provided are appreciated. The suggested revisions have been incorporated into the Final EIS.

Your letter will be reproduced in the Final EIS together with this response.

Sincerely,

HELBERT, HASTERT, VAN HORN & KIMURA, Planners

THA

Thomas A. Fee
Project Planner

TAF/lh

cc: Honolulu Department of General Planning

HAWAIIAN ELECTRIC COMPANY, INC. • PO BOX 2750 • HONOLULU HI 96841 0001

ENV 2-1
NY/G



Brenner Munger Ph.D., PE
Ecology
Environmental Department
(808) 548 6880

January 12, 1987

RECEIVED
JAN 13 1987

HELBER, HASTERT, VAN HORN
& KIMURA PLANNERS

Mr. Donald A. Clegg,
Chief Planning Officer
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Clegg:

Subject: Environmental Impact Statement (EIS) for Millilani -
Mauka Residential Community

We have reviewed the subject EIS and find that the summarization of the issues raised in our two letters of July 9, 1985 and September 19, 1986 found on Page XI-43 pertaining to this project is adequate.

Sincerely,

Brenner Munger

cc: Thomas A. Fee, Helber,
Hastert, Van Horn & Kimura
Planners

A Hawaiian Electric Industries Company

January 29, 1987

Mr. Brenner Munger, Manager
Environmental Department
Hawaiian Electric Company, Inc.
P.O. Box 2750
Honolulu, Hawaii 96840-0001

Dear Mr. Munger:

Millilani-Mauka Residential Community
Environmental Impact Statement (EIS)
Millilani, Oahu, Hawaii
TMK's 9-5-01: por. 1; 9-5-02: por. 1

Thank you for your letter of January 12, 1987 to Mr. Donald A. Clegg, Chief Planning Officer, Honolulu Department of General Planning, regarding the referenced report.

Your letter will be reproduced in the Final EIS together with this response.

Sincerely,

HELBER, HASTERT, VAN HORN & KIMURA, Planners

TAF

Thomas A. Fee
Project Planner

TAF/lh

cc: Honolulu Department of General Planning



July 9, 1985

Robert D. Ludd
Manager
Distribution Engineering

H & E Pacific, Inc.
Suite 300, Paahii Tower
1001 Bishop Street
Honolulu, Hawaii 96813

Attention: Mr. James S. Kuayaj, Ph D.
Vice President

Gentlemen:

Subject: Milliani Mauka Development
Electrical & Communications Study
HECO Request No. P136822

This letter responds to your letter of June 14, 1985, subject as above, which requested us to respond to several questions regarding future electrical service to the proposed Milliani Mauka Development. The following answers are keyed to the numbered questions in your letter.

We transmit a print of a Hawaiian Electric Company (HECO) map which shows the routes of our two 46 kv circuits that cross the proposed development area and the two 138 kv circuits that lie to the east of the area. All circuits are covered by perpetual easements. Concerning the 46 kv "A" and "B" circuits as delineated on the map, the "A" line from Waiolu to Kinohiwa Substation has been relocated once at our expense. All future relocations for this segment would be at the developers expense. The "B" line has a perpetual easement with no relocation clause. Further relocations of any portion of the "B" line would also be at the developers expense.

A2. Both the 46 kv "A" and "B" lines will serve the substation that in turn will serve the development. It is highly desirable to have two separate sources of power to the substation, one as primary and one as backup, to better insure continuity of service.

A3. HECO now has an adequate reserve capacity to serve the proposed mauka development load.

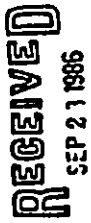
A4. HECO now has a System Generating Capability of 1203 megawatts of power. The system peak load in 1984 was 735 megawatts. By the 1990's, additional generating capability may be available.

A Hawaiian Electric Industries Company



Brenner Mungen, Ph.D., PE
Manager
Environmental Department
4088 240 8800

September 19, 1986



HELBER, HASTERT, VAN HORN
& KIMURA PLANNERS

Mr. Thomas A. Fee
Project Planner
Helber, Hastert, Van Horn
& Kimura Planners
Grosvenor Center, P.O. Tower
Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Fee:

Subject: Milliani Mauka Residential Community Environmental Impact Statement (EIS) Preparation Notice

We have reviewed the above subject EIS and have the following comments:

1. In Figure 2, it appears that one of HECO's 138 KV overhead lines pass through the single family residential area at the mauka end of the development. The EIS does not address whether these overhead lines will remain or be relocated. If they will be relocated developer should contact HECO.
2. The discussion on electrical systems data on Page 8 is inadequate. This data was provided by HECO to H&E Pacific, Inc. in our letter of July 9, 1985 (see Enclosure 1). This data is still pertinent and correct and should be used in the EIS.

Sincerely,

Brenner Mungen

Enclosures

A Hawaiian Electric Industries Company

APPENDICES

APPENDIX A

**Housing Market Analysis:
A Supplemental Study for General Plan Amendment
Application Relating to Implementation of
Millilani Town Master Plan.**

Tyrone T. Kusao, Inc. May 1984, Revised December 1986

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HOUSING MARKET ANALYSIS

A SUPPLEMENTARY STUDY FOR
GENERAL PLAN AMENDMENT APPLICATION
RELATING TO IMPLEMENTATION OF
MILILANI TOWN 4-STEP PLAN

MILILANI TOWN, INC.
P.O. BOX 2780
HONOLULU, HAWAII 96803

Tyrone T. Kusao, Inc.
Planning & Zoning Consultants
1186 Bishop St., Suite 2507
Honolulu, Hawaii 96813

May, 1984
REVISED-DECEMBER, 1986

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HOUSING MARKET ANALYSIS

This housing study is comprised of five basic parts as follows:

1. An Oahu-wide analysis examining those components creating housing demand, past housing production and future housing requirements.
2. Central Oahu analysis examining past housing production with projections for the future.
3. Milliani Town's past performance in the production of housing.
4. Milliani Town's future housing program.
5. Conclusions.

Oahu-Wide Analysis

Estimation of Housing Requirements. The following method was used to determine future housing requirements and the satisfaction of those requirements through future housing production.

1. The total requirements for housing units in the Year 2005 is determined by estimating the number of households occupying a dwelling unit each and adding a number of vacant units at a given vacancy rate. The number of households is the projected population divided by the average population per household.
2. The number of additional units required between 1980 and 2005 equals the total 2005 requirement less units in the existing housing stock, plus replacement of existing units removed from the inventory due to demolition.

3. The types of new housing required are based on past housing production trends and projected demographic patterns of birth and death rates, marriages, and household formation, etc.

Population Projection. The population projection by the State Department of Planning and Economic Development (DPE) Series H-P (Table 1 on page 3) has proven to be very accurate and is therefore used in this analysis. Oahu's population forecasted for the year 2005 is 954,500 people. This increase represents an additional 130,900 people from the actual 1985 population of Oahu of 814,600 people. The average annual increase would be 6,995 persons which is a decline from the annual increase in population between 1970-1982 of 11,700 persons. It should be noted that although Oahu's percentage increase in population is expected to decline, the population on the other islands has increased which reflects the State's efforts to encourage population growth on the neighbor islands.

Household Size/Estimated New Households in Year 2005. Oahu has experienced a steady decline in household size (Table 2, on page 4) which is consistent with the national trend of decreasing household size. In 1960 the average household size occupying a unit was 3.93 persons. In 1970 the average household size declined to 3.62 and in 1980 to 3.16 persons. By the year 2005 the average household size is estimated to be

TABLE 1
PROJECTED POPULATION LEVELS
1980 - 2005
(in thousands)

	1980	1985	1990	1995	2000	2005
Total Resident Population						
DPED, M-F Series, 1984:	765.0	815.3	859.3	896.9	925.7	954.5
Actual Population:	764.9	814.6 ¹				

A-4

TABLE 2
TRENDS IN HOUSEHOLD SIZE
1960 - 1980
CITY AND COUNTY OF HONOLULU

	Net Change, 1960-1970		Net Change, 1970-1980	
	Number	Percent	Number	Percent
Area				
Persons per Occupied Dwelling Unit	3.93	3.63	-0.30	-7.6%
Persons per Occupied Dwelling	3.63	3.16	-0.47	-12.9%

Source: Hawaii: Population and Economic Projection and Simulation Model. Updated State and County Forecasts. Department of Planning and Economic Development, July, 1984.

¹Actual 1985 population per State Department of Planning and Economic Development.

Sources: 1970 Census of Population and Housing, U.S. Department of Commerce;
 1980 Census Summary Tape File 1, Honolulu Department of General Planning; Williams-Kuebelbeck and Associates, Inc.

3.0 persons. This steady decrease in household size is a result of several household formation patterns combined with greater economic independence. Marriages are delayed and families are smaller. There has been a significant increase in individual and unrelated group household formation as well as a significant number of single parent households.

The decline in household size directly impacts and increases future housing requirements. Even if there were no population increase, the 1985 population of Oahu of 814,600 people would require an additional 13,749 units if the average household size was 3 instead of 3.16 persons. Therefore, a declining household size together with an increasing population will accelerate the increase in new housing requirements.

The projected number of new households on Oahu is determined by estimating the number of households in the year 2005 less the number of households in 1985. The estimated number of households in year 2005 is equal to the forecasted population divided by a household size of three (954,500 divided by 3 = 318,167). The number of households in 1985 equals the actual population of 814,600 divided by the average household size of 3.16 (814,600 divided by 3.16 = 257,785). The number of new households on Oahu in the year 2005 is 60,382 (318,167 - 257,785) or an average annual increase of 3,019 households.

Vacancy Rate. According to the Department of Housing and Urban Development (HUD), a vacancy factor of five percent is the minimum level necessary to assure normal market choice, mobility and turnover. Oahu, during 1977-1985 (Table 3 on page 7) has not exceeded a vacancy rate of 1.7 percent. This low vacancy rate has had a negative impact on the population. According to Bank of Hawaii's "Construction in Hawaii 1983":

"Over the decade, the median rental rate in Hawaii rose 124 percent from \$121 to \$271, compared to the 77 percent rise in the median household income. Due to the rapid increase in rental rates, over 65 percent of the renters paid a rate at or above the median rent in 1980 as compared to 55.5 percent in 1970."

To provide for a more normal market situation, future housing production should increase housing inventories to allow for a five percent vacancy rate. The five percent vacancy to satisfy the vacancy requirement by the year 2005 on Oahu, is determined by multiplying the estimated number of households in the year 2005 by five percent or 15,908 units (318,167 x .05).

Replacement of Demolished and Dilapidated Units. An integral component in calculating future housing requirements is the estimate of units needed to replace existing housing units

removed from the housing stock because of demolition and dilapidation. Units may be demolished because they have lost their economic value (under utilized properties) or because they have lost functional use. Functional obsolescence in units normally occur because of dilapidation. Dilapidated units are defined as structures 45 years or older. However, not all dilapidated units are demolished. Owner renovation and rehabilitation will extend the life of the unit. Due to increased rental opportunities and government programs to encourage rehabilitation, the actual rate of demolition of dilapidated units has decreased. In 1970-1975, the estimated annual rate of demolition was 810 units. In 1975-1980, the actual annual rate decreased to 604 units. Although the rate of demolition has decreased, this component of future housing requirement continues to be significant. If the annual rate of demolition was established at the 1975-1980 level, than a total of 12,080 units would have to be produced by the year 2005 to replace units lost from the housing inventory due to demolition.

Future Housing Requirements. The projected housing requirement for 1985-2005 must respond to the forecasted additional number of households, at adequate vacancy rate of five percent and the anticipated loss of units through demolition. Based on these three factors, the estimated residential housing production on

TABLE 3

Vacancy Rates for Existing Units on Oahu: 1977 - 1983

Existing Units	1977	1978	1979	1980	1981	1982	1983
Single Family Units	0.46	0.61	0.38	0.58	0.38	1.18	0.61
Multi-Family Units	2.91	2.41	1.98	2.16	1.98	2.28	2.18
All Units	1.68	1.58	1.18	1.38	1.48	1.78	1.38

Source: Federal Home Loan Bank of Seattle
Honolulu, Hawaii
Housing Vacancy Survey
March, 1983

Oahu from 1985 to 2005 is 80,028 units (Table 4, page 10). Therefore, annual production of residential housing must average approximately 4,001 units to meet expected housing demand.

Housing Production 1970-1990. The total housing inventory for Oahu in 1980 was estimated at 252,000 units. Census data has also indicated this was an increase of 77,300 units from the 1970 census housing count of 174,700 units. The average annual production amounted to 7,730 units during this time period and has been the largest increase in any decade on Oahu.

Housing Production 1980-1985. Housing production in 1980-1985 has not followed the housing boom of the 1970's (1970-1979). While annual production of units averaged 7,272 units in the 1970's, production in 1980-1985 has averaged only 2,818 units (Table 5, page 11). If housing production continues at the 1980-1985 pace through 2005 and estimated housing production requirements are confirmed, there would be a housing shortage of approximately 23,672 units on Oahu by the year 2005, or an annual shortage in production of 1,184 units.

Past and Future Production of Units by Type and Price. The 1980 census of housing units indicates an almost equal number of existing single family units and multiple family units.

TABLE 4

ESTIMATED HOUSING PRODUCTION REQUIREMENT

1985 - 2005

Honolulu

Total Unit Requirement	
Households - Year 2005	318,167
Vacancy	15,908
Total Unit Requirement	334,075

Number of Additional Units Requirement	
Total Unit Requirement - Year 2005	334,075
Less existing 1980 housing inventory	(266,127)
Plus replacement of demolished units	12,080
Production Requirement	80,028

Estimated Annual Production Requirement	4,001
---	-------

Assumptions:

1. Existing residential vacancy rate of 1.6%.
2. 2005 average household size of 3.0.
3. 5% residential vacancy rate achieved by 2005.
4. 2005 population figures based on DPED X-F Series projection.
5. 4% of projected population assumed residing in group quarters. 4% of housing production for second home purchase.
6. Annual demolitions equal to the 1975-1980 annual average.

TABLE 5
HOUSING UNITS STANDING (ANNUALLY)
1970 - 1985
(As of April 1)

<u>Year</u>	<u>State Total</u>	<u>City and County of Honolulu</u>
1970	216,774	174,742
1971	228,749	184,101
1972	238,770	190,973
1973	250,742	198,970
1974	266,828	210,940
1975	284,120	222,647
1976	298,339	232,669
1977	306,989	237,571
1978	315,313	243,103
1979	324,261	247,465
1980	334,235	252,038
1981	342,873	254,969
1982	348,980	256,967
1983	353,393	259,574
1984	359,107	262,902
1985	364,436	266,127

This was a result of a significant increase of multiple family units between 1970-1980. During this time period, approximately 75 percent of the units constructed were multiple family units, while single family units accounted for the other 25 percent. This rise in multiple family units can partly be explained as a response to changing demographic and socio-economic characteristics of Oahu's population. During 1970-1980, household seeking initial housing purchases (ages 20-30) represented 40 percent of the population of the State. These smaller households experienced a 77 percent rise in incomes permitting them to enter the housing market. However, due also to a steady rise in housing prices, especially for single family units, these young families purchased smaller and more affordable multi-family units (table 6, page 13).

In addition to the demand for smaller units by initial purchasers, people in the age group 50 years and older, comprised of 75,000 persons, also sought smaller size units to meet their reduced housing needs.

During this same period of high multiple family unit production, of the number of single family units produced, a significant amount were four or more bedrooms. According to Bank of Hawaii's report "Construction in Hawaii 1983".

Source: Hawaii State Department of Planning and Economic Development
Housing Unit Estimates for Hawaii, 1970-1986 (Statistical
Report 191, July 18, 1986), Table 2.

TABLE 6

MULTIPLE LISTING SERVICE SALES OF
RESIDENTIAL AND CONDOMINIUM UNITS FOR OAHU
1972 - 1986

(Average Sales Price Of Re-sale Units)

Year	Residential ¹	Condominium
1972	\$65,723	\$43,869
1973	85,914	46,811
1974	83,611	54,956
1975	83,797	55,296
1976	85,691	59,842
1977	94,028	61,484
1978-1979 ²	114,264	67,783
1979-1980 ²	151,775	84,880
1980-1982	162,107	103,342
1981	191,597	111,065
1982	184,227	107,185
1983	188,742	104,895
1984	187,270	101,448
1985 ³	188,900	98,800
1986	\$208,000	\$107,500

¹ Single-family structures.

² Year ended February 28 or 29.

³ As of November 15, 1986

Source: Honolulu Board of Realtors records.

"In 1970, there were 13,567 houses of four or more bedrooms available for 47,175 families of five or more members. Only 29 percent of the families possibly requiring such accommodations could be housed. However, by 1980 the ratio of units available to house five or more members increased to 78.6 percent. The change in the ratio occurred almost entirely because of a growth in construction of larger size units since the number of families of five or more members remained almost unchanged (-2.2 percent) from the 1970 level. Although a large portion of the increase in large single family dwelling units can be attributed to satisfying the housing need of large families, larger units were sometimes constructed in response to the demand for more rental units."

During the period 1985-2005, the initial purchaser group, comprising 40 percent of the population would then be in the 30-50 age group. Normally, as this age group increases its family size and income, larger sized multi-family units or smaller three bedroom single family homes will be needed to meet this demand. There will also be a continuing need for affordable smaller sized multi-family units to serve the increasingly large older population and the additional new initial housing purchasers. There will be a demand for a limited number of larger size (four-bedroom or more) single family units to match inventory in this category with housing need not satisfied during the 1970-1980 production period. The pricing of units will be dependent on construction cost, incomes, available financing, available inventory and demand. Prices in the 1980's has thus far shown a stabilization and an

adjustment downward between 1981 and 1982 in both single family and multiple family housing pricing. New developments will have to be responsive and sensitive to unit type, pricing and affordability in order to meet expected housing requirements.

Central Oahu Analysis

The regional housing market of Central Oahu, of which Mililani is a part, includes the communities of Wahiawa, Mililani, Waipahu, Waiawa and Waipio. The 1984 population for this region was 114,400 or 14.2 percent of Oahu's population. The City and County of Honolulu's General Plan population growth guidelines indicate an increase in the region's population by 25,400 by the year 2005 for a total of 139,800 people. The estimated number of housing units required to meet this increase in population, with an average of three persons per household, 5 percent vacancy ratio and 15 percent of the total demolished units equals 14,631 units or 697 units annually (Table 7, Page 16).

The housing units production rate of 697 annually represents approximately 17.4 percent of the island wide production requirement.

TABLE 7

CENTRAL OAHU HOUSING REQUIREMENT
1975 - 2005

New Households	10,398
From existing population (reduction size from 3.16 to 3)	1,931
From increased population with household size 3	8,467
Vacancy (5% of total households of 43,800)	2,330
Demolition (15% of Oahu total of 12,080)	1,903
Total Housing Requirement	14,631

Central Oahu's Role in Housing Production. In the 1960's, housing production was concentrated in the Halawa to Pearl City (Primary Urban Center West) corridor, Waikiki and Hawaii Kai areas. However, as suitable land for housing decreased in these areas, housing production in the Central Oahu area has increased since the 1970's. This trend has accelerated over the years with Central Oahu accounting for 82% of all new residential units sold on Oahu in 1985 (Bank of Hawaii's "Construction in Hawaii" report, 1986).

According to the Bank of Hawaii report, a total of 1,455 new units (both single-family and multi-family units) were sold on Oahu in 1985. Of this total, Central Oahu accounted for 1,196 units (82% of total), with the remainder located in Central Honolulu, East Honolulu and Windward Oahu. For new single-family units, Central Oahu accounted for 1,016 units or 89% of total Oahu sales. Of Central Oahu's 1,016 single-family sales, Milliani Town with 474 units accounted for nearly one-half or 47% of the total. In the area of new multi-family units sales (4 stories or less), there was a total of 316 transactions for all of Oahu in 1985. Of this number, 57% of the total or 180 sales occurred in Central Oahu with the remainder in Central Honolulu.

Central Oahu with ample lands suited for development, infrastructure availability and pleasant climate has become the major area for housing production in the County. Based on plans for new developments which will be discussed in the ensuing sections, no change in Central Oahu's role in this regard is indicated.

Development Plan Status of Future Housing Projects. Table 8 on the following page lists all future Central Oahu housing projects based on the City's Central Oahu Development Plan files. At the moment, there is a total of 6,756 units which have been approved on the Central Oahu Development Plan but remain unbuild since further government permits such as re-zoning and subdivision approvals are still required.

The other set of projects comprising 15,270 units are those for which development Plan amendment applications have been filed without any action by the City to date. These applications will be considered by the City during the 1987 calendar year.

In all, a total of 22,026 units are proposed for Central Oahu by various development organizations. Of this number only 316 (6,756 units) has received Development Plan approval while decision on the remaining 63% (15,270 units) is pending. In this connection it is pointed out that amendments to the

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TABLE 8

**FUTURE HOUSING PROJECTS FOR CENTRAL OAHU
BASED ON CENTRAL OAHU DEVELOPMENT PLAN**

A. Unbuilt Units With Development Plan Approval:			
Project	Single-Family	Multi-Family	Total
Millilani Town (Makai of H-2 Freeway)	960	410	1,370
Melemanu Woodlands, III		1,122	1,122
Waterfront Manor		704	704
Waikale	810	1,950	2,760
Waipahu Civic Center	300		300
Village Park	500		500
	<u>2,570</u>	<u>4,186</u>	<u>6,756</u>
B. Projects Requesting Development Plan Approval:			
Project	Single-Family	Multi-Family	Total
Millilani Town (Makai of H-2 Freeway)	4,688	1,172	5,860
Waiawa	6,250	1,650	7,900
Village Park Expansion	1,165	345	1,510
Total	<u>12,103</u>	<u>3,167</u>	<u>15,270</u>
	Grand Total		<u>22,026</u>

population allocation table of the City's General Plan will be required prior to action on the pending Development Plan applications as Central Oahu's population quota has been reached based on projects which have been approved to date.

Housing Requirements To Year 2005. It is projected that approximately 60% of the total units proposed for Central Oahu or 13,216 units will be completed by Year 2005. The bases for this projection are as follows:

- 1 - Both City and State approvals for the major projects totalling 15,270 units are still pending. Unless there is a major shift in government's growth policy, it appears quite unlikely that all of the units applied for will be approved. Even for those projects with Development Plan approval, problems can be encountered at subsequent permit approval stage, such as rezoning, which can reduce the unit count or delay project completion.
- 2 - Unlike Millilani Town or Village Park which are considered expansion projects, the Waiawa and Waikale projects are entirely new undertakings requiring considerable start-up time for planning and infrastructure installations. As such, only a portion of these projects will be completed by the Year 2005.

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2 - Unlike Millilani Town or Village Park which are considered expansion projects, the Waiawa and Waikole projects are entirely new undertakings requiring considerable start-up time for planning and infrastructure installations. As such, only a portion of these projects will be completed by the Year 2005.

3 - Market Factors. The rate at which units can be marketed will hinge on market factors such as interest rates and economic condition of the State as a whole. The recent (1980-84) slow down in real estate activities due to high mortgage interest rates attests to this. Financing problems which can plague developers can also add to slow down of unit completions.

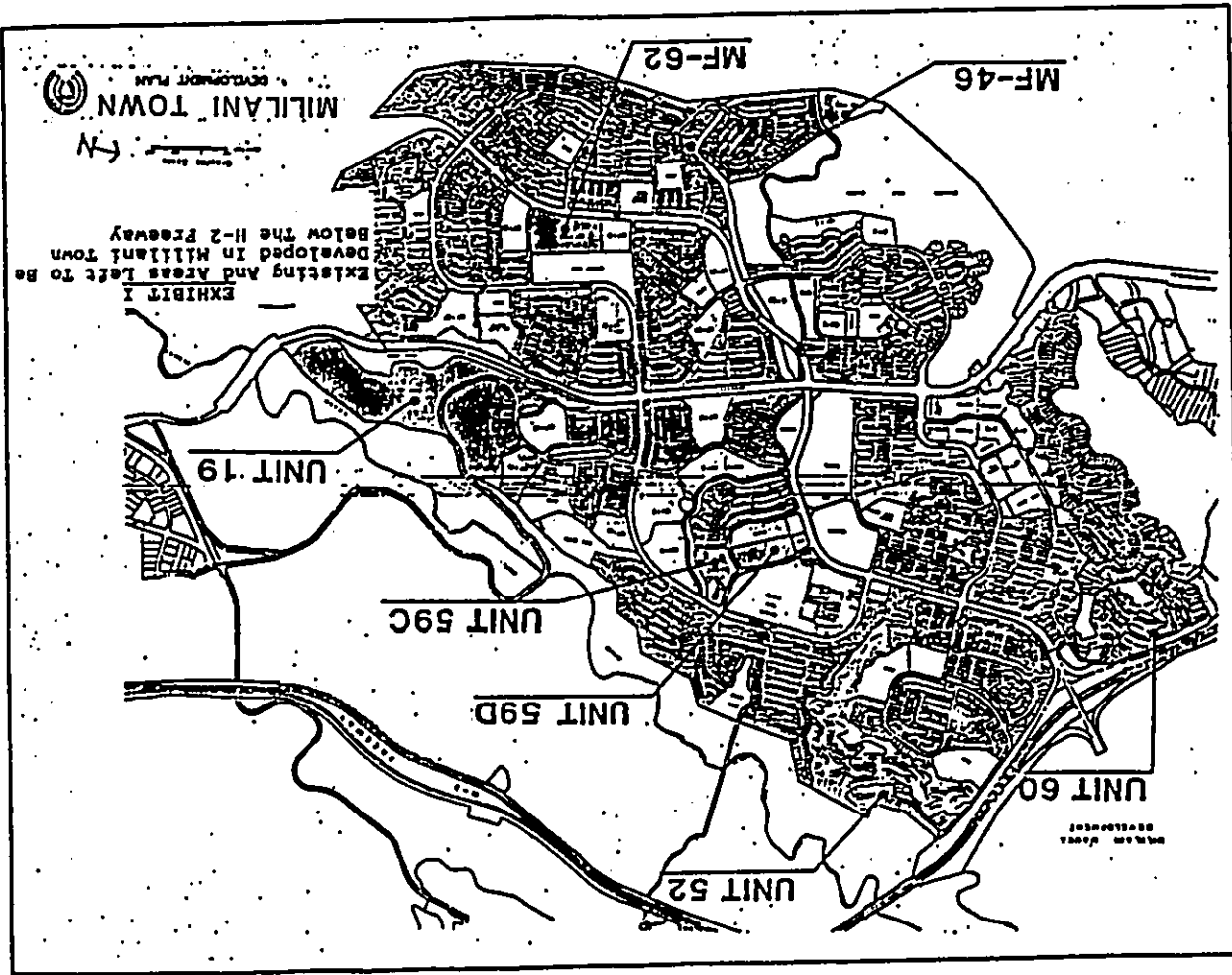
The experience of Mililani Town further attests to the 60% completion projection for the developments proposed in Central Oahu to the Year 2005. Over the 20 year period since development of Mililani Town was initiated, only 52% of the housing units proposed for that project (7,800 units of 15,000 units planned) have been completed. In this light, the 60% completion projection over the next 19 year period may prove to be somewhat optimistic.

As was shown on Table 7, Central Oahu Housing Requirement, 1985-2005 on page 16, the total housing need for Central Oahu amounted to 14,631 units. With projected completion of 13,216 units based on 60% completion of the proposed projects, it is estimated that there will be a shortage of 1,415 units in Central Oahu by the Year 2005.

Mililani Town's Past Performance

The preceding sections of this report have examined the housing picture for Oahu as a whole followed by a look at the situation in Central Oahu where Mililani Town is located. At both levels, the need for additional housing based on population growth, the trend towards smaller household size, maintaining a desirable vacancy rate and replacement of dilapidated units is evident. This section of the report will look at the past performance of Mililani Town in the development of housing.

An Overview. Exhibit I, following page, titled "Existing and Areas Left To Be Developed In Mililani Town Below H-2 Freeway" depicts the current status of development for the applicant's holdings below or "makai" of the H-2 Freeway. The areas yet to be developed are shown by the applicable unit designations with their completion anticipated by 1990. Except for these in-fill locations, the bulk of the makai area has now been developed. The discussion under this section, Mililani Town's Past Performance, will be restricted to the completed areas of Mililani Town. The area remaining to be developed below the freeway will be discussed together with the proposed development on the 1,200 acres above the freeway under the ensuing section titled Mililani Town's Future Housing Program.



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Units Completed Through 1986. Table 9 on the following page shows unit completions at Mililani town from 1969 through 1986 on a calendar year basis. A total of 7,861 units have been completed and sold over this 18 year period averaging 437 units annually. For the most active 9 year period, 1971-1979, a total of 5,514 units were produced averaging 613 units per year.

Viewing the total column on Table 9, a noticeable drop in production occurred in 1980 which has continued through 1984. This was due mainly to the sharp escalation in the interest rate and in part due to lack of zoned land. This latter condition occurred in 1979 but was resolved shortly thereafter through appropriate rezoning actions. Although not shown on the table, another significant action on the part of Mililani Town, Inc. in 1980 was the deemphasis of multi-family unit construction as part of their development. This matter will be further discussed under the sub-heading Unit Types, below.

Beginning in 1985, housing production and sales have dramatically improved due to the lowering of the interest rates and pent up demand for housing units. All indications point to similar results for the 1986 calendar year with 421 units projected for completion.

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TABLE 9

UNIT COMPLETIONS AT HILLILANI TOWN
1969 - 1986

<u>Year</u>	<u>By Hillilani</u>	<u>By Others</u>	<u>Total</u>
1969	239	---	239
1970	280	98	378
1971	459	181	640
1972	509	342	851
1973	513	207	720
1974	624	100	724
1975	503	---	503
1976	454	---	454
1977	585	---	585
1978	628	---	628
1979	409	---	409
1980	115	---	115
1981	132	---	132
1982	161	---	161
1983	224	---	224
1984	275	---	275
1985	402	---	402
1986*	421	---	421
TOTAL	6,933	928	7,861

Average Annual Production 437 Units/Yr.
 Total Production, Post Active 9 years
 1971 - 1979 5,514 *
 Average Annual, 1971 - 1979 613 *

* Projected completion.

Between 1970 through 1974, Hillilani Town, Inc. made lands available to two other builders to cope with the growing production demand and to gear itself for increased production. Beginning in 1975 Hillilani Town, Inc. has done all of the construction itself and will continue to do so in the future.

Density Calculations. With a total of 7,861 units housing a population of 26,492 today, household occupancy averages 3.37 persons per dwelling unit. Although this is somewhat higher than the island-wide average of 3.16 persons per household based on the 1980 Census, this is attributed to a higher percentage of single-family, detached units in Hillilani Town. On this latter point, of the 7,861 units completed, 5,188 or 66% are single-family, detached units while 2,673 or 34% are multi-family units.

Unit Types. Over the years, the applicant has developed various forms of housing within the basic context of a low-rise, low-density development in keeping with the rural setting of his project. This has involved three-story walk up apartments, town houses, patio homes, zero lot line developments, duplexes and single-family, detached homes. In terms of land ownership, both the condominium as well as individual forms of ownership have been employed. It is noted that the applicant was one of the principal innovators in the

development of subdivided cluster housing development wherein each purchaser is given outright title to his lot in a multi-family development complex.

Based on their extensive experience in building a variety of housing types over the last 18 years, it is the applicant's conclusion that the single-family, detached units are far and away the most desired as well as the most marketable housing type for their development. This is borne out by the fact that roughly two-thirds of all units sold to date have been in this category. Over the years, the typical single-family, detached residence in Millilani Town has been the 1,500 square foot house on a 6,000 square foot lot. With the continuing demand for single-family homes and the need to keep the selling prices affordable, the applicant is now developing smaller single-family units (i.e. 900 square foot house on 3,700 square foot lot) in increasing numbers. All indications point to the continuing popularity of these units.

Earlier, it was mentioned that beginning in 1980, the applicant has deemphasized the production of multi-family units except for those required to meet the City's housing requirements for the low/moderate income families. Some of the reasons for this decision are discussed here. In the early stages, multi-family projects were developed under the condominium form of

ownership. The major draw back to this arrangement was the high, monthly maintenance fee assessed to each owner (\$140-\$160 monthly). According to the applicant's sales manager, most purchasers would just as soon do their own maintenance work and apply such savings towards payment for the higher-priced but more desirable single-family home.

The other approach used by the applicant in developing multi-family units was the cluster subdivision where the purchaser owns his lot and therefore performs his own maintenance work. A typical arrangement consisted of four units in a row, each with its own lot. The lack of light and air, particularly for the middle units, was cited as the main reason for waning purchaser interest in these units. The combination of these factors coupled with the sharp increase in interest rates beginning in 1980 and the growing popularity of the smaller, detached single-family homes has resulted in minimum construction of multi-family units beginning in 1980. All indications point to a continuation of this pattern in the future.

Sales Price. The marketing approach employed by Millilani Town is aimed at the center of the house-buying market. Although lower-priced units as well as luxury units are available, the bulk of the units sold have been in the mid-price range.

TABLE 10
1985 HOUSING DEVELOPMENT DATA

SINGLE-FAMILY RESIDENTIAL DEVELOPMENTS ON OAHU

Project Developer	Type of Development	Lot Area (Sq. Ft.)	Units (1985)	Total Units Completed	Total Units Available	Price Range Per Unit (Est.)
ALB LANDING, Ltd. Bancroft Properties 8 E. Street	1-4	6,000	—	—	—	—
	2-4	2,000	—	—	—	—
PALEHUA VILLAGES C. Street, Ltd.	2-4	—	—	—	—	—
	2-4	—	—	—	—	—
HAWAII LOA RIDGE Hawaii Loa Ridge Hawaii Loa Ridge	2-4	3,000	—	—	—	—
	2-4	3,000	—	—	—	—
SEALALA Kono Development Co. Kono Development Co.	2-4	1,700	—	—	—	—
	2-4	1,700	—	—	—	—
WINDWARD OAHU NANI PUA GARDENS RTV Limited MALE APAPANE Maile Homes	2-4	1,000	—	—	—	—
	2-4	1,000	—	—	—	—
CENTRAL OAHU PALEHUA RIDGES II Palo Alto Co., Ltd. PALEHUA RIDGES Palo Alto Co., Ltd. ALBION Palo Alto Co., Ltd. VILLAGE PARK Village Park MILLIKEN TOWN Milliken Town MILLIKEN TOWN Milliken Town SEASIDE Seaside SEASIDE Seaside MIDCOURT AT WAILUKA Midcourt at Wailuka ROYAL SCOUTS Royal Scouts H. E. Pineda Homes	2-4	1,000	—	—	—	—
	2-4	1,000	—	—	—	—

Presently prices for the market units range from a low of \$113,745 to a high of \$279,500.

For 1985, the average sales price of a new single-family, detached house in Hillilani was \$154,562. In contrast the Oahu-wide average as reported by the Research Section of Bank of Hawaii for the comparable product was \$147,093, a difference of over \$7,469 per unit.

Applicant's broker attributes this somewhat higher average for Hillilani homes in 1985 due to larger homes and lots as compared to the competition. A good portion of the competitor's projects were developed under the zero lot line concept resulting in smaller homes with lower selling prices.

Although not directly applicable for comparison purposes, the sales price of all re-sale units for Oahu averaged \$179,490 for single-family, detached units in 1985. Table 10 on page 30, provides 1985 statistical data for all new housing developments on Oahu.

Buyers' Profile. To understand Hillilani's past performance in developing and marketing housing, information concerning buyers in the development are of considerable interest. In this regard, the applicant compiles certain data concerning each

PRIVATE MULTI-FAMILY RESIDENTIAL DEVELOPMENTS ON OAHU
(Four Stories or Less)

Project Developer	Type of Development	Lot Area (Sq. Ft.)	Units (1985)	Total Units Completed	Total Units Available	Price Range Per Unit (Est.)
CROSSPOINT Lynch Homes	1-4	700	—	—	—	—
	1-4	700	—	—	—	—
PALEHUA VIEW ESTATES Palo Alto Co., Ltd.	2-4	1,200	—	—	—	—
	2-4	1,200	—	—	—	—
PALEHUA VILLAGES C. Street, Ltd. HAWAII LOA RIDGE Hawaii Loa Ridge HAWAII LOA RIDGE Hawaii Loa Ridge ALB LANDING Bancroft Properties ALB LANDING Bancroft Properties	2-4	—	—	—	—	—
	2-4	—	—	—	—	—

Source: Bank of Hawaii, "Construction in Hawaii," 1986.

HILLIANI SALES INFORMATION CENTER
 CALLAHAN TOWN 1985
 HILLIANI
 PURCHASER'S PROFILE REPORT
 FINAL REPORT

DATE: April 30, 1986

TOTAL SALES: 51

PROJECT: Unit 56 (Traditional Homes)

- Average Age of Husband: 38 Wives: 37
- Average Years Living in Hawaii: 21 years
- Professions Area Where Purchasers Lived:

Central Honolulu/Waikiki	22	Ala Moana/Keolu/Keolu City	153
Mililani	111	Kalihi/Kalihi/Manoa	23
Waipahu/Manoa	31	Kalihi/Kalihi	2
Waipahu/Crossroads	31	Kalihi/Kalihi/Manoa East	3
Waipahu/Kalihi	29	Other	5
- Ethnic Background of Purchasers:

Japanese-American	53	Swedish/Port-Kenilworth	85
Chinese	77	American-American	27
Philippine-American	103	Chinese-American	102
Mixed	24	Other	2
- Location of Purchaser's Place of Employment:

Central Honolulu/Waikiki	374	Wife	
Waipahu/Waipahu/Schofield	122	Husband	
Pearl City	12		
Mililani	13		
Ala Moana/Keolu/Keolu City	18		
Pearl Harbor/Richard	203		
Kalihi/Manoa/Waialae	1		
Waipahu/Keolu/Waikiki	101		
Other	123		
- Occupation of Purchaser:

Professional	313	Wife	
Technician	17	Husband	
Construction	33		
Clerical	83		
Self-employed	113		
Other	15		
- Percentage of Working Wives: 80%
- Percentage of Purchasers with Children: 68%

Pre-school Age	278	Total Children	50
Age 5-11	31		
Age 12-17	211	Avg. Children/Wife	1.1
- Average Combined Income of Purchasers: \$57,312

Average Husband	\$2,571	9a. Religious Preference	
Average Wife	\$3,521	Catholic	278
		Protestant	15
		Buddhist	7
		None	1
		Other	1
		Not Specified	23
- Average Price of Purchase (with options): \$150,793

Average Mortgage	\$ 5,208 (27%)
Average Monthly Payment	\$27,329
	\$1,071
- Average Amount of Options Purchased: \$1,645
- Solar Preference: Option 5; 2; Install 2; 3; Single Only 1; 3
- Window Type Preference: Louvers 18; 2; Sliding Type 2; 3
- Energy Preference: Gas 21; 2; Electric 39; 3
- Reasons for Buying at Hilliani:

1st Priority	Community
2nd Priority	Location
3rd Priority	Price
4th Priority	Live Here

purchaser which is then tabulated by project areas in Hilliani Town. These are referred to as purchasers' profile reports. Inasmuch as there is no overall summary for all purchases, we have included the summaries for Unit 56 comprised of 41 traditional homes and Unit 57 consisting of 60 new design homes which are smaller homes on smaller lots. Both of these units are comprised of single-family, detached homes only. The 1985 profile reports are found on the following two pages.

Analysis of these reports reveal certain characteristics pertaining to these two groups of purchasers. Homes in Unit 56 with average price of \$160,303 (as against \$138,246 for Unit 57) have attracted households with higher incomes and slightly older couples than those in Unit 57. 41% of Unit 56 purchasers previously resided in Hilliani Town which indicates upgrading by residents. On the other hand the single largest group of purchasers in Unit 57 previously lived in Central Honolulu/Waikiki. These would be first time single-family home buyers desiring to get away from urban congestion to a quieter, more open form of living environment.

Another interesting point relates to places of employment for household members. For both groups, less than one-half of husbands worked in Central Honolulu while about one-half of the wives worked there. As expected, a high percentage of working wives (80%+) are found in both groups.

HILLIANI TOWN'S FUTURE HOUSING PROGRAM
 HILLIANI TOWN
 PURCHASER'S PROFILE REPORT
 FISCAL REPORT

DATE: APRIL 30, 1985
 TOTAL SALES: 60

PROJECT: Unit 57 (New Design Homes)
 Unit 57 (New Design Homes) 33 W(s) 31
 Average Age of Husband: 33 W(s) 25
 Average Years Living in Hawaii: 25

Previous Area Where Purchasers Lived:
 Central Honolulu/Haiku 201
 Hiliiani 201
 Waipahu/Kaunoihi 105
 Waipahu/Kaunoihi 105
 Kalaheo/Haiku 11
 Other 274

Ethnic Background of Purchasers:
 Japanese-American 115
 Caucasian 201
 Filipino-American 105
 Mixed 115

Location of Purchaser's Place of Employment:
 Husband
 Central Honolulu/Haiku 33
 Waipahu/Kaunoihi 105
 Pearl City 33
 Hiliiani 105
 Aiea/Haleiwa/Haiku 105
 Pearl Harbor/Haiku 105
 Kalaheo/Haiku 105
 Waipahu/Haiku 105
 Other 115

Wife
 Central Honolulu/Haiku 105
 Pearl City 105
 Hiliiani 105
 Aiea/Haleiwa/Haiku 105
 Pearl Harbor/Haiku 105
 Kalaheo/Haiku 105
 Waipahu/Haiku 105
 Other 115

Occupation of Purchaser:
 Husband
 Professional 105
 Technician 105
 Construction 105
 Clerical 105
 Dept. of Defense 105
 Other 105

Wife
 Professional 105
 Technician 105
 Construction 105
 Clerical 105
 Dept. of Defense 105
 Other 105

Percentage of Working Wives: 100%
 Percentage of Purchasers with Children: 115
 Pre-School Age: 215
 Ages 5-11: 311
 Ages 12-17: 265
 Total Children: 311
 Avg. Children/Unit: 2

Average Combined Income of Purchasers: \$71,200
 Average Husband: \$2,283
 Average Wife: \$3,367
 Average Combined Income of Purchasers (with options): \$130,250
 Average Husband: \$22,248 (165)
 Average Wife: \$15,178
 Average Monthly Payment: \$1,007

Religious Preferences:
 Catholic 201
 Protestant 201
 Buddhist 105
 None 105
 Other 115
 Not Specified: 211

Average Amount of Options Purchased: \$1,129
 Solar Preference: Option 2, 3; Install 17, 2; Range is only 69, 2
 Window Type Preference: Lower 2, 3; Sliding type 53, 2

Energy Preference: Gas 53, 2; Electric 57, 2
 Systems for Buying at Hilliani: 1st Priority: Price
 2nd Priority: Community
 3rd Priority: Location
 4th Priority: Climate

Other: 115

Hilliani Town's Future Housing Program
 At this stage, detailed plans for the development of the 1,200 acres above the H-2 Freeway have not been developed so consequently the discussion which follows is somewhat general in nature.

Basic Development Direction. Hilliani Town's 3,500 acre master plan calls for a comprehensively planned residential community providing a variety of facilities to serve the requirements of its residents. With the forthcoming housing developments on the mauka 1,200 acres adding to its population base, facilities which are not available today would be possible resulting in greater convenience for the residents. The Town Center, a major regional shopping center presently under construction, a college campus and an area to be set aside for a retirement community in the mauka area will definitely add to the attractiveness of Hilliani Town. Although not a part of the 3,500 acre Hilliani Town community, the development of the Hawaii Technology Park nearby will also add to the desirability of this community by providing job opportunities nearby.

Owing to the success of the project, it is the applicant's intent to continue with present developmental direction and policies looking to the future. This means the continuation of

of 15,872 units. The remaining 8,011 units are proposed to be built over the next 13 years.

Unit Mix. In terms of unit mix, applicant projects roughly 80% to be single-family, detached units with the remaining 20% being low-rise, low-density multiple units for the balance of the project area. This mix emphasizes the development of more single-family detached units as compared to the present mix of 66% single-family units and 34% multi-family units. Certainly market conditions will be the deciding factor in determining the final mix. However with the increasing popularity of the single-family, detached homes in Milliani Town and the need to keep prices of these units in line, smaller units on smaller lots will constitute a larger portion of the future housing inventory.

In keeping with the growing trend towards smaller household size as well as smaller units, it is projected that the future household occupancy will average 3.14 persons per unit compared to the existing 3.37 person household.

Pricing. Consistent with its basic approach of continuing its present policies with respect to future developments, the bulk of the units will continue to be priced to attract those in the

an essentially residential development (emphasizing single-family, detached units) with the products aimed at the middle of the homebuying market. Policies with respect to low-density, low-rise development which blends in with the urban fringe setting will be continued. Further, the high level of maintenance which is one of the principal ingredients for an attractive community will definitely be continued.

Housing/Population Count. The table below summarizes the total housing development for Milliani Town based on its 3,500 acre master plan with accompanying population projections.

Table 11
Total Unit and Population Projection
Milliani Town

<u>Area</u>	<u>Number of Dwelling Units</u>	<u>Population Projection</u>
Property above H-2 Freeway (1,200 acres)...	6,640	20,850
Area below H-2 Freeway left to be developed ...	1,371	4,456
Completed portion	7,861	26,491
Totals.....	15,872	51,797

Viewed in terms of the overall total, the 7,861 units completed to date represent approximately one-half of the projected total

Millilani Town in that market are presented for consideration.

1. It is estimated that the following demand for additional housing units to the Year 2005 exists:

Oahu-wide.....80,028 units
 Central-Oahu.....14,631 units

2. With 5,860 units planned for the 1,200 acre mauka area, Millilani Town will play a major role in supplying Central Oahu's requirement for additional housing.

3. Over the last eighteen years, Millilani Town, Inc. has produced and marketed over 7,800 units, averaging 437 units annually over this extended period. As such, it has emerged as the major home building entity in the State.

4. Millilani Town being an on-going project has a definite advantage in terms of time required to gear up for production and marketing of units over some of its major, future competitors who are only now contemplating beginning their projects in Central Oahu and Ewa.

5. Measured in terms of market acceptance of its products as well as returns to the developer, the Millilani development is considered a success. All indications point to similar results looking to the future.

middle of the house-buying market. Also there will be no change in the practice of selling land in fee which most purchasers find very attractive.

Development Phasing. Applicant estimates that complete build out of the entire 3,500 acre Millilani Town will encompass approximately 13 years to the Year 1999. By sub-areas, the time table is projected as follows:

Area	Development		Completion	
	Years	Years	Years	Years
Area below H-2 Freeway	4 years		1990	
Area above H-2 Freeway	9 years		1999	
Total		13 years		

With a total of 8911 units scheduled for construction over the 13 year period, annual average production numbers 616 units. Although this level of production is higher than the average annual output of 437 units over the last 18 years, it approximates the 613 units per year production during the 1971-1979 peak production period.

Conclusion

Based on the foregoing analysis, the following conclusions regarding the overall housing market and the involvement of

APPENDIX B

**Preliminary Market Study for a Proposed
Retirement Community at Millilani Town, Oahu.**

Helber, Hastert, Van Horn & Kimura Planners. March 1985

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PRELIMINARY MARKET STUDY FOR A PROPOSED
RETIREMENT COMMUNITY AT MILLIAM TOWN, CALIF.
March 15, 1985

DRAFT

INTRODUCTION

This report presents information relating to the possible development of a retirement community at Mililani on a portion of the 1,250 acre area mauka of the H-2 freeway. A brief narrative describing the proposed location of a retirement community within the project area is followed by a general overview of the potential market for a retirement community - those households at or near the retirement age wishing to relocate their primary residence to an age restricted residential community. This is followed by an overview of the history and experiences of the retirement community at the national level and a summary of local examples and experiences. A description of the proposed development is then outlined. The final section presents a preliminary market analysis of the potential demand for a retirement community at the site described below.

SITE DESCRIPTION

A 160-acre site located at the south eastern mauka end of the Mililani Hauka expansion has been identified for the possible development of a retirement community. The site is bordered by Kipapa Gulch to the east, the H-2 Freeway to the south and a small unnamed gulch separating it from the remainder of the mauka development. The physical separation provided by these topographical features is ideally suited to the concept of the retirement community in that vehicular access to and from the area can be closely monitored - providing the enhanced security protection so often sought by retirees. The land, currently under cultivation, slopes gradually up-land to an apex approximately five-fifths of a mile mauka of the freeway. Access to the H-2 Freeway is located at the south western boundary via an extension of the Meheula Parkway. Figure 1 below locates the proposed site within the Mililani Hauka area.

GENERAL CHARACTERISTICS OF THE ELDERLY POPULATION

Introduction

Old age is nothing new; the fact that entire generations of our population are reaching old age with memberships almost in tact is new however. Until this century, the majority of Americans suffered irreversible physical decay in their 40s and 50s - that is if, they survived childbirth and the array of diseases that have since been eliminated. Medical advances in the last century have almost doubled the life expectancy of the average American: from 47.3 years in 1900 to 78.0 years in 1980. The concept of retirement therefore, wherein an individual, upon reaching a certain age, has achieved the "right" to live without working, has thus evolved from something that only a few hardy individuals would survive to enjoy to a major institutional force that is experienced by a growing majority of the American people.

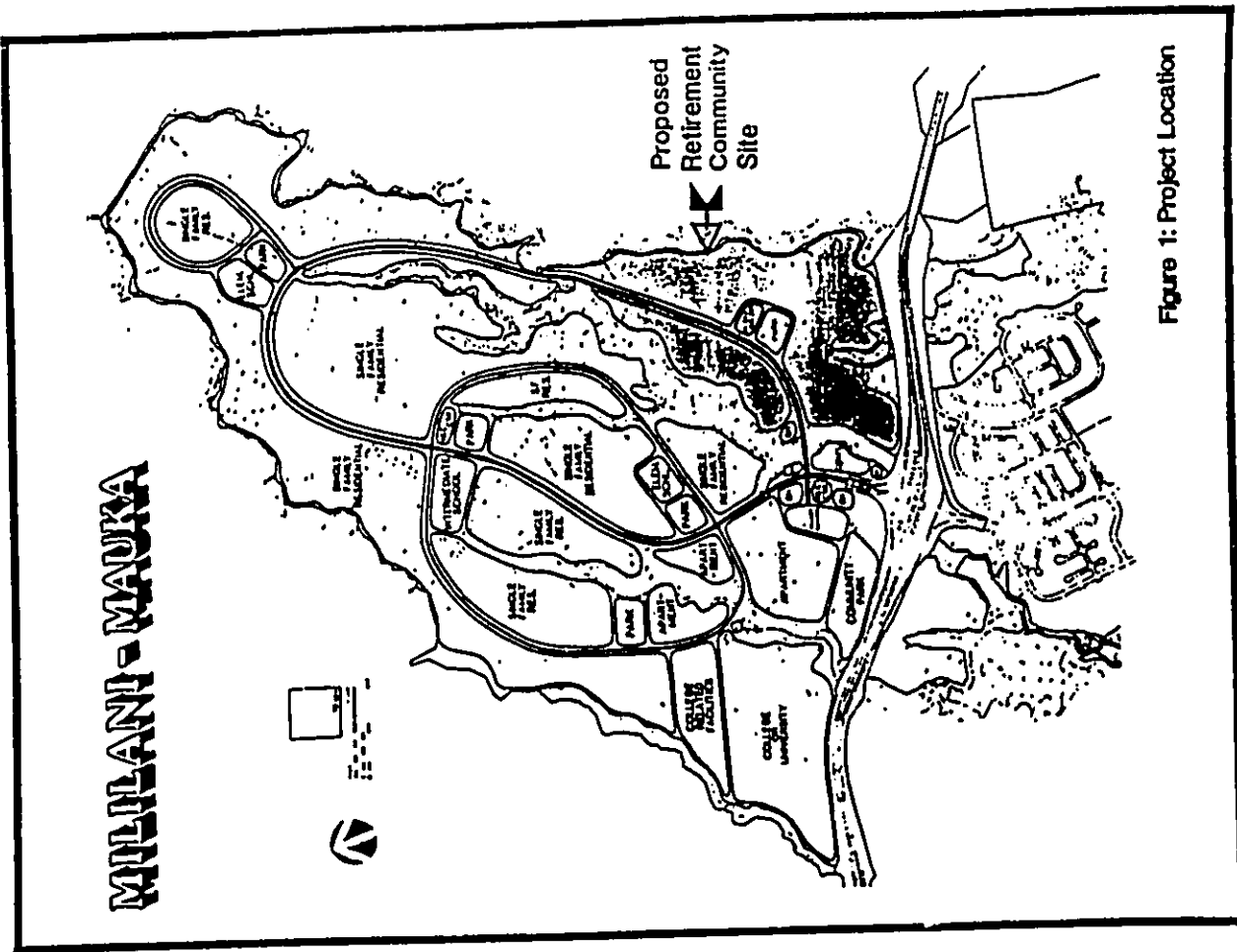


Figure 1: Project Location

origins of the economy where large numbers of male plantation workers were imported to work in the sugar fields.

AGE STRUCTURE OF THE ELDERLY POPULATION IN HAWAII (1980)

	Total	Median Age	55+	55-64	65-74	75+
Oahu	762,565 (100.0)	27.1	120,465 (15.80)	65,097 (8.54)	35,932 (4.71)	19,436 (2.55)
State	964,691 (100.0)	28.3	161,397 (16.72)	85,177 (8.83)	49,375 (5.12)	26,775 (2.78)
Country (1,000s)	226,546 (100.0)	30.0	47,233 (20.85)	21,703 (9.58)	15,581 (6.88)	9,969 (4.40)

Note: Figures in parentheses indicate percent of row total.

Source: Statistical Abstract of the U. S., 1980 Census records.

The changing age profile of Hawaii's people is indicative of both national and local trends generally. An examination of the age-sex pyramids below graphically presents the "bulge" which is beginning to emerge within the population of Oahu. The leftward skew within the 20 to 24 age bracket represents the large number of single males serving in the military on Oahu.



The prevalence of homeownership amongst the elderly is much higher than that of the general population where approximately half of all housing units are owner-occupied. On Oahu in 1980, there were an estimated 66,000

The novelty of health and physical vigor in the elderly population is reflected in the current struggle over nomenclature. Many of the words used to describe members of this growing segment of the population such as: the old, the senior citizen, the aged or aging, etc. are fraught with value connotations which are often unacceptable to those designated by them. The term "retirement community" itself also evokes a number of disparate and often erroneous connotations by many who view them as nothing more than cursing and convalescent homes for the frail.

This section of the report examines the relevant demographics and explores some of the unique problems and opportunities facing the elderly relative to their special housing needs.

Demographics

As the population of America ages, more and smaller households are becoming the norm. The number of persons over 60 years of age is increasing rapidly and, in fact, those people over 75 years of age are proportionately the fastest growing age group in America. "In 1920, the number of persons in the 'pre-elderly' age category of 55 to 64 years rose to about 21.7 million - an increase from 1970 of 17 percent, or more than 3 million people. The median household income of this group exceeded that of all other age groups, especially in regard to the amount that was discretionary in nature. At the same time, many of these households have become 'empty nesters' and find themselves with excess housing appropriate for retirement living." (Urban Land Institute, 1983.)

"The typical older person in the U.S. today is likely to be a woman, a homeowner (72 percent of elderly households) with a mortgage paid off (84 percent of elderly homeowners), and living as part of a married couple. Although this older person has no plans to move, she is concerned that in the future her health or economic situation might necessitate a relocation. She sees members of her family who live nearby several times a month but has no desire to live with them. She is uncertain as to what relocation possibilities might be available or how to obtain more information." (Ibid.)

In Hawaii, 1980 Census data indicates that approximately 17 percent of the resident population was 55 years old or older, this is less than the national average of approximately 21 percent (see following Table). By the year 1995, this population segment is expected to increase to 20 percent - growing at almost twice the rate of the general population (49.23 vs. 25.15 percent). Persons 75 years and older are projected to increase by greater than 140 percent. The "graying" of the State population is further supported by the increasing median age of the total population: 1980 median age was estimated at 28.3 years. 1985 estimates are 29.9 and by the year 2005, the median age is expected to be almost 35 years. Hawaii is unique to the rest of the States in that the male-female ratio amongst the elderly is quite balanced relative to the norm which is dominated by females. This is a transitional phenomenon however and can be attributed to the

households headed by an individual 55 years of age and older, of these, 44,880 or 67 percent were owner-occupants. In addition to a higher prevalence of homeownership, national Census data indicates that over 80 percent of these elderly-owned homes are owned free and clear. (U. S. Bureau of the Census, Current Population Reports, Special Studies Series P - 23, No. 85, "Social and Economic Characteristics of the Older Population, 1980.")

Average household size amongst elderly households is significantly smaller than that of the general population. On Oahu in 1980, average household size for the general population was 3.15 persons per household. At the same time, average household size for homes headed by individuals at least 55 years of age was 1.8. The smaller household size amongst the elderly is significant because of the increased demand for housing units that ensue.

Problems and Opportunities.

Life-cycle Changes and Residential Mobility

Life-cycle Changes. Several aspects of life-cycle changes bear upon the elderly and near-elderly's need for specialized housing services. The first major change affecting the elderly is the "empty-nest" phenomenon, a reduction in family size due primarily to the departure of children and also to a loss of other household members. The home, designed for two parents and three children with the "big yard in back" may no longer be appropriate housing after the kids move out. Pre-retirement "empty-nesters" in the 45-55 age group are often at the peak of their income earning ability and have the financial wherewithal to up-grade their standard of living while reducing the overall size and maintenance responsibilities associated with their existing residences. This age group is increasingly becoming a major market for developers of retirement communities across the country.

The second, and most significant life-cycle change affecting the age-sixty-five-and-over group, but also increasingly affecting younger households, is retirement. The most tangible impact of retirement is the loss of income and its effect on the retiree's accustomed standard of living. As persons reach the retirement age, their incomes are often cut by 1/2 to 1/3. Although a high percentage of the elderly own the houses they live in and have paid off the mortgage, other housing expenses continue to consume an increasing share of their disposable income. (Urban Land Institute, 1983.) This is particularly true in areas such as Hawaii with a relatively high cost of living and lack of affordable alternative housing accommodations. In addition to the more obvious economic ramifications involved with retirement, there are far more subtle changes as well. The retiree must re-evaluate what sometimes can be deeply ingrained personal values towards family, career and relationships to peers in light of the changed social status. Almost overnight, the "daily-commute-to-work" ceases and must be replaced with expanded leisure time. Many retirees

are unprepared to accept this new status and feel uneasy about "not working;" especially in the company of their "still working" peers.

The physiological aspects of the aging process itself are a third determinant of the life-cycle's affect on residential mobility and demand for alternative housing forms. With advancing age, stairs become harder to climb, door knobs harder to turn, garage doors harder to open, door bells harder to hear, etc. Health related problems increase rapidly in the 75+ age group where it is common to find persons handicapped in one or more major life activities. It is appropriate to note that chronological age is not a sufficient criterion of physiological welfare. Some people simply age at different rates than others.

Effects on Residential Mobility: The Appeal of the Retirement Community. These life-cycle changes may predicate the desire to relocate. In the first instance, the "empty-nest" phenomenon, the household will desire more appropriate residential accommodations reflecting a more mature lifestyle and smaller space needs. An increasing number of this group are seeking the service amenities found in retirement communities. In the second instance, retirement, the retiree will seek a residential environment which is economically feasible and where leisure is seen as an unstigmatized post-retirement activity and social contact is maximized. In the third instance, the increased dependence on environmental support services resulting from the physiological changes of the aging process, may encourage, indeed may force, elderly households to relocate to more supportive environments offered by many retirement communities.

At the national level, it is well documented that older people move less frequently than younger people - about 5 percent each year compared to 20 percent of the overall population. When they do move, they don't go very far. Among elderly who move within the country, few move beyond State boundaries and most stay within the same county. Two-thirds of those who move are renters. The reasons most often cited for moving by elderly households are "to be closer to relatives, retirement and for a change of climate." (Myers, 1982)

Inter-State Migration. Of the elderly that do move beyond State boundaries, approximately 50 percent move to the Sunbelt States. "Since 1960 the number of Americans aged 60 and older who move to the Sun Belt has nearly doubled from 469,000 in the five years from 1955 to 1960, to 925,000 between 1975 and 1980. Most of this rise occurred during the 1970's." (Longino, 1984.) The top four sunbelt destinations are Florida, California, Arizona, and Texas. In Florida, 24 percent of migrants to the State between 1975 and 1980 were aged 60 and older. In Arizona, 16 percent of migrants were older Americans. In contrast, it is estimated that only 3.7 percent of the migrants to Hawaii between 1975 and 1980 were aged 60 and older. While Florida is the top importer of the elderly, it is also the fourth-ranking exporter of older people - those "... most demanding of Florida's health and social-service systems - the very old, the poor, the widowed, and the

elsewhere in the system. An important consideration in combining shelter and service needs are the differing scale economies involved in each. When the developer begins to add services for the elderly, whether housekeeping, personal care, meals, medical treatment, or recreation, to his provision of shelter, he is confronting markets that are either smaller or larger than the building tenancy for which he is providing shelter. There are varying geographical markets, break-even points, and economies of scale in the provision of each of these services that may be quite different from the specific market for housing. Simply put, the "housing plus" business is more complicated than the mere provision of shelter." (Samuelson, 1981.)

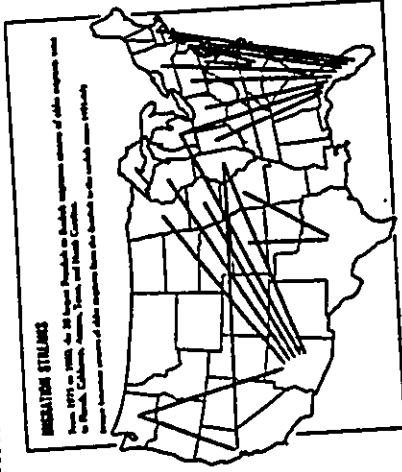
Yet another impediment to residential mobility involves the illiquidity of home equity. Home equity represents the major asset of most elderly households. The phenomenon of the cash-poor elderly homeowner, wherein estate life savings are tied up in a non-income producing asset like a home, characterizes many in this age group. Evolutions in debt financing and changes in federal, state and local tax codes are facilitating residential mobility by enabling elderly homeowners to utilize home equity without incurring financial debt (which may ultimately end up being the responsibility of the deceased family). Financial devices such as the Reverse Annuity Mortgage (RAM) and Sale/Lease back agreements allow the elderly homeowner to utilize existing home equity by turning it into a monthly income stream. Changes in the Federal Tax Code have eased the burden on elderly homeowners allowing them a one-time \$100,000 tax-free capital gain on the sale of the primary residence. Changes to state and local tax laws such as real property tax exemptions and exemptions on State income Taxes have also served to lower the opportunity costs of moving to the elderly resident.

Independence

The maintenance of an individual's personal independence in the least restrictive environment has proven to be an important societal objective both in terms of the costs of service provision and the quality of life experienced by the particular individual or household. The maintenance of maximum independence is of special importance to the elderly for continued mental, emotional and physical well being. Because of the physiological aspects of aging, the aging process itself is correlated with an increasing dependence on environmental supports such as medical and personal care services. Changes of this type accelerate among those over 75 years of age.

In order to maintain pre-existing levels of life quality in light of the gradually increasing dependence on environmental supports, a continuum of living arrangements should be available ranging from the conventional detached single family dwelling to the fully supervised nursing home. A community which can offer a this range of environmental support to elderly households will be more appealing to the extent that it provides for the maximum degree of independence in the least restrictive environment to each of its residents.

dependent." (ibid.) The major migration streams within the continental U. S. are reproduced below.



Factors inhibiting residential mobility. A key factor inhibiting residential mobility amongst the elderly is the lack of viable housing alternatives available to the elderly household. The national housing industry has long been preoccupied with the development of housing for a young population. The focus has been on single family, detached housing with a large number of bedrooms for young and growing families. The whole concept of residential and community design has revolved around this housing type. Neighborhoods are typically defined by such criteria as "that area serviced by an elementary school." Open spaces, playgrounds, ballfields, even neighborhood commercial centers are designed to meet the needs of young families. Now, as the population matures, there is a need for the development of varied living arrangements for the elderly besides the present alternatives of the conventional single family dwelling and institutional care.

Another factor impacting the housing needs of the elderly is the lack of coordination between shelter production and the provision of services for the elderly. Little coordination occurs between the providers of housing and those that provide the services which many of the elderly depend upon. The elderly resident is forced to deal with a myriad of disparate service providers of housing, recreation, medical and other service providers. It is becoming apparent that investments in appropriate housing for the elderly - housing providing more than the provision of basic shelter - involving a more comprehensive approach to the changing and often times increasing environmental needs of the elderly, can generate savings in service and medical costs and a reduction in income assistance needs, and that the failure to make investments in such housing can generate costs

AGE SEGREGATION

Whether explicit or implied, age segregation is a fundamental precept of the retirement community. As with any form of intentional segregation, it can prove to be problematic. A number of social critics have viewed the age segregated community with skepticism. "Margaret Meade characterized such developments as 'golden ghettos,' while Lewis Mumford argued that such large scale organized living quarters for older persons were socially unnatural and should be avoided at all costs." (Urban Land Institute, 1983.)

Some planned retirement communities are shunned by new retirees who prefer neighbors their own age, rather than the original residents who have grown relatively older. Also, in an increasing number of instances, the voting blocks of older persons may stand in the way of practical actions such as long-term commitments to investments in roads, schools and other public facilities demanding instead increased health care services and other elderly related public services.

Some municipalities prohibit discrimination against prospective housing purchasers. In Hawaii, State Law prohibits discriminatory practices in real property transactions except in the case of elderly housing accommodations (HRS, Section 515-3 para. 7 "Discriminatory Practices in Real Property"). Housing may be provided exclusively for individuals at least 62 years of age. These policies would appear to undermine the viability of an age segregated community oriented towards the young-elderly; the "empty nesters" and pre-retirement households. In practice however, it has often not been necessary to codify rules regarding age segregation; the financing, styles, amenities, and services offered by the respective developments have usually been sufficient to attract the appropriate age groups.

Attitudes Towards the Family Unit

The retirement community concept appears to be a predominantly western phenomenon. Although Hawaii is becoming increasingly "westernized", the cultural values held toward family elders amongst the major ethnic groups may affect the marketability of the retirement community concept. Are the values concerning the extended family, where multiple generations of a particular family live under one roof, purely an economic phenomenon or will they work against the idea of the age segregated community? Since the market for a retirement community at the Mililani site is expected to come from within Honolulu County (the majority from within an eight mile radius of the site), the potential impact of geographical separation between family heads would appear to be insignificant.

RETIREMENT COMMUNITIESIntroduction

The concept of the "retirement community" is a relatively new phenomenon in the United States. These communities were first built in the 1920's when various social organizations developed specialized housing projects in Florida to provide for the needs of their retiring members. Since that time, an extensive variety of communities has evolved ranging from the New Towns in California and Arizona to rental mobile trailer parks located in South Florida. This section provides a brief description of various retirement community types located throughout the country and ends with a description of local experiences with the retirement community phenomenon.

Definitions

The term "retirement community" is an amorphous one and can encompass many housing types, a variety of non-residential amenities and a wide range of age groups. As discussed previously, the term is laden with connotations about housing for the frail and infirm elderly. Retirement communities are not to be confused with nursing or convalescent homes although they may offer many of the same services. A general eligibility requirement in many communities is that the prospective resident be ambulatory and in good mental and physical health upon admittance.

Housing types can range from mobile and manufactured housing to high rise apartments. The communities may be found in trailer parks, in the middle of an urban area or on broad tracts of land where a full range of housing types may be provided. Environmental support provided within retirement communities varies according to the particular needs of the residents and the scale of the development. Housing units may be owned in fee, rented or a range of sub-fee positions.

Enhanced security protection is a basic amenity provided by most retirement communities. Many will offer scheduled social programs to facilitate interaction amongst residents, some will offer medical care ranging from a weekly doctors visit to an on-site skilled nursing facility. The huge retirement communities of Sun City (Arizona) and Leisure World (California) have private hospitals located within their developments. Other amenities provided to residents can include active and passive recreational facilities, housekeeping and food services and various educational and personal development programs.

Age restrictions on potential residents, explicit or implied, are central to the concept of the age-segregated community. The actual age requirement (55 years, 65 years, 75 years, etc.) will vary with the type of community and the particular market to which it responds. Communities offering extensive on-site medical facilities (sometimes referred to as "life-care" communities) will be capable of providing for the needs of the frail-old, residents

that are no longer able to carry out basic life functions. Other communities oriented around more active recreational amenities may attract the young-old, those households at or near the retirement age that wish to remain very active. As discussed above, many of the larger retirement communities offer a full range of environmental supports and may appeal to the full spectrum of the elderly population.

Sponsorship, financing and tenure can vary considerably amongst retirement communities. Sponsors vary from non-profit religious and fraternal groups to national firms specializing in the construction and management of retirement communities. Private or non-profit developers may be retained by the land owner or sponsoring organization to design, construct, market and manage a particular project. Construction financing is accomplished in a number of ways depending on the type of community and the particular market demand. Developers of higher priced "continuous-care" communities may solicit commitments from prospective residents sufficient to obtain interim construction loans which are then retired by "entrance fee" payments by residents upon final occupancy. Alternatively, long term financing may be sought to reduce the up-front costs to the new resident by amortizing it in monthly rental payments. In most instances, operating expenses are paid in monthly installments by residents, the exact amount of which varies with the size and type of accommodation.

Tenancy can vary both amongst and within particular projects. A community may offer rental accommodations with simple month-to-month tenancies cancellable on thirty days notice. Others may offer limited equity tenancies sometimes referred to as a "non-assignable personal right of occupancy for life." The elderly householder purchases the right to occupy the premise for the remainder of his or her life. A recently proposed continuous-care community in Honolulu provides for a greater equity position by returning a percentage of the proceeds of the sale of the apartment unit to the deceased residents estate. Standard condominium and cooperative forms of ownership are also often available as is the more conventional fee-simple ownership.

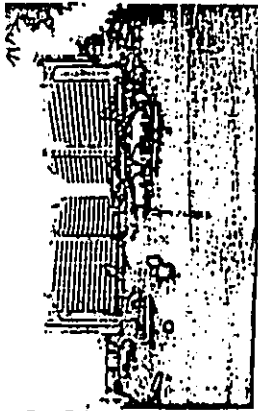
Retirement Community Types

To further examine the phenomenon of the retirement community, it is helpful to disaggregate them into classes or types of communities based on size, mix of services offered, and population characteristics. The five types identified below are: retirement new towns, retirement villages, retirement subdivisions, retirement residences and continuing care retirement centers. This typology is used simply as an analytical device to assist the reader in visualizing the range of developments which fall under the general rubric of the "retirement community." Much of the information for this section was obtained from the Urban Land Institute publication Housing for a Growing Population, 1983.

Retirement New Towns. These are the largest of the retirement communities sustaining populations of over 5000 residents (Arizona's Sun City and Leisure

World at Laguna Hills California had 1980 populations of 47,500 and 22,000, respectively) and occupying large tracts of land of several thousand acres. A variety of housing options are available to prospective residents ranging from single family homes, duplexes and townhouses to high rise buildings. Common forms of tenancies offered include fee-simple, condominium and cooperative ownership.

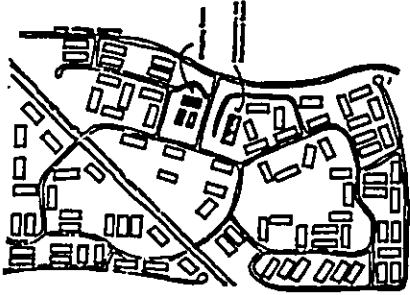
Designed as completely self-contained towns, numerous on-site support facilities are available which provide for most of the recreational, medical, commercial, and financial needs of the community. A 1981 study (National Policy Center on Housing and Living Arrangements for Older Americans, The Directory of Retirement Communities in the United States, November 1981) identified 16 of these communities, 75 percent of which were developed in the 1960's. The study estimated that although only one percent of the retirement communities in the Country are referred to as retirement new towns, they house an estimated 30 percent of the entire retirement community population. The illustration below of Leisure World is representative of one these 16 communities



Leisure World, a retirement new town in Laguna Hills, California.

Retirement Villages. These are smaller than new towns—generally ranging in size from 1,000 to 5,000 residents although they may offer the same mix of housing types. They can be found on sites ranging from 100 to 1,200 acres and offer numerous recreational and leisure activities. A major difference between the retirement village and the new town concept is the degree of self-containment. The retirement village will generally provide for the convenience goods needs of the local residents and will at least offer some sort of emergency medical facilities but, for the majority, will not approach the level of self-sufficiency exhibited by the larger new town community. It is estimated that villages represent 11 percent

of all U.S. retirement communities. The Country Village Apartments, a typical retirement village, is shown below.

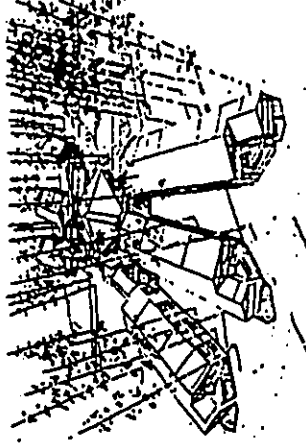


Retirement Village, such as Country Village Apartments in San Jose, California, have a limited number of residents.

Retirement Subdivisions. These contain a very limited number of services and facilities and are usually sited close to areas already rich in amenities and services. The larger community becomes the major attraction for prospective residents. Sizes vary although most house no more than 500 residents. Common housing types are either single family or mobile homes; the former are generally owner-occupied while the latter may also be rented. The retirement subdivision is the least supportive form of retirement living.

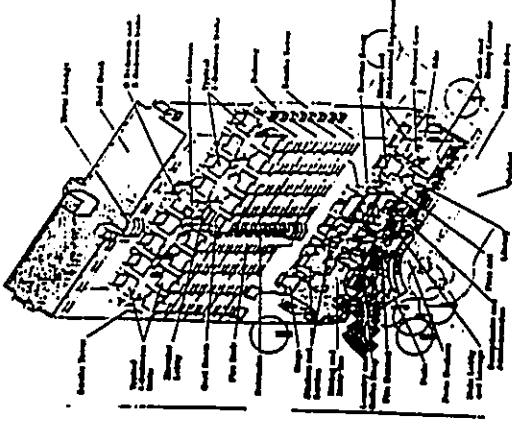
Retirement Residences. These are small retirement communities which provide supportive environments designed to accommodate a relatively independent lifestyle at a moderate cost to older retired persons. They are often built under the sponsorship of non-profit groups such as churches, unions, or benevolent organizations. Residences can be located in urban communities near public transportation, shopping and medical services, and are found in all parts of the US. The average residence contains fewer than 500 dwelling units most of which are apartments rented on a month-to-month basis. Besides apartments, retirement residences provide communal rooms and dining facilities where residents may eat at least once a day. Like retirement subdivisions, they generally lack outdoor recreational amenities and health care facilities and services. A low-rise rental retirement residence is pictured on the following page.

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These retirement centers are typically located in areas already rich in amenities and services. They provide a wide range of services and facilities, including health care, dining, recreation, and other amenities. All CCRC units come with health care services.

Continuing Care Retirement Centers. Unlike retirement subdivisions and residences discussed above, these provide a highly supportive environment based on the concept of continuing health care. Residents are housed in either a complex of buildings or in a single building. The building complex typically contains a mix of residential structures, dining facilities, meeting rooms and medical facilities. Many of these centers offer on-site skilled nursing and intermediate care facilities (SNF/ICF) in addition to various support services including housekeeping, social and recreational activities and out-patient services. These facilities may be located within either the new town or the retirement village communities discussed above or may be self-supporting. An example of a continuing care facility is reproduced below.



Continuing care retirement centers are typically located in areas already rich in amenities and services. They provide a wide range of services and facilities, including health care, dining, recreation, and other amenities. All CCRC units come with health care services.

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In 1981 it was estimated that there were a total of 2,363 retirement communities in the US housing nearly 1 million residents. Florida and California ranked first and second, having 16 and 13 percent respectively of the total United States retirement communities.

Local Examples of Retirement Communities

Hawaii has had limited experience with retirement communities largely due to three factors: its geographic location relative to the large population centers of the continental U. S.; the limited size of the domestic population or market; and the high cost of living. A preliminary survey has identified seven retirement communities, two of which have yet to break ground.

1. Sun Village. Located adjacent to the Wilcox Hospital one mile north of Lihue, Kauai, Sun Village was designed as a retirement condominium and would probably be classified as retirement residences according to the typology discussed above. The project consists of 143 dwelling units located in three three-story buildings and includes a variety of studios and one and two bedroom apartments. Kitchen facilities are provided in each unit. Eligibility is limited to those persons 55 years of age and older. There are no health restrictions for entry and no health care is provided to residents. Trouble lights have been installed in each of the units and are connected to the resident manager's office. Medical care and hot meals are available at the Wilcox Hospital adjoining the site. An exercise room and pool are provided and the homeowners association organizes group activities and maintains a small library. The project was initially marketed in 1980 to a down real estate market and was foreclosed by the lender shortly thereafter. The lender, who continues to own most of the units, is currently managing the property.

2. Arcadia. Developed in 1967 by the Central Union Church, the Arcadia is a continuing care facility. The single-structure, 13 floor project is located in central Honolulu adjacent to nearby medical, shopping and transportation facilities. The project contains a total of 250 studio and one bedroom units in addition to a 36 bed skilled nursing facility (SNF) for exclusive resident use. In 1979, the Arcadia was home to 312 residents, 79 males and 233 females. Occupancy rates for the SNF were 97 percent in 1982. New applicants to the Arcadia may have to wait three to five years before being accommodated. Eligible applicants must be 60 years of age or older, ambulatory, in good mental and physical health and meet certain financial guidelines. A one time, non-refundable "entrance fee" amounting to between \$30,000 and \$87,200 is paid by the new resident upon admittance. A subsequent monthly service charge of between \$95 and \$1,192 is levied to cover the operating costs of the project. The facility offers a range of environmental amenities including a full-time social director and executive chef.

3. Pohai Mani. Located in Kaneohe, the Pohai Mani Good Samaritan Kauhale is a continuing care retirement community offering both apartment and cottage housing. Pohai Mani is owned by the Evangelical Lutheran Good Samaritan Society of Sioux Falls, South Dakota. The project contains a total of 184 apartment units and 22 cottages in addition to a 42 bed skilled nursing facility (not for the exclusive use of the tenants). New applicants, "reasonably" healthy and at least 55 years of age, pay an "admission fee" of \$1,500 to \$2,500 and monthly rents ranging from \$665 to \$2,025. Tenancy is month to month. A full range of services are offered to residents including housekeeping and meals.

4. Laniloa. Located in Waikiki, the Laniloa Good Samaritan Center is also owned and operated by the Evangelical Lutheran Good Samaritan Society. A mix of 70 furnished studio and two bedroom apartments are offered all situated in a 12-floor hi-rise building. In addition, an 18 bed personal care unit is available for persons needing minimal nursing care or assistance-this facility is open to non-residents as well. Call buttons are provided in each room to allow the resident to summon emergency assistance. There are no age restrictions for entry into the residence. As with Pohai Mani discussed above, a full range of housekeeping and meal services are provided. Two rental programs are available to residents: the "Entrance Fee Plan" and the "Non-Entrance Fee Plan." With the payment of a \$15,000 entrance fee, the prospective tenant reduces the monthly rental payment by approximately 25 percent depending on the size and location of the unit. In the non-entry fee plan the tenant pays the increased monthly rent without having to pay the initial entry fee. Rents range from \$698 to \$1,133 under the entrance fee plan and are increased by \$200 under the non-entrance fee plan.

5. 630 Piikoi. Life Care Services Corp. of Des Moines, Iowa, plans a 253- to 265-unit highrise continuous-care retirement condominium, along with a 60-bed skilled nursing facility on part of a five-acre mixed-used development in Kakaako. The project is designed to provide individuals, aged 62 years and older, with an apartment residence and unlimited guaranteed nursing care for the duration of their life. With the payment of the initial "entry fee" and monthly service fees, residents are entitled to the apartment of their choice, utilities, meals, and other services and amenities and unlimited lifetime nursing care exclusive of hospitalization. Upon the death or withdrawal of a resident, 90 percent of the entrance fee is repayable to the resident/estate from the proceeds of reacquiring the apartment. Entry fees will range from \$155,000 to \$355,000 with monthly service fees ranging from \$700 to \$1,000. Current projections are for occupancy in 1987.

6. Cloud Country. Plans are currently under way to construct a 52 unit retirement condominium on 4 acres near Pukalani, Maui. The

project is bordered by the Puhalani Golf course and a large gulch restricting vehicular access to one entry gate. Cloud Country consists of three main two-story structures (with parking below) connected to a central meeting/dining room facility by a series of ramps and covered walkways. Elevators are located in each of the main buildings. Amenities include congregate dining facilities (initially serving two meals per day), craft rooms, tenant garden areas, heated pool and jacuzzi. No age restrictions are planned. A resident manager will be responsible for the operation of the facility.

7. Hale Mahua Project. Plans have been completed for the construction of a 300 unit life care facility to be located on an as yet undetermined location on the island of Maui. The project is similar to the 633 Pittoi facility discussed above except that it will offer low-rise residential units spread over 23-acre site. As with the 633 Pittoi project, an age restriction of 62 years will be enforced. A skilled nursing facility will be available on-site with priority given to residents. A Certificate of Need has not yet been filed with the State Health Planning and Development Agency. Purchasers will pay a one-time \$170,000 entrance fee and a monthly pro rata portion of the operating expenses. Ninety-four percent of the entrance fee is reimbursed to the resident's estate upon his or her demise. Recreational amenities include swimming, golf and lawnbowling. Other passive activities such as card and craft rooms and a library will also be provided. Hale Mahua is now in the process of locating a developer and is currently negotiating with both the Marriott Corporation and Retirement Communities of America, Inc. (RCAM).

8. Diamond Head. Plans have been announced to develop a small retirement condominium to be situated on the coast near the Diamond Head Light-house. Further information on the current status of this project will be forthcoming.

DESCRIPTION OF THE PROPOSED MILILANI RETIREMENT COMMUNITY

The present Mililani master plan for the area mauka of the M-2 Freeway designates approximately 160 acres for a retirement community. In the types of retirement communities described previously, this would fall into the "retirement village" category, which is an appropriate description of this area within the larger Mililani community. As such, it will have some internal facilities which will cater specifically to the needs of the retirement villagers, but it will also be dependent on the Greater Mililani community for other services.

As presently envisioned, the retirement area would contain a full spectrum of residential unit types aimed at the 50 and up age group from the empty-nesters to those requiring continuing or nursing care. The actual unit types would include scaled-down standard single family detached homes, zero-lot-line, duplex and cluster units with small yards and/or garden plots, one and two story apartments, and a continuing care center. The total number of residential units proposed in the area is 1,400 which would result in a population of approximately 2,500 people living in the retirement community.

In addition to the residential units, community facilities within the retirement village would include a senior citizens' center and a park with recreational facilities catering to retirees' needs. Although a par-3 golf course shown on an earlier plan was dropped due to lack of community support, the market for such a facility should be more carefully evaluated for this retirement village as it could be a major asset in attracting future residents.

Although the retirement community would not be large enough to support its own commercial facilities, a neighborhood shopping center serving the entire mauka area will be located adjacent to the retirement community within walking distance of many of the residents. Also in this area around the shopping center are churches, a large recreation center/entertainment hall and an express bus/rapid transit terminal, all of which could play important roles for the senior residents.

The area designated for the retirement community is surrounded by gulches, thus isolating it from the rest of the Mililani development and making it more secure, a major concern of many retirees. However, the primary loop road serving the mauka area passes through the length of the retirement village, which, if it were part of a bus route as proposed, would be within walking distance of all residents. This internal bus system, if it were to serve all of Mililani, would provide access for senior citizens to the Mililani Town Center, library, golf course, churches and other shopping areas, as well as the college or university, if one is built.

It is recommended that the first phase of development be aimed at the empty-nesters market. Although such facilities as a continuing care center and nursing home should not be built in this initial phase, sites should be

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established and a timeframe set for their development so that potential buyers in the empty-nester market can see that their needs will be taken care of as they age in the years ahead. By providing a full spectrum of residential care in the community, retirees will be able to spend the rest of their lives in the same familiar surroundings among their friends and families.

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PRELIMINARY MARKET STUDY

Summary

A preliminary market study was conducted to assess the demand for a 1,400 unit retirement-oriented residential community at the 160 acre Miiilani Site. The particular market being assessed are those householders, 55 years of age and older, which owned and occupied homes valued in excess of \$100,000 (1980 dollars) on the island of Oahu. This is a good indicator of market support in light of the fact that a high percentage of these homes (national estimate - 80%) are owned free and clear and would represent a substantial equity base to support the development of a retirement community at Miiilani.

Since the earliest occupancy for such a community would be in the mid-1990's, population and household projections were made to reflect 1995 conditions. Three distinct service or market areas were identified on the island of Oahu due to the differential "attractiveness" of such a retirement community to residents of each of the three service areas. Eligible householders (defined as those householders at least 55 years of age which own homes in excess of \$100,000) living closer to the site would be more prone to relocate than those located further away, other things being equal.

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Results from the analysis of population and household projections for the year 1995 identified a total of 27,800 eligible householders island-wide. Potential demand, after adjusting for the variable levels of relative attractiveness of housing at the Miiilani retirement community amongst householders in the three service areas, was estimated to be sufficient to support the development of the retirement community as proposed in Section V of this report. More than fifty percent of the prospective purchasers reside within an eight-mile radius of the site. This estimate of market support is a conservative one for reasons stated below and because it ignores other potential markets such as prospective neighbor island and out-of-state purchasers, households which would utilize assets other than home equity to buy into the proposed community, and householders nearing 55 years of age that would be attracted to the particular amenity mix offered by the retirement community.

Service Areas

The propensity for an elderly household to relocate is conditioned by a number of variables, not the least of which is distance between the existing and the prospective residence. Eligible households living on the Windward side of the island will be less likely to relocate to the proposed retirement community than, say, eligible residents of Miiilani. To account for this differential effect, the island of Oahu was divided into three service or market areas. (See Figure 2.)

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Primary Service Area. The primary service area includes all communities situated within an eight-mile radius of the proposed site. The area includes Aiea, Milliani, Pearl City, Schofield Barracks, Wahiawa and Waipahu and other smaller communities lying between. Eligible homeowners located within this area will be a primary market for the retirement community. Resident population for this area in 1980 was estimated at 186,965 persons.

Secondary Service Area. The Secondary Service Area encompasses the Ewa Plain, the North Shore and Honolulu proper-west of Nuuanu Valley. Eligible households in this area, although located further away than those in the primary service area, would still provide considerable market support for the proposed development. The 1980 resident population of this area (184,771) was approximately equal to that of the primary service area.

Tertiary Service Area. This area essentially includes the rest of Oahu. Communities located in the Waiānae, Koolauloa, Koolauapoko and East Honolulu areas have been included here. The area will provide some support for the proposed development but due to the time-distance to the proposed site, it is anticipated that it will generate the least proportionate demand. Resident population in 1980 was estimated at 390,829 persons—almost double that of the primary and secondary service areas.

Existing and Projected Supply of Retirement Housing Accommodations

Currently, three private retirement communities exist on Oahu providing housing and other amenities to Oahu's senior households. An additional 255 unit development is currently being planned for the Kakaako district. All of the existing developments are either at or near capacity and all four offer a particular kind of residential amenity with a great emphasis on congregate living and continuing health care in a high-rise and or high-density environment. In addition, all of these projects are located in the tertiary service area. These projects are discussed in greater detail in previous sections.

It is currently anticipated that there will not be any significant competition for the retirement housing market by developers offering the same amenity packages within the time frame of this study.

Growth Projections

Best available estimates indicate that the earliest occupancies of the retirement community (should it prove feasible to develop) would be in the mid 1990s. To obtain estimates of market demand coincident with actual product availability, 1980 Census data (Bureau of the Census, 1980 Census of Population and Housing, May 1983) were projected by service area to the year 1995.

Overall population growth for the City and County of Honolulu was estimated using the M-F series population projections (DP2, Hawaii Population and

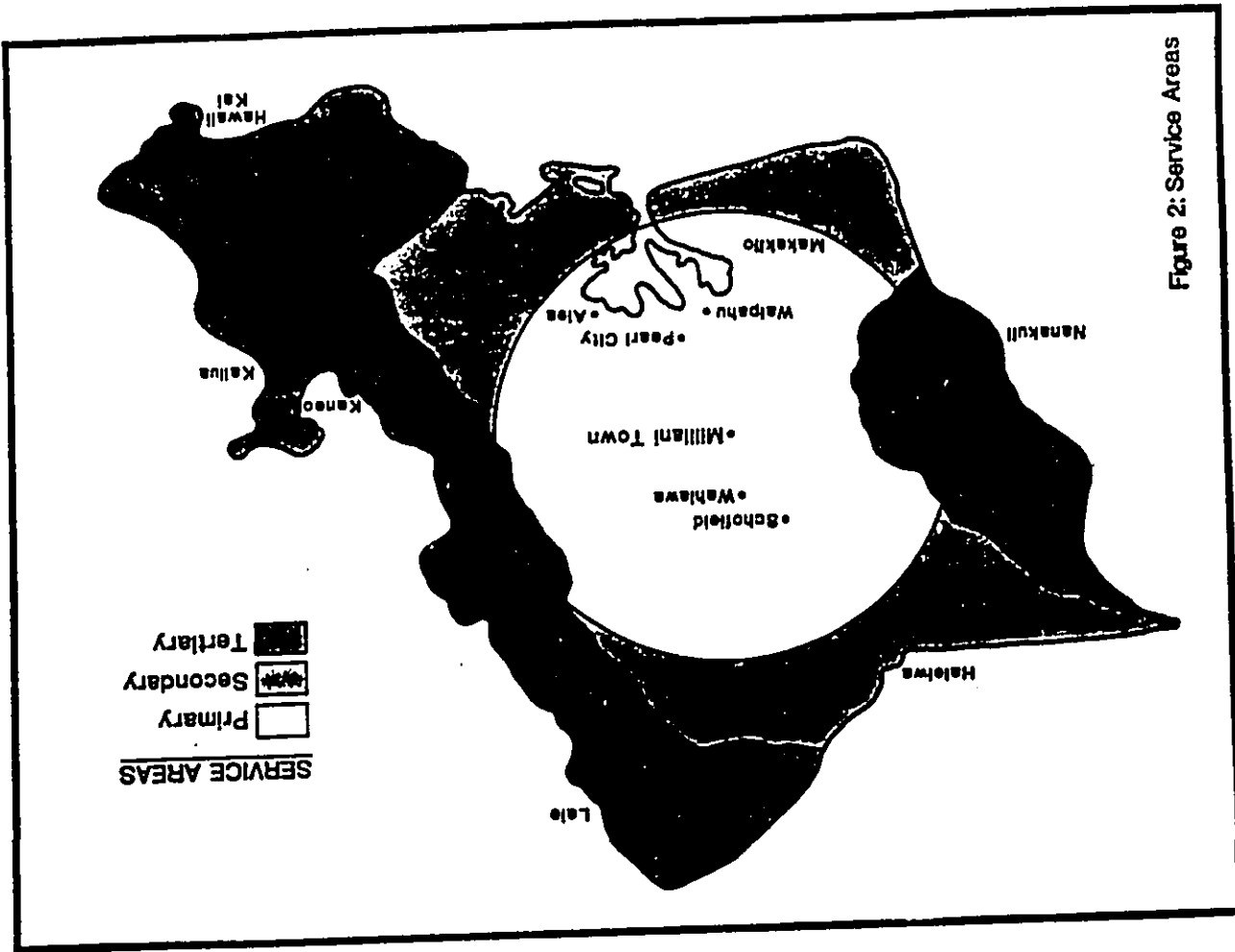


Figure 2: Service Areas

Economic Projection and Simulation Model: Updated State and County Forecasts - July 1984. Island-wide growth between 1980 and 1995 is projected at 17.37 percent or an additional 134,335 residents. Relative growth within the service areas was estimated by correlating the service areas with the City and County Development Planning (DP) Areas and interpolating the relative growth rates identified for the latter by the Department of General Planning (DGP, Land Supply Review: Population Implications of the Development Plans, August 1984.) In anticipation of General Plan revisions to the population capacity of the Central Oahu DP areas, an additional 20,000 persons were allocated to the primary service area. Overall growth rates for the three service areas between the base and projection year (1980 and 1995), were as follows: primary service area, 20 percent; secondary service area, 25 percent; tertiary service area, 13 percent. The growth of the secondary service area is highly influenced by the development of the secondary urban center located within its boundary. These growth rates were then adjusted to correspond with the Island-wide projection made by the DPED.

Growth rates of the particular age cohorts within the service areas were developed as a function of the total island-wide growth, service area growth and growth rates peculiar to the particular age cohort (the assumption being that not all age groups increase at the same rate). Age cohort growth rates are provided at the State level as part of the M-F series population model. The results of the growth projections are presented in Table 1.

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TABLE 1
ADULT AND ELDERLY POPULATIONS BY AGE AND SERVICE AREA - 1995

Service Area	Total	Age Groups			
		45-54	55-64	65-74	75+
Primary	224,358 ²	23,427 ³	12,337	7,531	5,587
Secondary	230,963 ²	23,018	15,931	14,067	11,642
Tertiary	441,578 ²	55,385	42,695	31,739	26,983
Oahu	896,900 ¹	101,829	71,163	53,357	44,213
State	1,211,500 ¹	134,900	100,400	77,800	64,900

- 1 DPED M-F series projection.
- 2 Population distribution per General Plan Policies and proposed G.P. amendments.
- 3 DPED M-F series statewide age group projection proportions applied to 1982 Service Area Age Group Populations and Service Area Growth.

Population Implications.

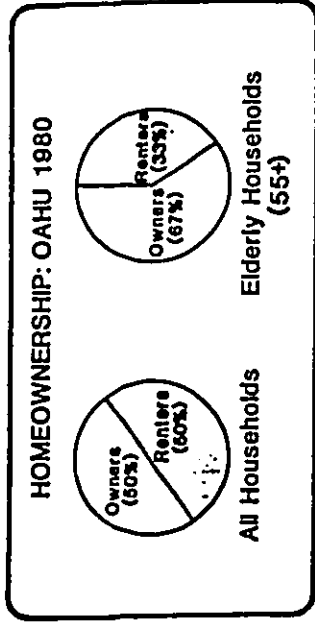
In 1980, 15.8 percent of the Oahu resident population was 55 years of age or older (55+). By comparison, the overall State ratio was 16.72 percent and the individual service areas were 9.89, 14.75 and 19.12 percent, respectively. As expected, the 1995 population projection shows a considerably higher proportion of the population aged 55+, with the State and Oahu ratios climbing to 20.07 and 18.81 percent, respectively. These ratios are summarized below.

THE AGING OF THE STATE (percent of population 55+)	
	1980
Primary S. A.	9.89
Secondary S. A.	14.75
Tertiary S. A.	19.12
Oahu	15.80
State	16.72
	1995
Primary S. A.	11.44
Secondary S. A.	18.03
Tertiary S. A.	22.97
Oahu	18.81
State	20.07

Source: DPED M-F Series Population Projections; Bureau of the Census, 1980 Census of Population and Housing.

The growth rates within the 55+ age group vary greatly with the 75+ group increasing the fastest and the 55-64 group the slowest. At the State level, the 75+ group will increase by 141.26 percent, over five times faster than the total State growth. In comparison, the 55-64 age group only increases by 15.94 percent, less than overall State population growth of 25.15 percent. This trend is reflected in each of the service areas.

The prevalence of homeownership amongst elderly households is much higher than that in the general population as the figure below illustrates. On Oahu, two-thirds of elderly households own their homes. This is considerably greater than the overall average of one-half.



The prevalence of elderly homeownership amongst all households (19.09 percent of all households on Oahu) is highest within the primary service area (22.03 percent) and lowest in the secondary service area (14.56 percent). No adjustment was made for changing trends in housing tenancy between the base and projection year.

Homeownership by age and service areas for homes valued in excess of \$100,000 were then estimated by applying proportions derived in the 1980 Census data in conjunction with information provided by the Executive Office on Aging (EOA). The Elderly in Hawaii: A Data Digest of Persons 60 and Over, September 1982. These proportions were then applied to the information presented in Table 2, the results of which are found in Table 3. Results indicate that, in 1995, approximately 35 percent of all owner-occupied housing with an assessed value greater than \$100,000 will be occupied by a householder aged 55+. This is significant in light of the fact that the same age group will represent only 18.18 percent of the resident population. Even more significant is the 55-64 year age group which own 21.26 percent of the housing valued greater than \$100,000 but represent only 7.93 percent of the population.

TABLE 3
OWNER-OCCUPIED HOUSING UNITS BY HOUSEHOLDER AGE AND SERVICE AREA:
ASSESSED VALUE GREATER THAN \$100,000¹ - 1995

Service Area	Total	
	All Ages	55+
Primary	22,670	7,947
Secondary	12,380	4,291
Tertiary	44,334	15,543
Oahu	79,384	27,781
		16,876
		7,883
		3,072

¹ 1980 dollars.

POPULATION GROWTH BY AGE GROUP: STATEWIDE
1980 - 1995

Age Group	Population Growth (percent)
55+	49.23
55-64	15.94
65-74	57.49
75+	141.76
All Ages	25.15

Source: DPED Series M-F Population Projections.

Housing Implications.

Homeownership by age and service area was projected to 1995. (See Table 2.) Total Oahu households were assumed to increase at the same rate as the growth in the general population. No special or temporal adjustments were made for household size, thus resulting in a more conservative estimate of eligible households. As expected, household size varies considerably with the age group under consideration. Average household size ranges from 1.79 for the 55-64 age group to 2.02 for those 75+ (vs. 3.15 in the general population).

TABLE 2

PROJECTED HOMEOWNERSHIP BY AGE AND BY SERVICE AREA - 1995

Service Area	Total Households	Owner Occupied Households	
		All Ages	55+
Primary	58,624 ³	33,779	12,914
Secondary	63,439 ³	24,156	9,234
Tertiary	148,971 ³	77,395	29,588
Oahu	271,035 ¹	135,328 ²	51,736 ²
		29,691 ²	15,495 ²
		6,550 ²	

- ¹ DPED Series M-F projection adjusted to reflect total households.
- ² Figures derived by applying 1980 proportions to 1995 household estimates.
- ³ Change in resident population (1980-1995) times 1980 households.

The majority of these homeowners, possibly 80 to 84 percent (Myers, 1982, Urban Land Institute, 1983), own their homes free and clear, having lived long enough to have paid off the conventional thirty year mortgage. Furthermore, most of them have witnessed a substantial increase in home equity due to the surge in real property values experienced in the Hawaii housing market over the past decade.

A total of 27,781 eligible householders aged 55+ are identified on Oahu. Over half of them are located in the tertiary service area (56 percent) with the primary and secondary service areas containing 29 and 15 percent, respectively.

Market Share.

A fundamental concern confronting eligible householders in their decision to relocate to the proposed site will be the time-distance from their existing communities, families and friends. Due to the impact on accustomed lifestyles associated with relocation, the Millilani site will be more appealing to residents of the primary service area than other regions of the island. Eligible residents of, say, East Honolulu (located in the tertiary service area), will experience a greater impact due to relocating to the Millilani site.

Because there are no existing retirement communities of the type proposed herein located within the State, reliable market share data reflecting local attitudes were not available. In lieu thereof, the analysis determined the amount of market support necessary to develop the project as proposed in Section V of this report. Table 4 presents this analysis by treating as given the size of the proposed development (1,400 units) and the number of the eligible households within each of the three service areas to arrive at the minimum levels of market demand needed to support the proposed development, in this case 10 percent of the primary market, 5 percent of the secondary market and 2.5 percent of the tertiary market.

POTENTIAL DEMAND FOR RETIREMENT HOUSING AT SUBJECT SITE, PERSONS 55+ YEARS - 1993

TABLE 4

Service Area	Market Share	Eligible Households ¹	Potential Demand ²
Primary	10%	7,947	795
Secondary	5%	4,291	215
Tertiary	2.5%	12,543	314
Oahu Total	5% (average)	27,781	1,399

1 From column 3, Table 3.

2 Eligible households attracted to the Millilani site.

Conclusion

Market share factors derived in Table 4 indicate that there would be sufficient market demand to support the development of a 1,400-unit retirement community at the Millilani site if 10 percent of the eligible householders from the primary service area, 5 percent of those from the secondary service area, and 2.5 percent of those from the tertiary service area were to be attracted to the site. This initial assignment of market share appears reasonable in light of the interest expressed for the project by members of the advisory committee and in light of the responses to the newspaper questionnaire regarding to the establishment of a retirement community within the Millilani Ikaika area.

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APPENDIX C

**Mililani-Mauka Electrical & Communications Study.
(August 1985)**

Mililani-Mauka Potable Water System Onsite/Offsite Evaluation;

Mililani-Mauka Groundwater/Surface Water;

**Mililani-Mauka Wastewater System Onsite/Offsite Evaluation.
(October 1986)**

M&E Pacific, Inc.

SUMMARY

The electrical and communications improvements required to support the needs of the project do not aggravate the existing electrical and communications system and can be supported with minimal offsite improvements. The degree of offsite improvements required is in general an everyday activity for the utility companies. The development will require that the utility systems be constructed and maintained according to approved utility standards.

The utility systems applications for onsite facilities such as residential, schools and parks will have minimal impacts on the environment. Noise, aesthetic considerations, potential safety hazards, and loading impact on utility systems will be within normally applied guidelines.

EXISTING CONDITIONS

The project site is essentially without utilities except for the existing Hawaiian Electric Company's facilities that cross the site. The two overhead power line crossings are in easements granted to the Hawaiian Electric Company which permit them to operate 46 KV transmission circuits. The two lines are designated as Line "A" and Line "B" on the exhibit site plan. The Hawaiian Electric Company anticipates that either one of their existing 46 KV circuit can absorb the estimated 22.5 MVA increase in load due to the proposed development. The Hawaiian Electric Company's generation capacity is approximately 1300 MVA, with a present peak demand of approximately 935 MVA. The project's demand requirements are well within the reserve capacity of the generation system and therefore can be absorbed without taxing the Hawaiian Electric's generation system and limiting other developments.

The Hawaiian Telephone Company does not have any facilities within the site, and their nearest telephone facility is indicated by the duct bank stubout shown on the plan mauka of the Milliani Interchange. This duct bank will be adequate in serving this development.

MILILANI MAUKA ELECTRICAL & COMMUNICATIONS STUDY

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August 1985

Cable television facilities do not exist on the site but can be obtained from the trunking cable facilities located at the intersection of Meheua Parkway and Kuahelani Ave. Cable will be installed from this point to the new development via existing underground ducts along Meheua Parkway and across the Milliani Interchange at no cost to the developer. It is anticipated that cable television service will be required for most of the tenants.

FUTURE DEVELOPMENT PLANS

There are no anticipated improvements of public facilities that will be in the project site or that will benefit the project development.

PROPOSED DEVELOPMENT

Electrical

The existing overhead 46 KV Lines "A" and "B" that run near the site at the upper portion of the site are expected to serve the loads via a new HECO substation which reduces the voltage to 12 KV for distribution throughout the proposed residential area. It is highly desirable to have two sources of power to the substation, one as primary and one as backup, to better insure continuity of service. The necessary land acquisition and equipment procurement processing will be initiated at project inception so that a substation can be in place and ready to serve the loads as dwelling units or facilities are ready for occupancy.

The projected peak demand is estimated to be approximately 22.5 MVA, which will require the construction of a substation. The Hawaiian Electric Company (HECO) anticipates the ultimate installation of a 40 MVA substation on a minimum of 12,000-square foot area lot. The proposed substation site is to be in the near vicinity of the existing Hawaiian Electric Company 46 KV transmission lines so as to minimize the cost of extending 46 KV circuits to the substation. Normally, HECO will pay the cost for the 46 KV overhead line extension from Lines "A" and "B" to the substation. If decision is made to place these 46 KV lines

underground, the developer will then be charged the difference in cost between an overhead and underground installation. The latter cost will be dependent on the distance between the selected substation site and Lines "A" and "B" connection points.

Major main 12 KV feeder circuits will depart the substation to several switching vaults which are to be placed throughout the site. These switching vaults provide protection of the 12 KV distribution circuits that loop in and out of the vaults. In addition, the switching vaults provide for isolation and backfeeding of the various loop circuits to protect the development against outages resulting from the failure of any one section of the underground cable system.

The entire system will be an underground facility with only the substation, switching vaults, 46 KV lines, and individual service transformers being visible above ground. A network of underground ducts and handholes facilitates the cable installation, shields them from view, and offers an economical means for accessing these cables in the event of a need to repair a faulty cable section. The cables and ducts are for underground applications and are tolerant of both wet and dry conditions.

Each tenant lot or multiple tenant lots will be provided with a pad mounted metal enclosed transformer which will transform the 12 KV service to either 240/120 volts, 1 phase; or 208Y/120 volts, 3 phase service in accordance with the facility requirements. The Hawaiian Electric Company estimates that onsite electrical cost based on 1991 escalation will be approximately \$5,000,000, which the developer will need to pay.

Communications (Telephone)

Telephone cross-connect pedestals will be provided by the Hawaiian Telephone Company at various locations to permit access and telephone service tap offs. In addition, Hawaiian Telephone will need a parcel of land, approximately 5,000 square feet in area, located near the Milliani Interchange for a switching office.

The Hawaiian Telephone Company will make all necessary arrangements for individual tenant requirements with respect to data circuits, but these circuits are anticipated to be mixed with normal voice frequency circuits so that there will be no separate data and voice communications cables.

Street Lighting

Street lighting will consist of high pressure sodium lamps mounted on 30-foot steel or aluminum poles with bracket arms in accordance with the City and County of Honolulu's Department of Transportation Services' requirements. Each luminaire will be provided with a photo-electric cell for automatic control. Street lighting standards are to be spaced approximately 175 feet apart and located so as to properly illuminate intersection and stop signs.

DEVELOPMENT TIMETABLE AND PHASING

Hawaiian Electric Company facilities are adequate to serve the loads without major offsite improvements. Therefore, the utilities will be progressively installed in accordance with a timetable that develops the land close to H-2 Freeway first, and the inner parcels in a latter phase. The Hawaiian Telephone Company will not require offsite work to support the project.

1. The substation site will be adequately prepared by the developer so that the Hawaiian Electric Company will be able to install their facilities in accordance with a pre-determined schedule. This site shall be ready for immediate use by the Hawaiian Electric Company to supply needed power.
2. In accordance with a pre-determined phasing schedule of the lots to be released for sale, the appropriate supporting facilities will be installed by the utility companies. This limits the necessity for installing utilities in lots not being marketed.

3. Existing facilities covered by perpetual easements that conflict with the subdivision requirements can be relocated by the Hawaiian Electric Company at the developer's cost. The existing overhead facilities can remain at their present clearance to grade with the understanding that limitations exist on the development and use of the easement parcel so as to maintain safety and protection to both the Hawaiian Electric Company facilities as well as the occupants and infrastructures. Relocation of the 46 KV facilities or conversion of those facilities to underground is an expensive process that is not being considered.

The Hawaiian Electric Company's Line "A" was relocated once at the Hawaiian Electric Company's cost on a one time only basis. Line "B" has no similar provision and therefore would have to be relocated at the expense of the project. At this time, relocation of either 46 KV line will be at the developer's cost.

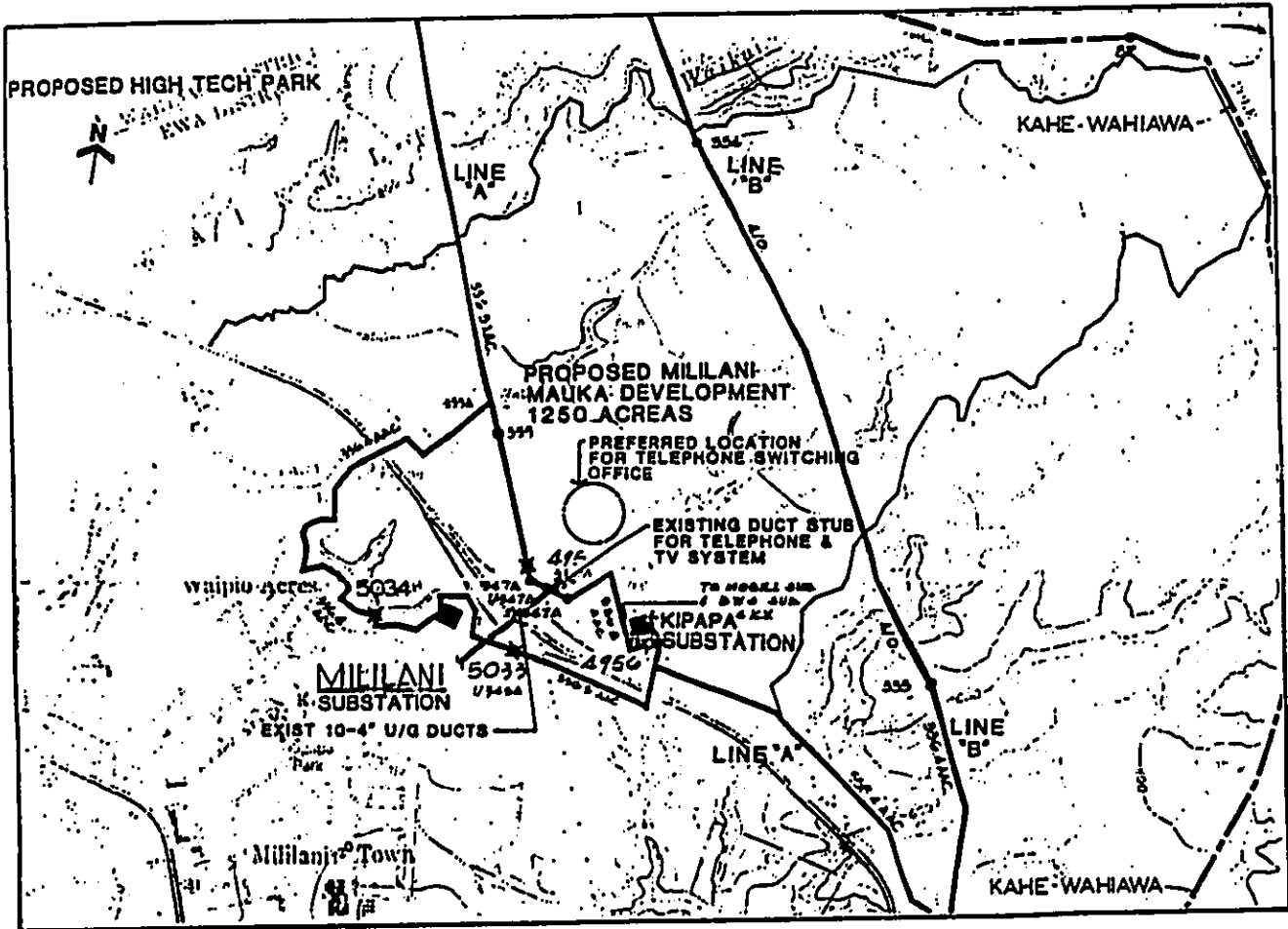
4. Street lighting will be installed throughout the development at the same time as the interior roadways are constructed.

POTENTIAL IMPACTS

The existing overhead 46 KV lines that cross the site, which are to be utilized for the project development, will have minimal negative impact on the surrounding community.

These 46 KV lines, which will supply power to the proposed new substation, will not require any additional offsite modifications. The new loads will therefore not negatively impact the surrounding community since HECO will maintain this circuit as intended and to its best use.

The telephone facilities do not require offsite work. The Hawaiian Telephone Company advised that there will be no onsite or offsite cost to support this project.



EXISTING FACILITIES

The Milliani Mauka Development Area, which is presently used for the cultivation of pineapple, does not have any potable water system servicing the area. Contained within the mauka area is an existing 2.0 MG reservoir and the 2.0 mgd wells, which service Zone 2 of the existing Milliani Town Development (makai of H-2 Freeway).

The current average daily water demand for Milliani Town is estimated to be approaching 3.2 mgd.

PROPOSED FACILITIES

In order to meet the water demands of the Mauka Development Area, onsite and offsite facilities must be developed (Figure 1).

The development of water sources for the Mauka Area will be contingent upon the Department of Land and Natural Resources (DLNR) approval. The Mauka Area is within the Pearl Harbor Groundwater Control District; therefore, the developer will require DLNR permission to withdraw water for their use. For the purpose of this report, it is assumed that DLNR approval will be granted.

All new sources of public potable water sources (Section 11-20-29, HRS) and public water distribution systems (Section 11-20-30, HRS) must be approved by the Director of the Department of Health, except when approval authority is delegated to the Board of Water Supply (BWS) for BWS distribution systems. Application for source approval is predicated on the submittal of a satisfactory engineering report prepared after initial well exploration. Distribution system approval requires the submittal of satisfactory construction plans and specifications.

Flow Assessment

The water demand for the Milliani Mauka Development Area was developed from the information contained in the Milliani Mauka Master Plan Summary

MILILANI MAUKA

POTABLE WATER SYSTEM
ONSITE/OFFSITE EVALUATION

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October 1986

(2/20/85). Milliani Town Delivery Projection 1985/86 to 1995/96 (5/23/85), and the Water System Standards, Board of Water Supply, City and County of Honolulu (March 1977).

The anticipated water demand for the Milliani Mauka Development Area is as follows:

Average Day Consumption =	3.8 mgd
Maximum Day Consumption =	5.7 mgd
Peak Hour Consumption =	11.4 mgd

Source and Storage Facilities

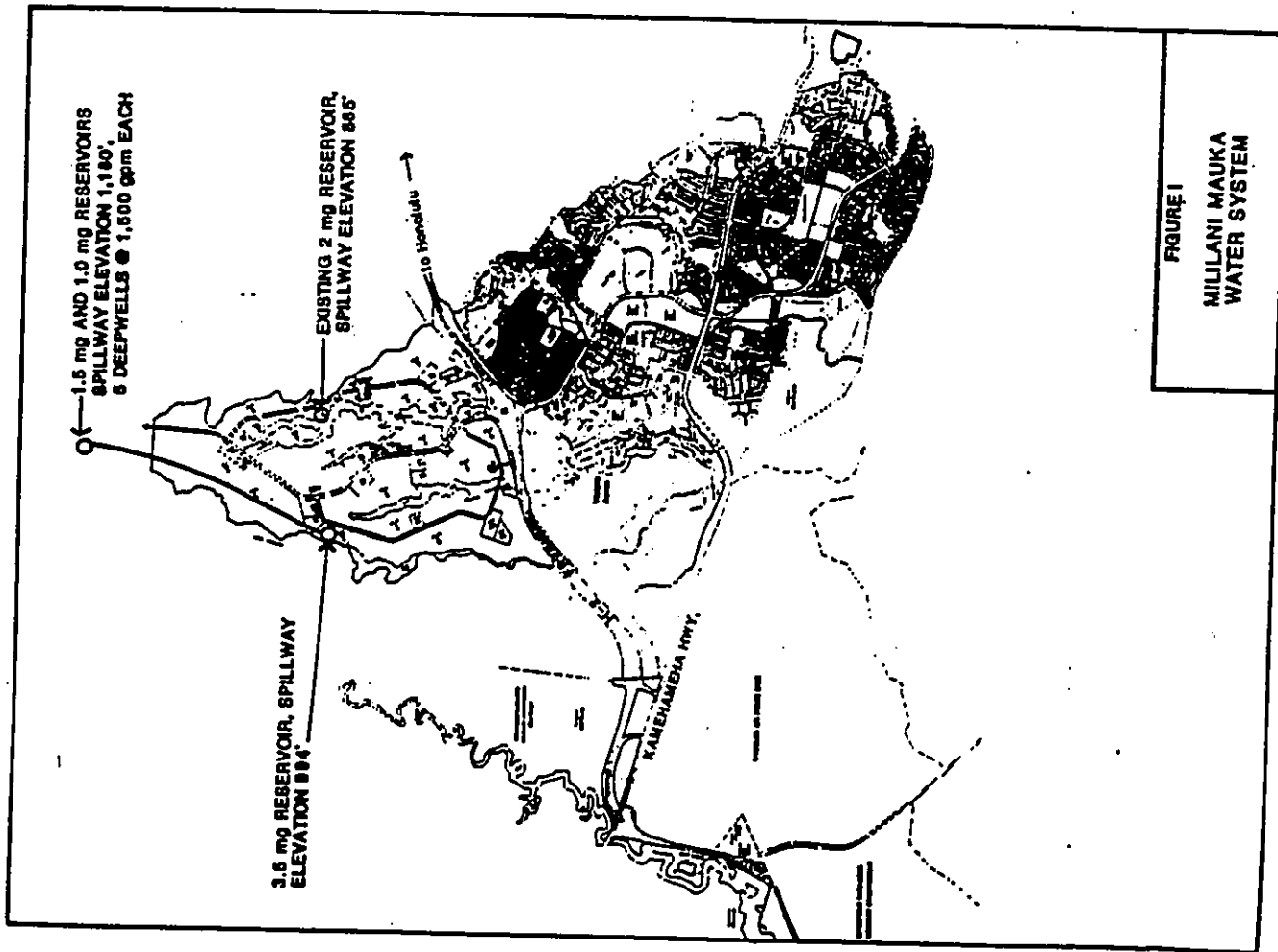
To accommodate the needs of the Mauka Area, five wells (1,500 gpm each) with pumps and motors and three storage reservoirs will be required (see figure).

The reservoir system shall consist of one 3.5 MG reservoir located at the 994-foot elevation to serve the lower Milliani Mauka Area and 1.0 MG and 1.5 MG reservoirs at the 1,180-foot elevation to serve the upper Milliani Mauka Area. The deepwell facility will be located at the 1,180-foot reservoir site.

Transmission Lines

The transmission lines will be designed to supply the maximum day demand flow plus the fire flow with residual pressure of 20 psi at the critical fire hydrant, the peak hour flow with a minimum pressure of 40 psi and a maximum velocity of 6 fps in accordance with the provisions set forth in the Water System Standards. The transmission system will be located in roadways. It is estimated that there will be approximately 35,000 linear feet of transmission lines.

The estimated cost for the Mauka Area Water System is \$16.5 million.



POTENTIAL IMPACTS

The potential impacts associated with the development of the Mauka Area water system are--

1. Construction inconveniences;
2. Visual and auditory concerns; and
3. The sustainable yield on the Pearl Harbor Groundwater Basin.

The noise, dust, and traffic disruptions due to the construction of the water system should be temporary, lasting only the duration of the construction.

The visual and auditory impacts of the water system facilities can be mitigated by judicious site selection, aesthetically pleasing architectural design, and the use of natural screening and/or mechanical mufflers.

The development of a well system may have an adverse impact on the sustainable yield of the Pearl Harbor Groundwater Basin. The impact to the sustainable yield can be alleviated by--

1. Obtaining pumping rights from other sources within the basin;
2. Reducing the quantity of water transported out of the Pearl Harbor Basin to compensate for Mauka Area water requirements; and
3. Importing water to the Pearl Harbor basin to compensate for Mauka Area water requirements.

Groundwater

The project site is located near the apparent boundary between the Schofield high level aquifer and the Pearl Harbor basal lens aquifer. This apparent boundary is formed by impermeable vertical rock structures called dikes which restrict the flow of groundwater between the two aquifers. Consequently, the fresh water groundwater head in the Schofield high level aquifer is at an elevation of 270 to 280 feet above mean sea level (msl), while the groundwater head in the Pearl Harbor aquifer is between 20 and 25 feet msl. Water for the project will probably be supplied by two to five new wells which tap the Pearl Harbor basal water lens. The Department of Land and Natural Resources well site east of Mililani is a likely candidate for the well site.

MILILANI MAUKA GROUNDWATER/SURFACE WATER

The sustainable yield of the Pearl Harbor Basin may be adversely impacted, albeit indirectly, by land use changes that lessen the permeable area available for groundwater discharge. The proposed project would utilize a significant portion of the available agricultural land in Central Oahu; however, the proposed 1,250-acre project represents less than 0.02 percent of the estimated 130 square miles of noncrop area overlying the Waianae and Koolau aquifers within the Pearl Harbor Ground Water Control Area (GWCA). Furthermore, not all of the land within the 1,250-acre project area will be rendered impermeable. Runoff generated by the proposed project will be diverted to the gulches that border the project area. A significant portion of any intermittent flow in the gulches exfiltrates into ground, contributing additional recharge.

Surface Water

There are no perennial streams in the project area. Intermittently, during periods of rainfall, surface water will either percolate into the basal lens system or drain into Waiakalaua Gulch to the west, Kipapa Gulch to the east, or into one of two smaller gulches which run through the project site. Runoff that drains into the gulches eventually discharges into Pearl Harbor.

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EXISTING FACILITIES

The Mililani Mauka Development Area is presently used for the cultivation of pineapple. The area does not have any wastewater collection or treatment facilities. Existing offsite wastewater facilities include the Mililani Town trunk sewer, the Mililani Wastewater Treatment Plant (WWTP), interceptor sewers, the Waipahu Wastewater Pump Station (WWPS), Mililani force main, and the Honouliuli WWTP (Figure 1). A weir within the influent box of the Mililani WWTP diverts a constant 0.5 MGD of influent into the wastewater treatment plant for treatment. Wastewater in excess of 0.5 MGD bypasses Mililani WWTP (via Interceptor sewer Line A) and the Waipahu WWPS to the Honouliuli WWTP (Figure 2). The 25-MGD capacity Honouliuli WWTP presently receives and treats about 17.25 MGD of wastewater.

MILILANI MAUKA
WASTEWATER SYSTEM
ONSITE/OFFSITE EVALUATION

PROPOSED FACILITIES

In order to meet the wastewater needs of the Mauka Development Area, construction of onsite facilities and offsite improvements will be necessary.

Flow Assessment

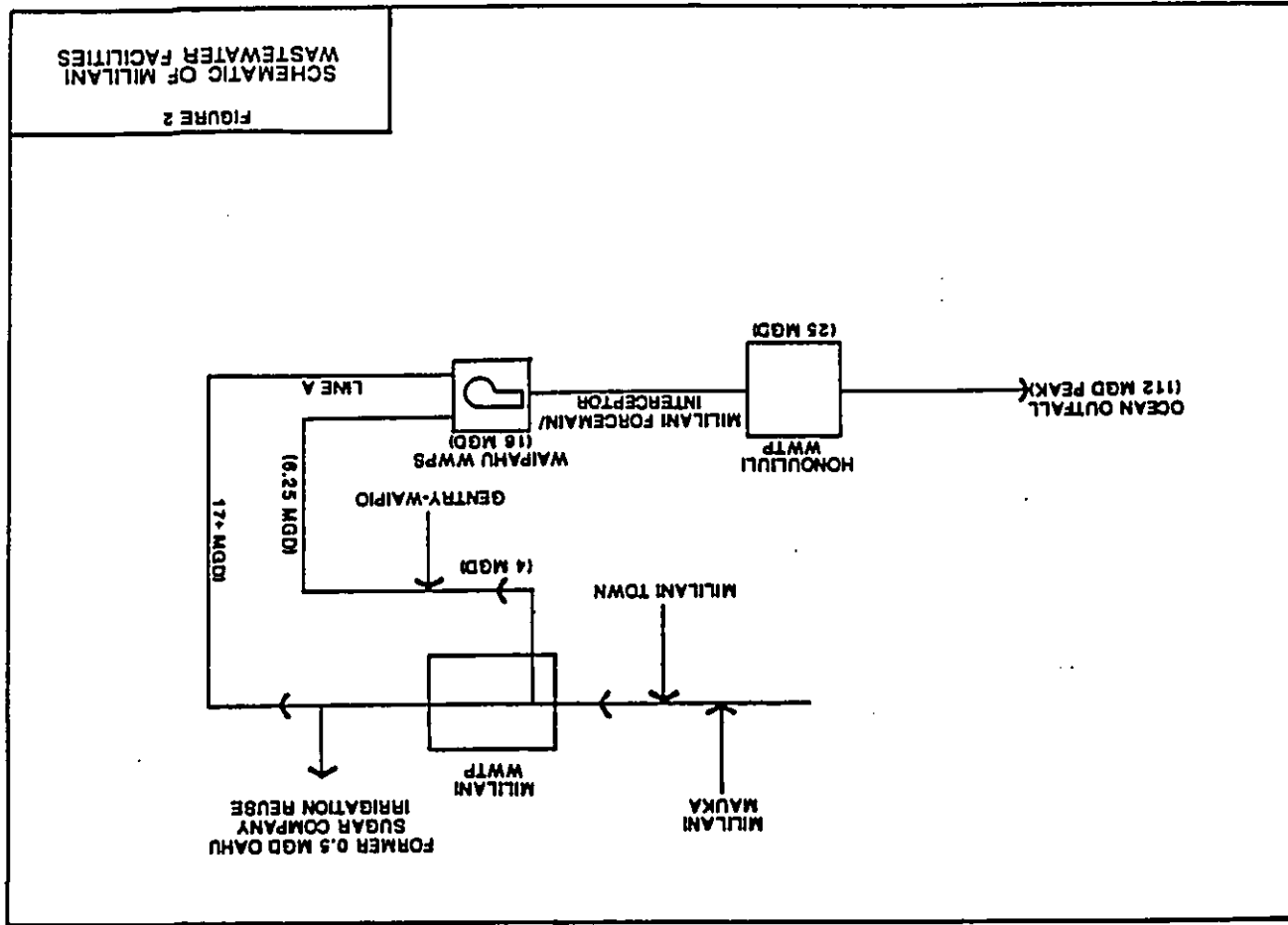
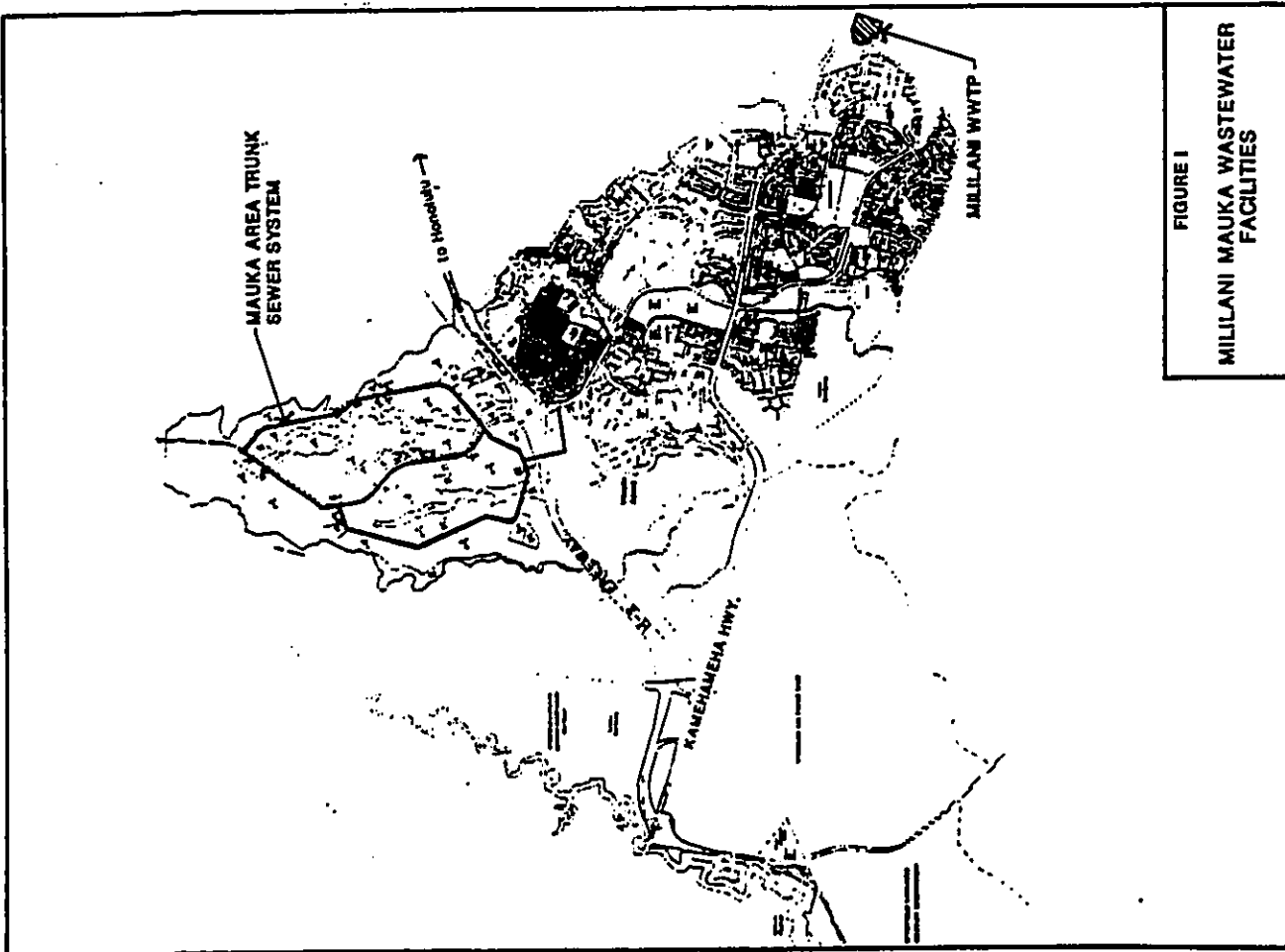
The wastewater quantities to be generated by the Mililani Mauka Area were developed from the information contained in the Mililani Mauka Master Plan Summary (6/85), Mililani Town Delivery Projection by fiscal years 1985/86 to 1995/96 (5/23/85), and the Design Standards of the Division of Wastewater Management, Volume 1 (February 1984). The anticipated wastewater flows are as follows:

Design Average Flow =	2.8 MGD
Design Maximum Flow =	6.8 MGD
Design Peak Flow =	8.3 MGD

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Onsite Facilities

The proposed onsite facility required for the development of the Mauka Area is a wastewater collection system. The collection system will consist of 8- to 21-inch diameter gravity sewer lines located in roadways and/or adjacent to rear lot lines. It is estimated that there will be approximately 35,000 linear feet of sewer lines. The Mauka Area wastewater collection system will be connected to the existing 21-inch diameter sewer line (inactive) under the H-2 Freeway and conveyed via the existing Milliani Town trunk sewer system to the WWTP. The estimated cost for the proposed onsite wastewater facilities is \$2.8 million.

Offsite Facilities

A gravity sewer main of the H-2 freeway will be required to connect the mauka area collection system to the existing Milliani Town trunk sewer on Meheula Parkway (Figure 2). The Milliani Town trunk sewer, which conveys flow to Milliani WWTP, has adequate capacity to accommodate the projected additional wastewater flow from the proposed Milliani Mauka development.

Milliani WWTP will be phased out of operation in the near future and raw wastewater presently treated at Milliani WWTP will be conveyed to Honouliuli WWTP for treatment. The existing Milliani secondary effluent disposal line connecting to the Honouliuli sewer system, hereafter referred to as Line A, would be used to transport raw wastewater to Waipahu WWPS. Aerated grit chambers and bar screens would be installed at Milliani WWTP to remove solids that would otherwise settle in Line A. When the 17 MGD capacity of Line A is reached in the future, equalization basins shall be constructed at Milliani WWTP to dampen wastewater flows below the capacity of Line A.

Presently, effluent from Milliani WWTP provides the only flow into Line A. In the near future, wastewater flow may also enter the line from the Waialeale development. However, the Division of Wastewater Management

(DWM), City and County of Honolulu, is uncertain on the long-term function of Line A or, for that matter, Waipahu WWPS because of the indefinite direction of development in Central Oahu, such as the proposed Waialeale Estates Subdivision and the Dole Cannery.

Raw wastewater from Milliani Mauka will ultimately be treated at Honouliuli WWTP. The current capacity of Honouliuli WWTP is 25 MGD. Presently, flow into the plant is 17.25 MGD. The DWM is asking for funds to expand the plant's capacity to 51 MGD by the end of 1993 to accommodate the proposed developments in Central Oahu. This project will not be EPA supported and other sources of revenue must be sought. The Barbers Point Outfall has a hydraulic capacity of 112 MGD, the projected peak flow for the year 2020.

POTENTIAL IMPACTS

The potential impacts associated with the onsite facilities and offsite improvements are mainly the inconveniences related to construction. The noise, dust, and traffic disruptions caused by normal construction operations should be the only adverse impact. These inconveniences should only be temporary, lasting only during the installation of the wastewater facilities. The additional wastewater flows generated by the development of the Mauka Area should have minimal impact on the existing Milliani Town trunk sewer system. The existing sewer will be able to accommodate the additional flows. The expansion of the WWTP, if required, will incur additional construction and operations and maintenance costs. The impact on land requirements of the WWTP expansion will be minimal since all improvements will be located on the existing WWTP site.

APPENDIX D

Millilani Town Water Master Plan

M&E Pacific, Inc. December 1986

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**MILILANI TOWN
WATER MASTER PLAN**

Prepared for:
Mililani Town, Inc.
Honolulu, Hawaii

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December 1986

Appendix A Hydraulic Analysis (Bound Separately)

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INTRODUCTION

Mililani Town is located in Central Oahu on the Schofield Plateau between Kipapa Gulch and Waipio Valley. Mililani Town, as ultimately planned, is divided into the three water service zones shown on Figure 1: zone 1 (elevation 765 to 1,065 feet), zone 2 (elevation 585 to 765 feet), and zone 3 (below elevation 585 feet).

Development of Mililani Town to date has been confined to areas makai of the H-2 freeway, within water zones 2 and 3. Current plans for Mililani Town are for continued development of urban areas within zones 2 and 3, with the major portion occurring on the southern side of zone 2.

Future development is planned for the 1,200 acres of zone 1, also referred to as Mililani Mauka in this report. The proposed development north of the H-2 freeway will ultimately consist of approximately 4,300 single family units, 2,400 apartment and retirement units, schools, churches, commercial areas, and a University of Hawaii West Oahu campus and provisions for a connected research facility.

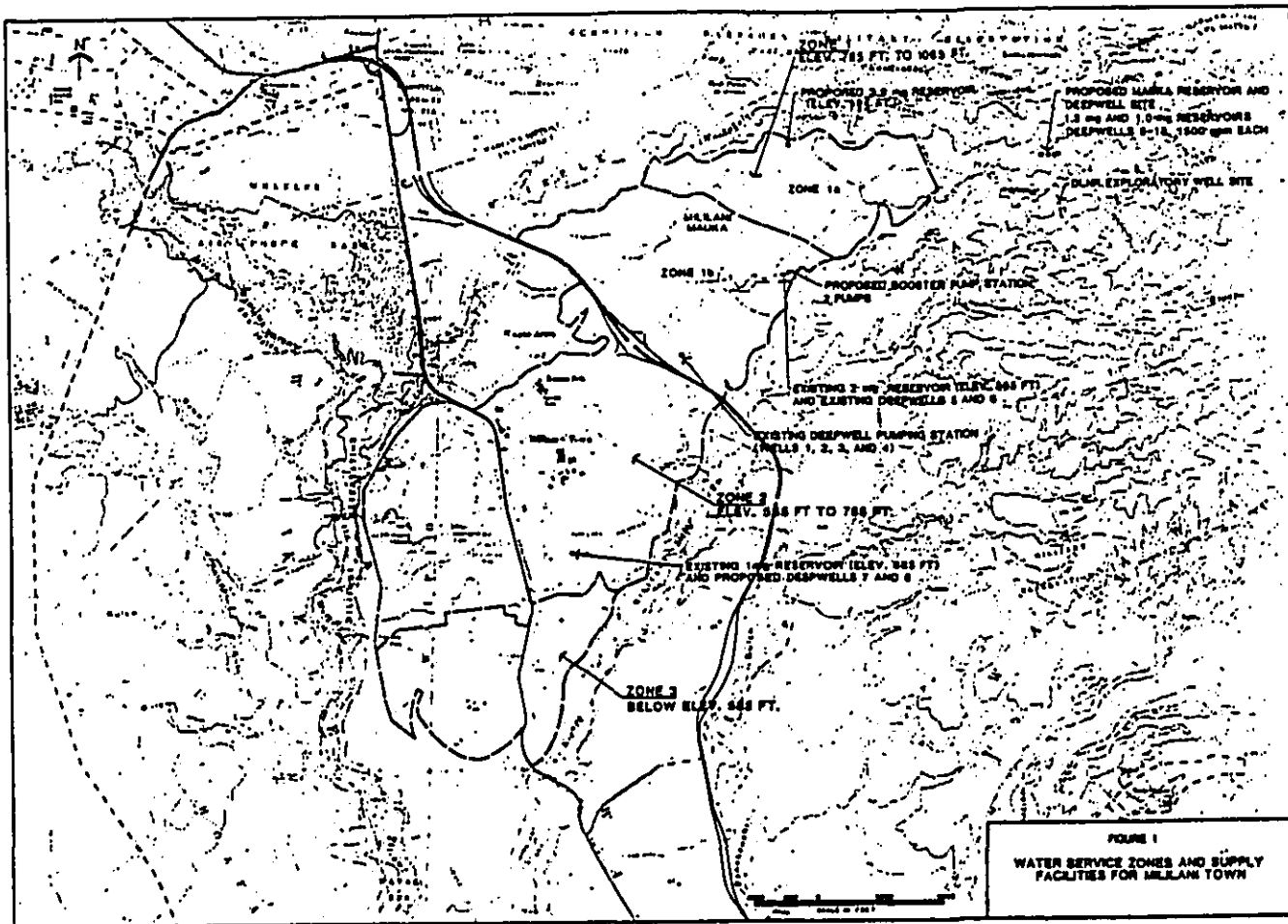
Additional water supply facilities will be required to service the proposed developments in Mililani Town. It is the intent of this water master plan to address the following items:

1. Source Development for Water Zones 2 and 3

Identify the water sources required for water zones 2 and 3 (as previously approved by the Board of Water Supply) and to discuss the development of a proposed water source which will satisfy the future demands in Mililani Town as well as improve the overall performance of the makai water distribution system.

2. Water Needs for Water Zone 1

- a. Estimate the water requirements for zone 1.



- b. Identify potential water supply sources and storage requirements for zone 1.
- c. Establish an overall transmission system for zone 1.

WATER MASTER PLAN FOR WATER ZONES 2 AND 3

A water master plan for water zones 2 and 3 has been previously approved by the Board of Water Supply (BWS) in 1977. The water sources and storage facilities ultimately required and approved by the BWS for zones 2 and 3 are--

1. Sources. A total of eight wells, each with a capacity of 2 MGD.
 - a. Existing sources - 6 wells
 - 1) Four wells (nos. 1 to 4) have been installed at the existing deepwell facility located just mauka of the H-2 freeway (see Figure 1). One unit functions as a standby.
 - 2) Two wells (nos. 5 and 6) have been installed at the existing 2.0 MG 865-foot reservoir site.
 - b. Future sources - 2 wells. Well nos. 7 and 8 have been drilled and capped within the existing 1.0 MG 685-foot reservoir site.

2. Existing Storage Facilities

- a. Zone 2. 2.0 MG reservoir at spillway elevation 865 feet
- b. Zone 3. 1.0 MG reservoir at spillway elevation 685 feet

The existing water supply system for zones 2 and 3 includes a deepwell pumping facility, a well site at the 865-foot reservoir and two reservoirs with 2.0 and 1.0 MG capacities, which serve zone 2 and zone 3 respectively. The system also includes a transmission and distribution pipe network.

Six of the eight proposed wells in the master plan are operating as supply sources in the existing makai water system. The master plan proposed continued development of the deepwell system as further development require these facilities.

Pending and future developments makai of the H-2 freeway will increase the average daily consumption in Mililani Town from 3.11 MGD to 4.67 MGD. The capacity and serviceability of the makai system must be adequate to satisfy this increasing demand. Table 1 and Figure 2 show the expected year-by-year water demand for zones 2 and 3.

The development of well no. 7 is designed to satisfy the increasing future demand in Mililani Town. The supply from well no. 7 will serve most of zone 3, with a predicted ultimate average daily demand of 0.97 MGD (see Table 2). Presently, zone 3 is supplied by well nos. 1 to 6. The long pipe network between these wells and the 1 MG 685-foot reservoir serving zone 3 results in added frictional losses in the makai distribution system. The development of well no. 7 will alleviate this problem, as the well site is adjacent to the 685-foot reservoir. Thus, the overall performance and reliability of the makai water system will improve with the development of well no. 7.

The new pumping facility for well no. 7 will consist of a control building and a 2.0-MGD well at the 685-foot reservoir site. The following items shall be installed in or adjacent to the control building:

1. Well water level indicator - recorder and accessories
2. Flow indicator-recorder-totalizer
3. Electrical power and control devices
4. Chlorination equipment

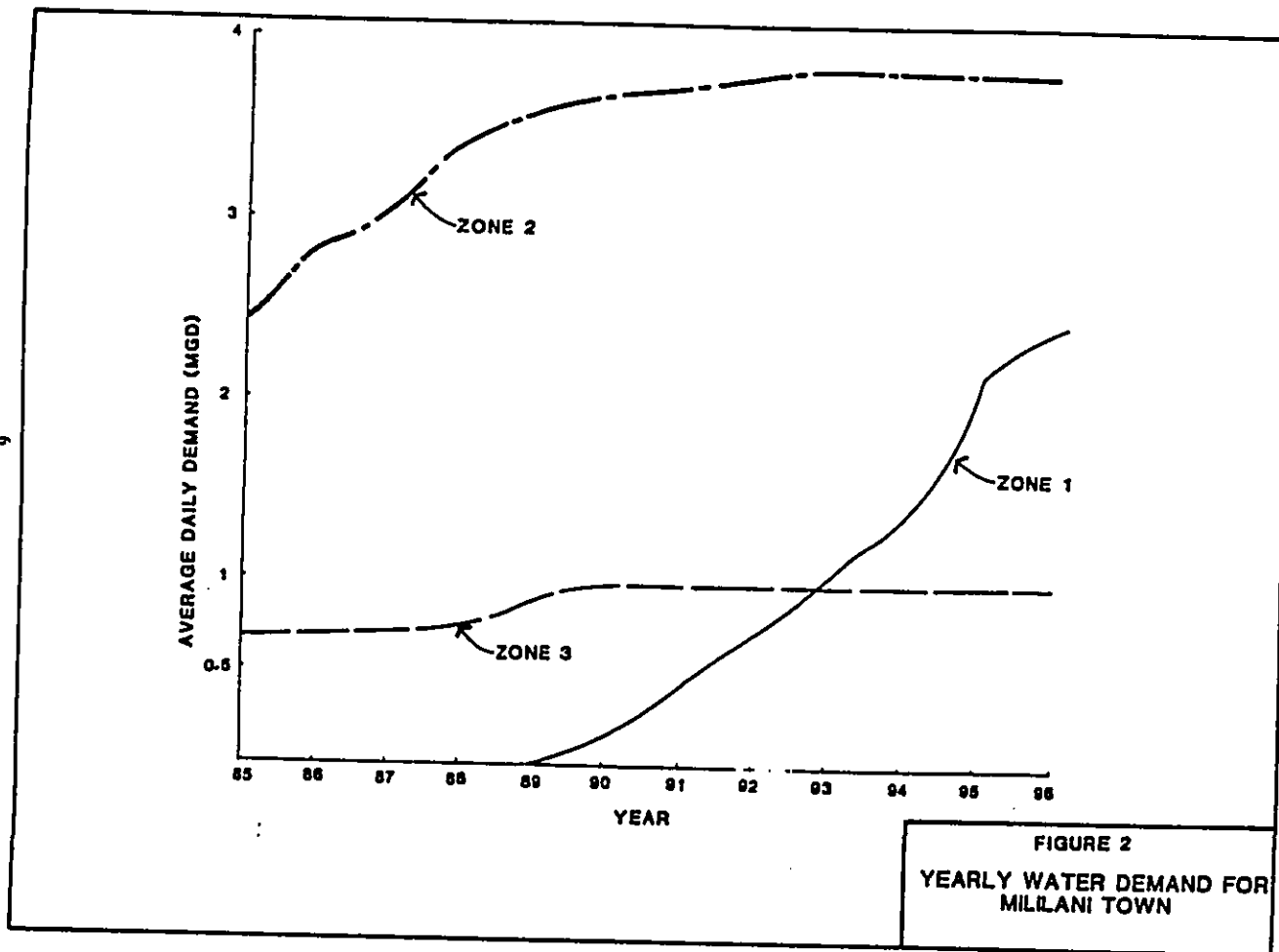


TABLE 1
PROJECTED WATER USE FOR MILLIANI TOWN

	1985	1985/1986		1987		1988		1989		1990		1991		1992		1993 ¹	
	WATER DEMAND (MGD)	ADON'L UNIT	WATER DEMAND (MGD)	ADON'L UNIT	WATER DEMAND (MGD)	ADON'L UNIT	WATER DEMAND (MGD)	ADON'L UNIT	WATER DEMAND (MGD)	ADON'L UNIT	WATER DEMAND (MGD)	ADON'L UNIT	WATER DEMAND (MGD)	ADON'L UNIT	WATER DEMAND (MGD)	ADON'L UNIT	WATER DEMAND (MGD)
SINGLE FAMILY RESIDENTIAL																	
ZONE 1	---	---	---	---	---	---	---	---	---	240	0.12	600	0.30	500	0.25	500	0.25
ZONE 2	595	0.30	343	0.17	303	0.15	84	0.04	---	---	---	---	---	---	---	---	---
ZONE 3	39	0.02	5	0.00	---	---	200	0.10	150	0.08	---	---	---	---	---	---	---
MULTIFAMILY RESIDENTIAL																	
ZONE 1	---	---	---	---	---	---	---	---	200	0.08	---	---	120	0.05	120	0.05	---
ZONE 2	172	0.07	52	0.02	90	0.02	58	0.02	50	0.02	50	0.02	50	0.02	50	0.02	120
ZONE 3	---	---	---	---	70	0.03	100	0.04	90	0.04	---	---	---	---	---	---	---
PARKS, CHURCHES, SCHOOL, LIGHT, INDUSTRY (Acres)																	
ZONE 1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
ZONE 2	6	0.02	---	---	59	0.24	15	0.06	15	0.06	---	---	---	---	---	5	0.02
ZONE 3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AVERAGE DAILY WATER DEMAND (MGD)																	
ZONE 1	---	---	---	---	---	---	---	---	0.12	0.42	0.72	1.04	---	---	---	---	---
ZONE 2	2.45 ²	2.84	3.03	3.14	3.56	3.64	3.66	3.68	3.70	---	---	---	---	---	---	---	---
ZONE 3	0.66 ²	0.68	0.68	0.71	0.85	0.97	0.97	0.97	0.97	---	---	---	---	---	---	---	---

¹ Development in zones 2 and 3 completed after this year. Development in zone 1 estimated to proceed at a rate of 400 units/year excluding churches, parks, schools, etc. after this year.

² Based on BWS letter to Oceanic Properties dated August 2, 1985. Water demands after 1985 predicted using BWS consumption rates.

TABLE 2
PROJECTED WATER REQUIREMENTS FOR MILILANI TOWN

	Zone 2		Zone 3		Zone 1a		Zone 1b	
	Total	Ave Day Demand (MGD)	Total	Ave Day Demand (MGD)	Total	Ave Day Demand (MGD)	Total	Ave Day Demand (MGD)
Present Average Day Demand, mgd		2.45		0.66				
Future Land Use								
Single Family, units	1,325	0.66	394	0.20	2,656	1.33	1,638	0.82
Multi-Family, Retirement, and Apartment, units	532	0.21	260	0.11	--	--	2,373	0.95
Parks, acres	44	0.18	--	--	18	0.07	28	0.11
Schools, acres	6	0.02	--	--	18	0.07	106	0.42
Churches, acres	--	--	--	--	--	--	7	0.03
Commercial, acres	--	--	--	--	--	--	5	0.02
Light Industrial	45*	0.18	--	--	--	--	--	--
Total		3.70		0.97		1.47		2.35

* Includes Towncenter.

5. Activated carbon treatment facilities
6. Toilet facilities
7. Flow tubes and appurtenances
8. Discharge piping

WATER MASTER PLAN FOR WATER ZONE 1

Introduction

The water master plan for zone 1 is discussed in three sections: 1) design criteria; 2) projected water requirements and; 3) plan for new sources of supply, storage reservoirs and transmission system. Plan for on-site distribution pipelines for Mililani Mauka will be submitted separately at the appropriate time.

Design Criteria

Water zone 1 is divided into the two service subzones shown on Figure 1. Zone 1a consists of the service area above elevation 890 feet, except for the small section in the southwest corner of the zone, where the service limit is 875 feet. Zone 1b consists of the remaining lower service areas of zone 1. The future water requirements and the planned water supply system for each subzone are based on the Water System Standards, City and County of Honolulu, Board of Water Supply (BWS). The applied design criteria for consumption rate, fire flow, pipeline size, reservoir storage, and demand factors are listed in Table 3.

Water Requirements

BWS-consumption rates were used to predict the water demands for zone 1 presented in Tables 1, 2 and 4 and Exhibit A. Table 1 lists the expected year-by-year water use in zone 1 in the next ten years, and Table 2 shows the ultimate water demand for zone 1 by land use. The distribution of average daily demand listed in Table 4 for the individual parcels shown in Exhibit A was used in the hydraulic analysis of the zone 1 water supply system. Appendix A presents the hydraulic calculations by the proposed water supply system.

TABLE 3

WATER CONSUMPTION GUIDELINES AND SIZING FACTORS

- A. CONSUMPTION RATE - per day
- | Land Use | Average Daily Demand |
|--|----------------------|
| Single Family - Residential | 500 gal/unit |
| Multifamily-Residential | 400 gal/unit |
| Retirement - Residential | 400 gal/unit |
| Light Industry, Schools, Parks, Churches | 4,000 gal/acre |
| Commercial | 3,000 gal/acre |
- B. DEMAND FACTOR
- Maximum Daily Demand = 1.5 x Average Daily Demand
 Peak Hour Demand = 3.0 x Average Daily Demand
- C. FIRE FLOW
- | Land Use | Fire Flow | Duration |
|--|-----------|----------|
| Single Family - Residential | 1,000 gpm | 1 hour |
| Multifamily-Residential, Schools, Small Commercial Centers | 2,000 gpm | 2 hours |
- D. PIPELINE SIZE
- Pipeline shall be sized for peak hour flow with a minimum residual pressure of 40 psi and maximum velocity in the main of 6 feet per second.
 - Pipeline shall be sized for maximum day flow plus fire flow with a residual of 20 psi at the critical fire hydrant.
- E. RESERVOIR STORAGE
- Reservoir volume shall satisfy maximum daily demand, without inflow.
 - Reservoir volume shall satisfy maximum daily demand plus fire flow for duration of fire, with inflow.

TABLE 4
PROJECTED WATER REQUIREMENTS FOR ZONE 1

ZONE 1a		No. of Units	Average Daily Demand (MGD x 10 ⁶)	Nodes Flow Distributed
Parcel	Type			
A	SF	203	1,015	7,8
B	SF	287	1,435	2,3
C	SF	285	1,225	2,8
D	P	4	160	7
E	S	6	240	3
F	SF	84	420	5
G	SF	245	1,225	10,20
H	SF	168	840	6,10,11
I	SF	209	1,045	18,19
J	SF	270	1,350	5,11,12
K	SF	189	945	11,12
L	SF	147	735	15
M	SF	105	524	18
N	SF	236	1,177	13,12
O	S	12	454	13
P	P	12	480	12,15
Q	P	2	80	15
R	P	140	700	15,16
S	SF	128	636	16,17
TOTAL			14,686 (1.47 MGD)	

ZONE 1b		No. of Units	Average Daily Demand (MGD x 10 ⁶)	Nodes Flow Distributed
Parcel	Type			
a	SF	22	110	40
b	SF	35	175	40
c	SF	237	1,183	42
d	SF	84	420	42
e	SF	448	2,238	36,43,33
f	SF	281	1,405	33,34
g	SF	294	1,470	45,46
h	SF	104	519	45,46
i	S	25	1,000	44
j	S	75	3,000	44
k	MF	256	1,024	44
l	MF	192	768	35
m	P	4	160	35
n	S	6	240	43

Source and Storage Facilities Requirements for Water Zone 1

A proposed plan to meet the future water requirements for zone 1 is presented in this section. The proposed water supply source, storage facilities, and transmission system are designed based on the Water System Standards, BWS, for dedication to that agency.

A new deepwell pumping facility to supply zone 1 will be located within the proposed mauka reservoir and deepwell site (see Figure 1). The deepwell pumping station will consist of four deepwells plus one standby unit (nos. 9 to 13). The wells will be spaced approximately 100 feet apart, and a 1500 gpm line shaft turbine pump will be installed at each well. The control building at the pumping facility shall house the same equipment listed for well no. 7, except that the activated carbon treatment facility is not required. An emergency power back-up system shall also be provided, equipped with a 1000 KW generator.

Two reservoirs totaling 2.5 MG will be constructed within the mauka reservoir and deepwell site. Both reservoirs will serve zone 1a. The smaller 1.0 MG reservoir will be phased into the water system when water needs for zone 1a show the need for its storage volume. Two reservoirs at spillway elevation 1180 feet are planned because of the difficulty of constructing a single 2.5 MG reservoir and deepwell site in the variable mountainous terrain above Mililani Mauka.

Zone 1b will be served by a 3.5 MG reservoir at spillway elevation 994 feet. Initially, water will be supplied to this reservoir from the booster pump station constructed near the existing 865-foot reservoir. Any supply over demand for zones 2 and 3 would be pumped from the existing 865-foot reservoir to the 994-foot reservoir serving zone 1b. The use of this source would be confined to the initial phase of development in Mililani Mauka, which would commence in zone 1b and progress upward to zone 1a. Eventually, water would be supplied to the 994-foot reservoir from wells no. 9-13. At that time, the use of the booster pump station would be restricted to emergency situations. Thus, the ultimate purpose of the booster pump station is to provide system flexibility and operational redundancy between the Mililani Makai and Mauka systems. A tentative

Table 4, Cont.

ZONE 1b (Cont'd.)

Parcel	Type	No. of Units	Average Daily Demand (MGD x 10 ⁴)	Modes Flow Distributed
o	SF	133	665	35,43
p	MF	312	2,048	35
q	MF	378	1,512	37,38,39
r	MF	1,031	4,140	37,38
s	P	2	80	36
t	CH	2	80	36
u	CH	1	40	36
v	P	2	80	36
w	CO	5	150	36
x	CH	2	80	37
y	CH	1	40	36
z	CH	1	40	36
aa	TRANS.	1	PKG.	36
bb	P	20	800	36
TOTAL			23,467 (2.35 MGD)	

Designations

- SF = single family
- MF = multifamily, retirement, and apartment
- P = park
- CH = church
- CO = commercial
- S = school

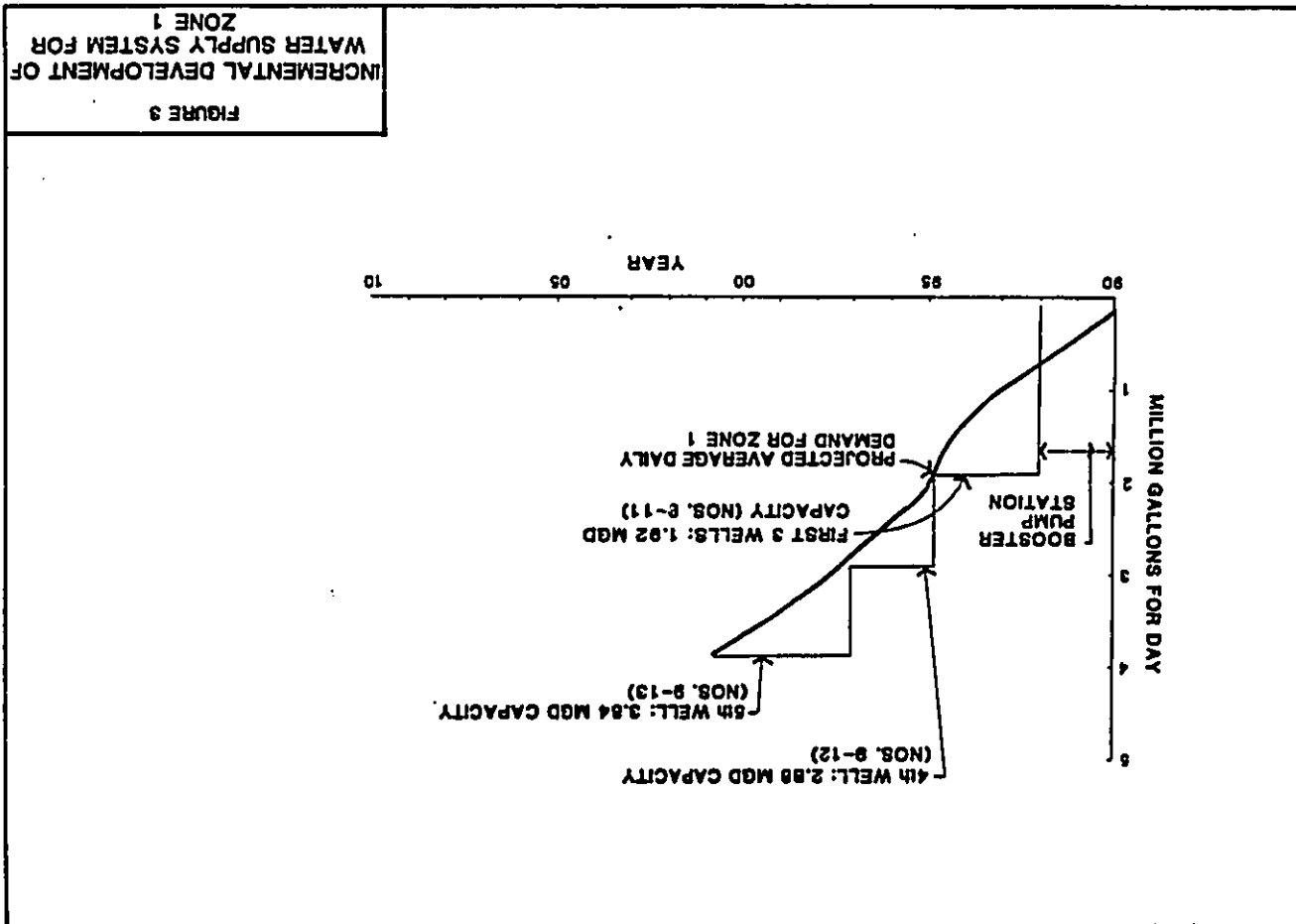
schedule for the use of the booster pump station and subsequent drilling of well nos. 9-13 is depicted on Figure 3.

SUMMARY

The major facilities presented in this water master plan are as follows:

1. Source Development for Water Zones 2 and 3

Service Area	Primarily Zone 3	Water Zone 1b
Additional Water Source	Well No. 7	Mililani Mauka deepwell pumping system/Mililani Makai deepwell pumping system.
2. Water System for Water Zone 1		3.5 MG reservoir
Service Area	Water Zone 1a	Water Zone 1b
Water Source	Mililani Mauka deepwell pumping system	Mililani Mauka deepwell pumping system/Mililani Makai deepwell pumping system.
Storage	1.5 MG reservoir and 1.0 MG reservoir	3.5 MG reservoir
Transmission Line	Transmission line from mauka reservoir and deepwell site	Transmission line from water zone 1a/line from booster pump station at 865-foot reservoir site



APPENDIX E

Preliminary Drainage Report for Millani-Mauka.

EDP Hawaii, Inc. October 1986

PRELIMINARY DRAINAGE MASTER PLAN FOR MILILANI MAUKA

INTRODUCTION

The Mililani Mauka project is situated at Waijui, Ewa, Oahu, Hawaii (See Figure 1) on land owned by Castle & Cooke. The site is proposed for development by Mililani Town, Inc., as the remaining increment of its original 3500-acre master plan for Mililani Town. Mililani Mauka encompasses approximately 1220 acres east of the H-2 Freeway, and is bounded by Kipapa and Waikakalua Gulches with access from the H-2 Freeway via the Mililani Interchange. The parcel is identified as being portions of Tax Map Key: 9-5-01, and 9-5-02.

The Master plan for Mililani Mauka (See Figure 2) proposes development similar to that of existing land uses in Mililani Town. These include single family residential and apartment units, recreation centers, churches, a commercial area, community facilities, and parks and open areas.

It is the intent of this report to define the on-site and off-site drainage areas of the proposed Mililani Mauka Development and to provide a preliminary assessment on the impact of additional runoff generated by the proposed development of Mililani Mauka on existing downstream drainage facilities as well as to set forth the preliminary engineering design concept for the project's storm drainage system.

PRELIMINARY DRAINAGE REPORT FOR
MILILANI MAUKA

By:
EDP Hawaii Inc.
1164 Bishop Street, Suite 1515
Honolulu, Hawaii 96813

October 18, 1986

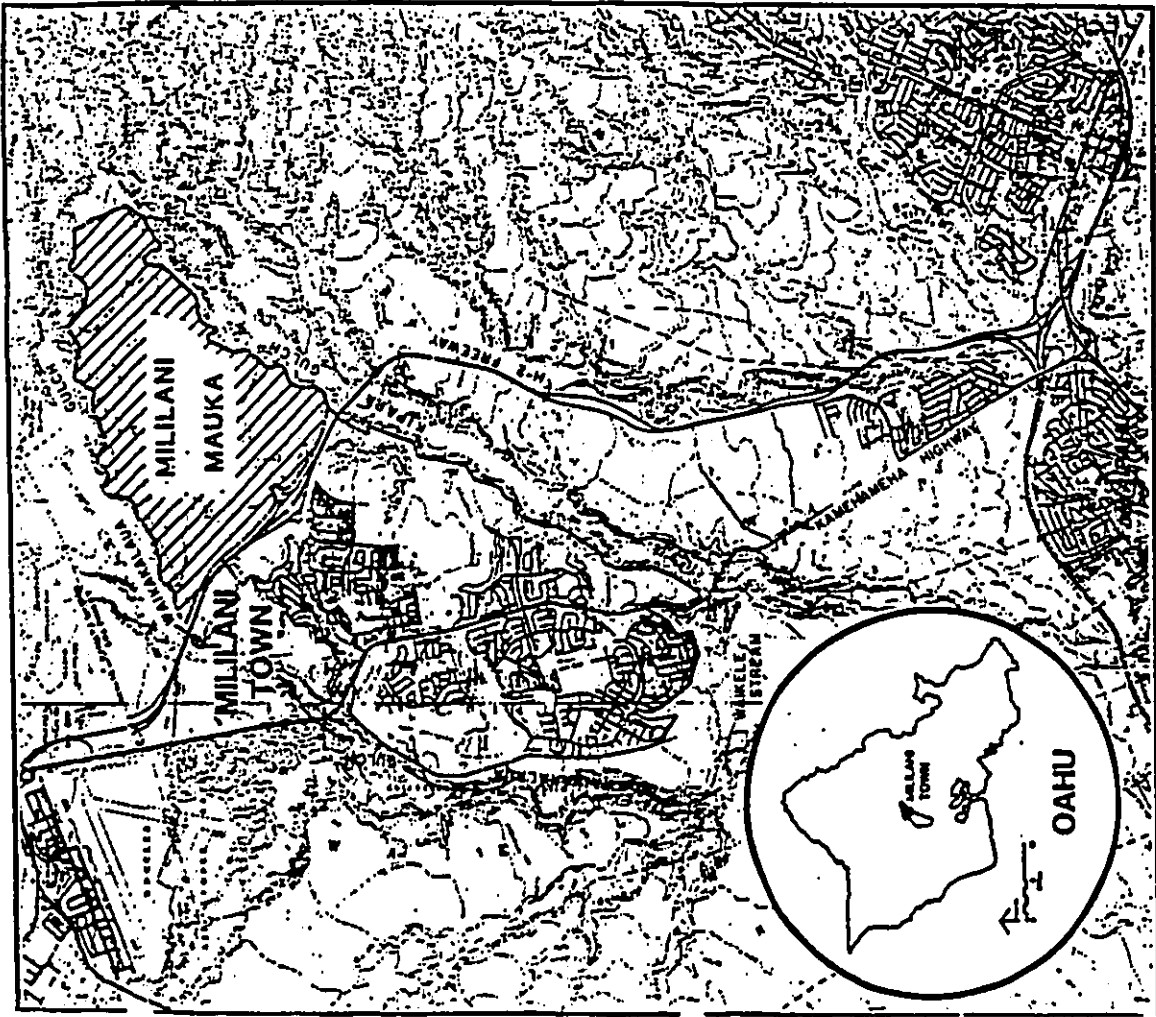


Figure: 1

0' 48,000'

LOCATION MAP

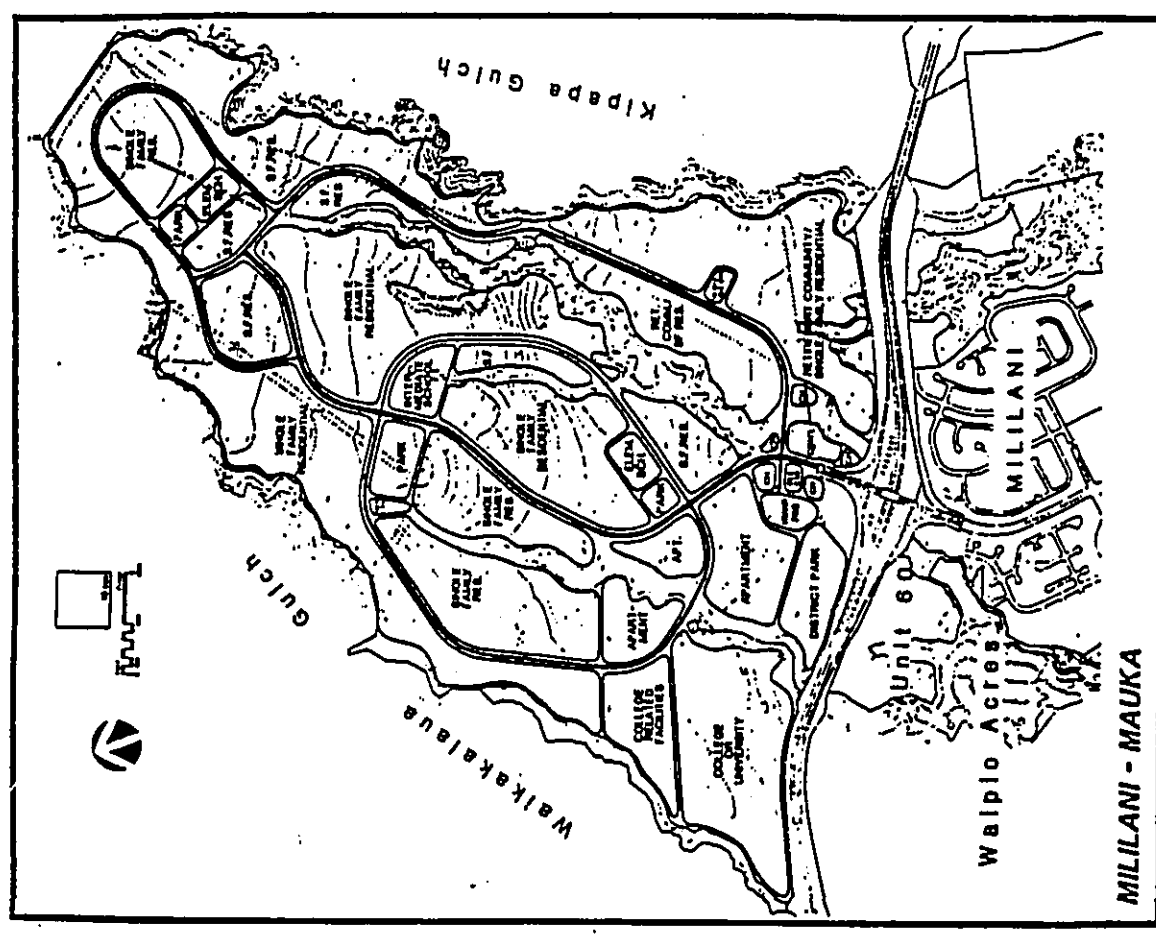


Figure: 2



MASTER PLAN

EXISTING CONDITIONS

The Mililani Mauka area is currently used for the cultivation of pineapple and situated on gentle plateaus with a natural grade of 24-34 sloping east to west. The site is traversed by two main gullies in a naturally vegetated state. The current drainage pattern follows the furrows in the pineapple fields and along service roads which leads to these two gullies. The two gullies, hereinafter referred to as the north and south gullies, act as the drainage basins for approximately 988 acres of the 1220 acre development of which storm runoff flows into culverts crossing the H-2 Freeway, the Waipio Acres drainage system and eventually into Waikaloa Stream within Waikakalana Gulch. North and south fringe areas (20 and 212 acres respectively) of the development site sheetflow into Waikakalana and Kipapa Gulches. Waikakalana and Kipapa Gulches are both tributaries for and part of the 45.7 sq. mile drainage basin for Waikaloa Stream.

The north and south gully drainage areas can be further broken down to approximately 371 and 617 acres respectively (See Figure 3).

m
1
3

The report Drainage Improvements For The Development Of Mililani Town Unit 60 by EOP Hawaii Inc., August 1986, and accepted by the City and County of Honolulu, Department of Public Works on September 19, 1986 assessed the impact of additional runoff generated by the development of Unit 60 on the drainage system within Waipio Acres. This report noted that the existing drainage system within Waipio Acres cannot accommodate increased storm runoff attributed to upstream land development. As such, Unit 60 is incorporating the use of a detention basin located within Mililani Mauka to minimize impact of its increased storm runoff on the Waipio Acres drainage system.

Based on data from Park Engineering's construction plans for Waipio Acres, the north branch of the system was designed to carry 600 cfs and the south branch 970 cfs.

Tables A and B show summarizations of the storm runoff entering the north and south channels of the Waipio Acres system and the remaining flows allowable from

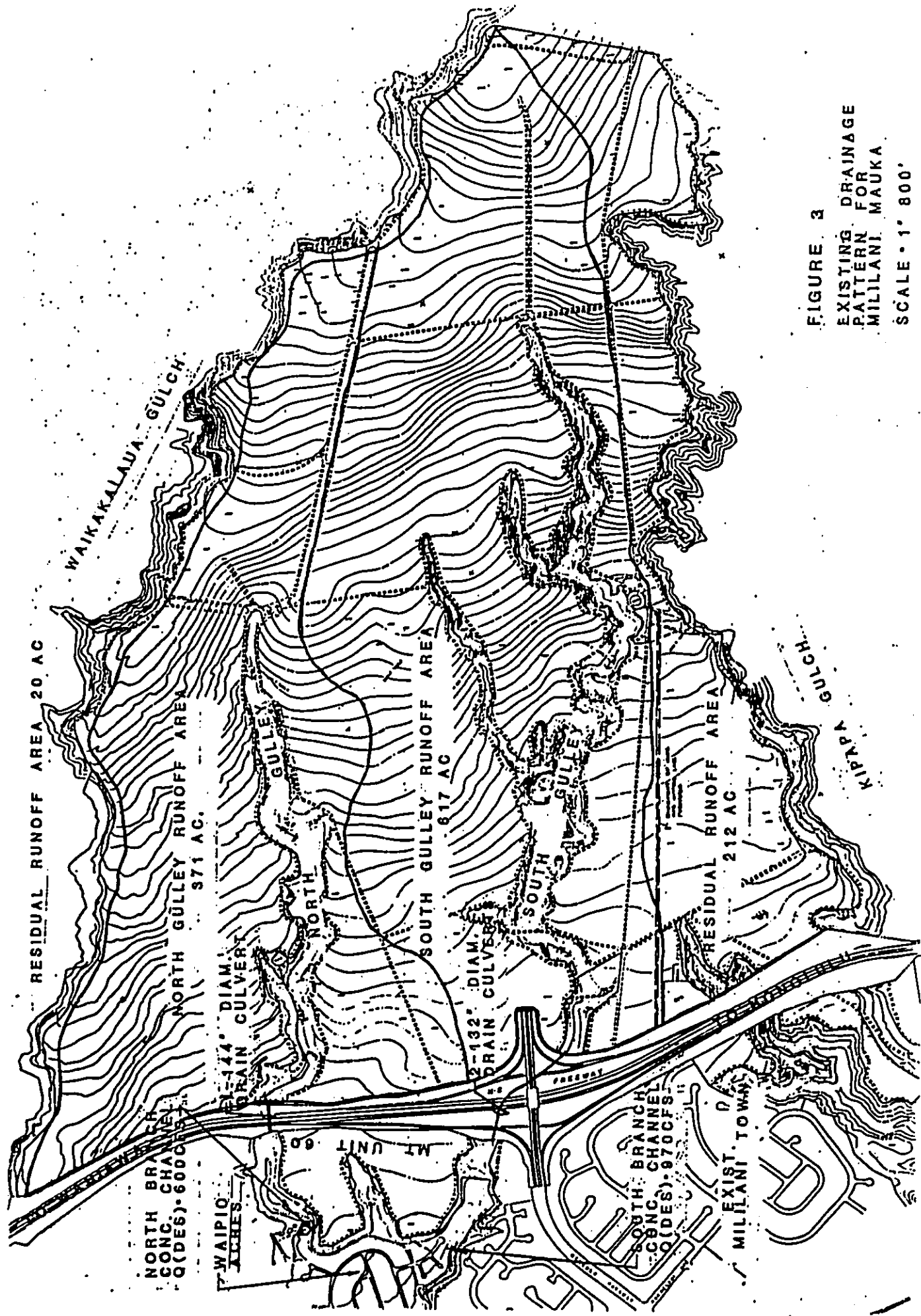


FIGURE 3
 EXISTING DRAINAGE
 PATTERN FOR
 MILILANI MAUKA
 SCALE - 1" 800'

Mililani Mauka. As shown, 300 cfs and 754 cfs from Mililani Mauka can be allowed to drain into the north and south branches of the Waipio Acres drainage system respectively.

TABLE A

SUMMARY: NORTH GULCH CHANNEL BELOW H-2 FREEWAY ONLY

DRAINAGE AREA	AREA (ACRES)	1.5 CFS/ACRE (AG. 50-YR)	3.8 CFS/ACRE (50-YR)
WAIPIO ACRES	26	39	98.8
MILILANI UNIT 6D	41.5	62.3	157.7
EXIST AG. AREA*	23.3	35	35
H-2 FREEWAY	2.1	3.2	8
TOTAL	92.9	139.5	300

*EXISTING AREA TO REMAIN IN AG. USE
 MAXIMUM CAPACITY DOWNSTREAM= 600 CFS
 CONTRIBUTION BELOW FREEWAY= 300 CFS
 ALLOWABLE FROM MILILANI MAUKA=300 CFS

TABLE B

SUMMARY: SOUTH GULCH CHANNEL BELOW H-2 FREEWAY ONLY

DRAINAGE AREA	AREA (ACRES)	1.5 CFS/ACRE (AG. 50-YR)	3.8 CFS/ACRE (50-YR)
H-2 FREEWAY	48.3	72.5	183.5
MT UNITS 12 & RESIDUAL AREAS			
MILILANI UNIT 6D	8.4	12.6	31.9
TOTAL	56.7	85.1	215.5

MAXIMUM CAPACITY DOWNSTREAM= 970 CFS
 CONTRIBUTION BELOW FREEWAY= 216 CFS
 ALLOWABLE FROM MILILANI MAUKA=754 CFS

PROPOSED DRAINAGE IMPROVEMENTS

To determine the increased storm runoff factors attributed to the development of Mililani Mauka, the rational method was used. In this case, the rational method appears to be the most appropriate method to estimate runoff as it is expected Mililani Mauka will be processed incrementally and that design plans will incorporate the rational method to determine the design requirements for the drainage system. Such runoff factors will be derived in accordance with the City and County of Honolulu's Storm Drainage Standards, March 1986, for a storm of a 50-year recurrence interval and can be seen in Table C.

From the qualitative runoff factors generated for the Mililani Mauka development (Table C), approximately 79 acres and 108 acres within the north and south Gulley tributary areas respectively can drain into the Waipio Acres drainage system. The storm runoff generated from the remaining 711 acres of the 988 acre drainage area of Mililani Mauka flowing into Waipio acres need to be diverted elsewhere.

Other alternatives to minimize impact of increased runoff were explored, such as improvement of downstream facilities. However, this alternative was not cost-effective and would require cooperation of all affected downstream land owners.

Another alternative was to incorporate the use of detention basins. Although detention basins are accepted means to effectively control increased runoff, it is uncertain whether use of detention basins would be effective because of the limited upstream tributary area. Such an alternative would also require careful monitoring and periodic maintenance due to problems that may be encountered with sedimentation and debris.

Diversions of runoff to nearby Waikakaleua Gulch was also considered. However, the Preliminary Drainage Report For Molemano Woodlands, Phase III, Gray-Nong and Assoc., December 18, 1985, and accepted by the City and County of Honolulu, Department of Public Works on January 20, 1986, cited that the existing drainage systems within Molemano and Waikakaleua Woodlands cannot accommodate increased storm runoff attributed to upstream land development.

TABLE C
ANALYSES TO DETERMINE RUNOFF FACTOR OF
50-YEAR STORM FOR MILILANI MAUKA

Method:	Rational Formula:	Q=CIA
Standard:	"Storm Drainage Standard", March, 1986 of Honolulu	
i -	3.1 (Plate 2)	
c -	0.7 (Table 2)	
Assumptions:		
	A) Ave. Lot Length = 100 ft. @ 1% graded	
	B) Ave. CB Spacing = 400 ft. @ 3% paved	
Tc(A) =	14.5 Min. (Plate 3)	
Tc(B) =	7.0 Min. (Plate 3)	
Tc	21.5 Min.	
Correction Factor:	1.75 (Plate 4)	
Runoff Factor/ Acre:	Q/A = CxixCF = 0.7x3.1x1.75 = 3.80 CFS/AC	
Contribution Allowable From Mililani Mauka To Waipio Acres		
For North Channel Only	= 300 CFS / 3.8 CFS/AC. = 79 Ac.	
For South Channel Only	= 75% CFS / 3.8 CFS/AC. = 198 Ac.	

Based on the constraints hereinbefore, diversion of runoff to Kipapa Gulch appears the most logical solution to maintain storm runoff flows within drainage system capacities of existing downstream developments. Therefore, drainage improvements for the proposed project need to be designed to divert storm runoff flows from portions of the project site away from these developments and into Kipapa Gulch which is relatively undeveloped and a natural tributary to Waikole Stream. In addition, by diverting storm runoff to Kipapa Gulch, the detention basin currently being developed with Milliani Town Unit 60 will not be required. As such, this detention basin can be removed upon implementation of the future drainage diversion improvements.

Future drainage improvements will include the construction of cut-off ditches, box culverts and pipe systems designed to transport storm runoff (in excess of the Waipio Acres' drainage system capacity) to Kipapa Gulch. All drainage improvements will conform to the requirements and design standards of the City and County of Honolulu.

EVALUATION OF RUNOFF QUANTITIES AND POTENTIAL IMPACT WITHIN KIPAPA GULCH

As Milliani Mauka and Kipapa Gulch are existing tributaries of Waikole Stream, emphasis for impact on downstream areas will focus on portions of Kipapa Gulch prior to its merging with Waikole Stream.

Peak runoff discharges will be estimated for both Kipapa's existing runoff area and the Milliani Mauka diversion, using criteria set forth in Plate 6 of the Storm Drainage Standards, March, 1986 of the City and County of Honolulu.

Normal depth values will be determined to analyze the impact of the proposed diversion. Normal depths will be calculated using the Manning's equation for open channel flow.

Study Area 1

At the proposed diversion connection (Study Area 1), the existing drainage area for Kipapa Gulch is approximately 5,645 acres (See Figure 4). With the addition of the 711 acres, the drainage area will increase to 6,356 acres. Referring to Plate 6, 5,645 acres has a corresponding peak flow of 14,000 cfs while 6,356 acres has 18,000 cfs. Therefore, the projected storm flows for Kipapa Gulch may increase 14%.

Using the values for peak discharges, calculations for normal depth (dn) were performed (See Appendix A) with slope and stream channel dimensions based on field observations and aerial maps. For Kipapa Gulch's existing peak flow of 14,000 cfs, the dn is estimated to be 14.7 ft. (at Section 1). With the additional runoff from Milliani Mauka, the dn will increase approximately 0.9 ft.

The area surrounding the proposed diversion location was found to be relatively undeveloped with no existing structures except for a few roads. These roads currently cross the normally dry gulch bottom to serve farmers in the upper regions of Kipapa Gulch. During periods of intense storms, the roads are usually impassable and an increase of less than a foot in normal depth is not expected to create a significant impact.

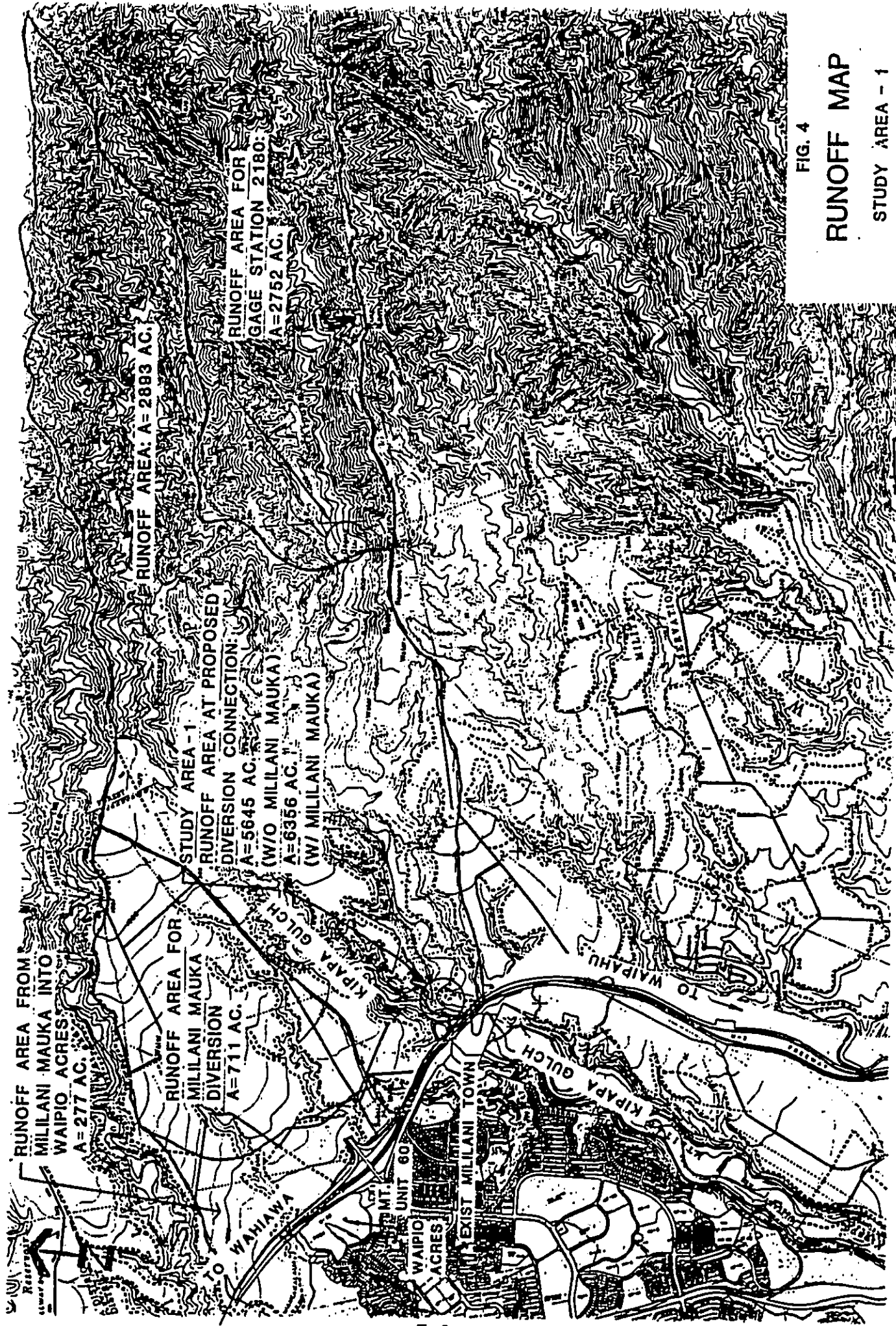


FIG. 4

RUNOFF MAP

STUDY AREA - 1

Study Area 2

A similar analysis was performed approximately 2.5 miles downstream (Study Area 2), near the Kanehamaha Highway crossing of Kipapa Gulch. Here, the existing drainage area for Kipapa Gulch increases by 1,025 acres to 7,470 acres (See Figure 5). Again referring to Plate 6, a peak discharge of 18,000 cfs is obtained. With the addition of Millieni Mauka's 711 acres, the peak discharge increases to 19,500 cfs which represents an increase of about 8%.

Using the values for peak discharges, calculations for DA were again performed (See Appendix B).

Within Study Area 2, certain sections along the existing channel may not be able to accommodate peak flows under existing conditions. 8,000 cfs (Section 3A) was calculated as the maximum peak discharge that can be accommodated through the normal channel section without overflowing its banks. Higher flows are expected to produce a flood plain. Therefore, using the 18,000 cfs and 19,500 cfs values, estimates were then made as to the difference in the extent of the flood plain area (See Figure B-1). From this analysis, the addition of Millieni Mauka may increase the flood level by approximately 0.5 feet which should not create any adverse impacts.

Various military facilities are located within and below Study Area 2. Therefore, the U.S. Army Corps of Engineers, Flood Control Management Division and Master Planning Division, as well as Hickam Air Force Base Engineers were consulted regarding records of flooding problems within the Kipapa Gulch Area. With the exception of a few problems encountered with small unjacketed pipes crossing under the stream's channel these agencies reported no record of serious flooding along Kipapa Gulch.

The Drainage Division, Department of Public Works, City and County of Honolulu was also consulted and they too have no records of flooding problems in Kipapa Gulch.

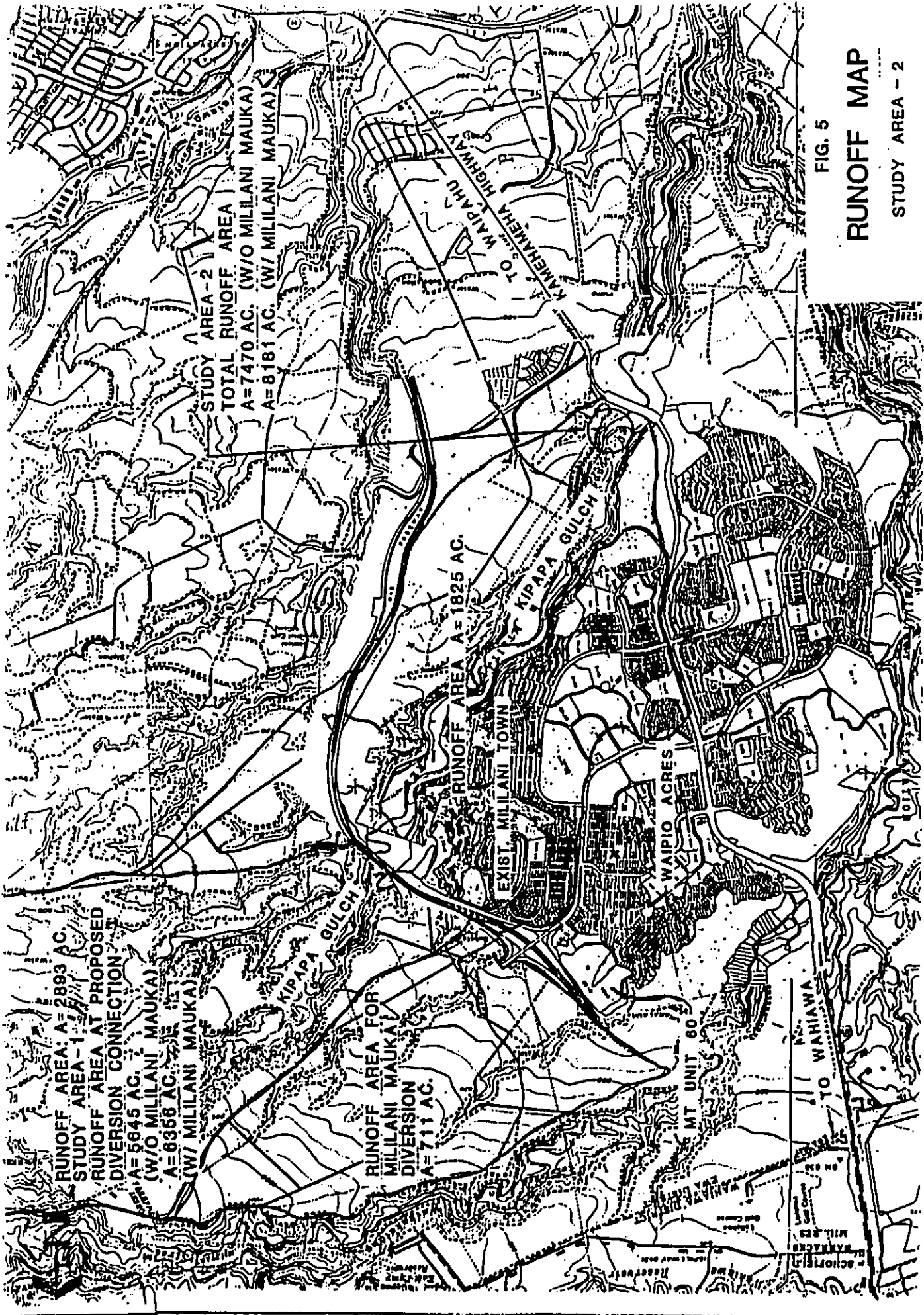


FIG. 5
RUNOFF MAP
 STUDY AREA - 2

Historical Peak Flow Conditions

An Analysis of The Magnitude And Frequency Of Floods on Oahu, Hawaii, Water-Resources Investigation 60-45, United States Geological Survey, June 1960, provides information for two gaging stations that are applicable to Kipapa Gulch's drainage area.

The first is Gage Station No. 2128 which monitors the drainage from a 4.3 sq. mile area and is located above Milliani Town in the upper reaches of Kipapa Gulch (See Figure 6). Gage Station No. 2130 recorded a maximum discharge of 5,680 cfs on May 14, 1963.

The second Gage Station No. 2130 monitors the drainage from a 45.7 sq. mile area of which 11.7 sq. miles is attributable to the Kipapa Gulch's Study Area 2 discussed hereinbefore. This Gage is located at Waikale Stream-Waipahu junction (See Figure 6). Gage Station No. 2130 recorded and maximum discharge of 13,000 cfs on November 28, 1954.

It is noted that this actual maximum recorded discharge for Gage Station No. 2130 is less than the figures derived hereinbefore for the smaller Kipapa Gulch drainage area using the criteria set forth in the City's Drainage Standard.

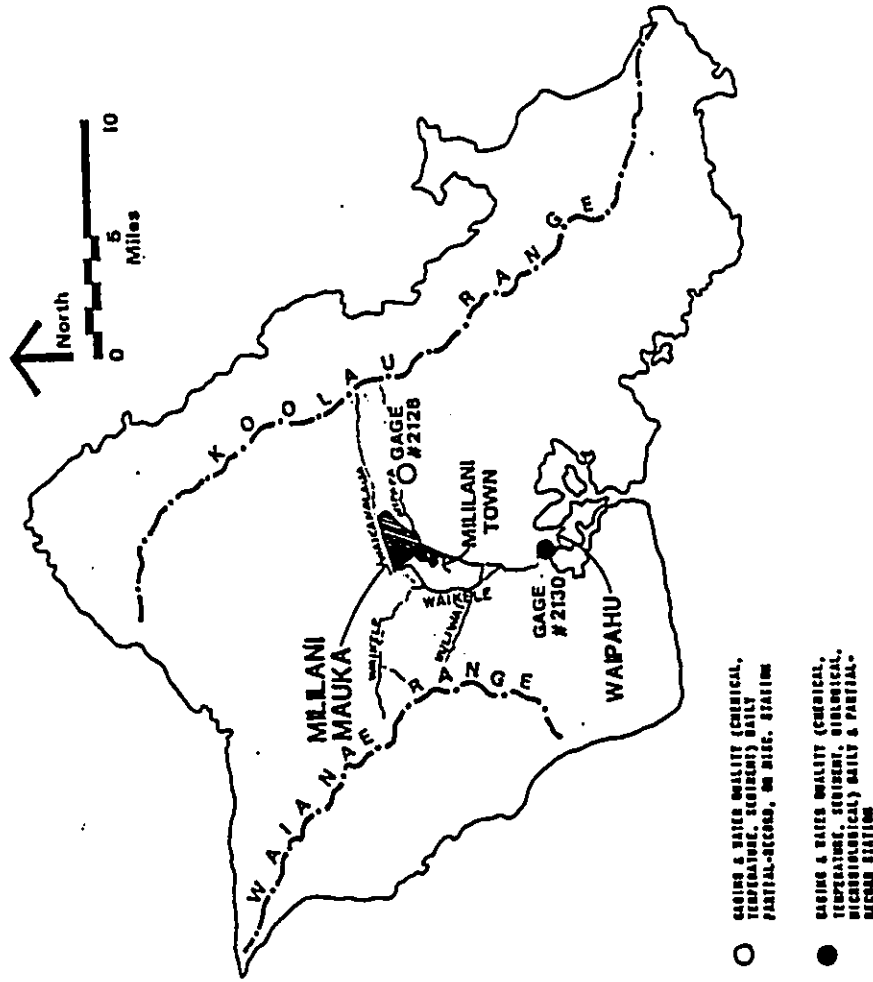


FIGURE 6
Gage Station Locations

CONCLUSION

Diversion of storm runoff from an urbanized Milliani Mauka (711+ Acres) to Kipapa Gulch will be required to maintain storm runoff within existing drainage system capacities of residential downstream areas such as Waipiu Acres. Also, by diverting Milliani Mauka's storm runoff, the detention basin currently being developed with Milliani Town Unit 60, will not be required. Upon the implementation of future drainage improvements, the detention basin may be removed.

Future drainage improvements, therefore, will include the construction of cut off ditches, box culverts and pipe systems designed to transport storm runoff in excess of the Waipiu Acres' drainage system capacity to Kipapa Gulch. All drainage improvements will conform to the requirements and drainage design standards of the City and County of Honolulu.

As Milliani Mauka and Kipapa Gulch are existing tributaries of Waikale Stream, diverting storm runoff from Milliani Mauka to Kipapa Gulch is not expected to adversely affect the peak runoff flows in Waikale Stream near Waipahu.

To date, developments at Milliani Town have not created any significant downstream drainage problems in Kipapa Gulch and Waikale Stream, and further developments are not expected to cause any significant adverse impacts.

Except for temporary disruptions (dust and noise) normally associated with construction of such drainage facilities, no other adverse impacts are anticipated.

APPENDIX A
STUDY AREA 1

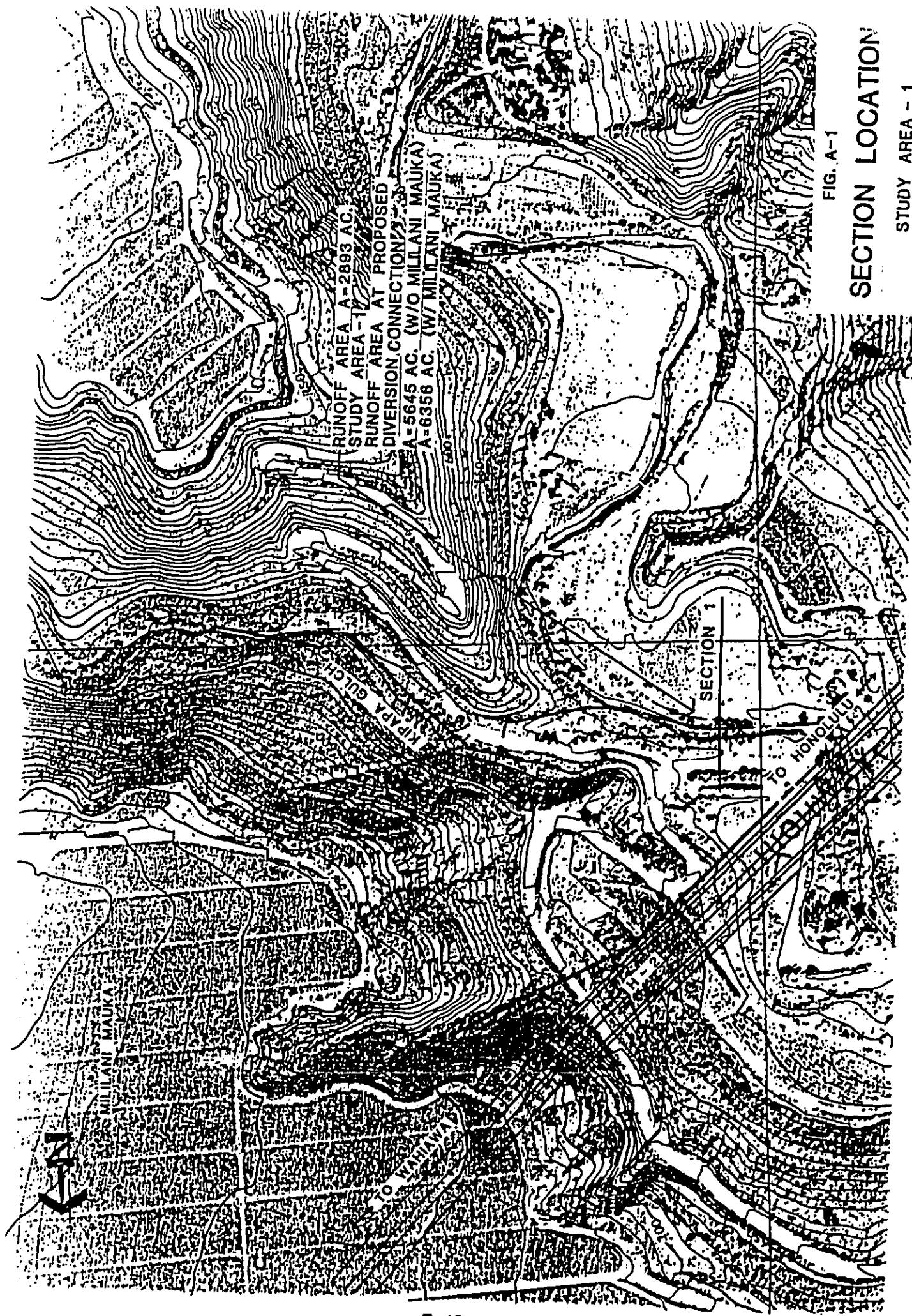


FIG. A-1
SECTION LOCATION
 STUDY AREA - 1

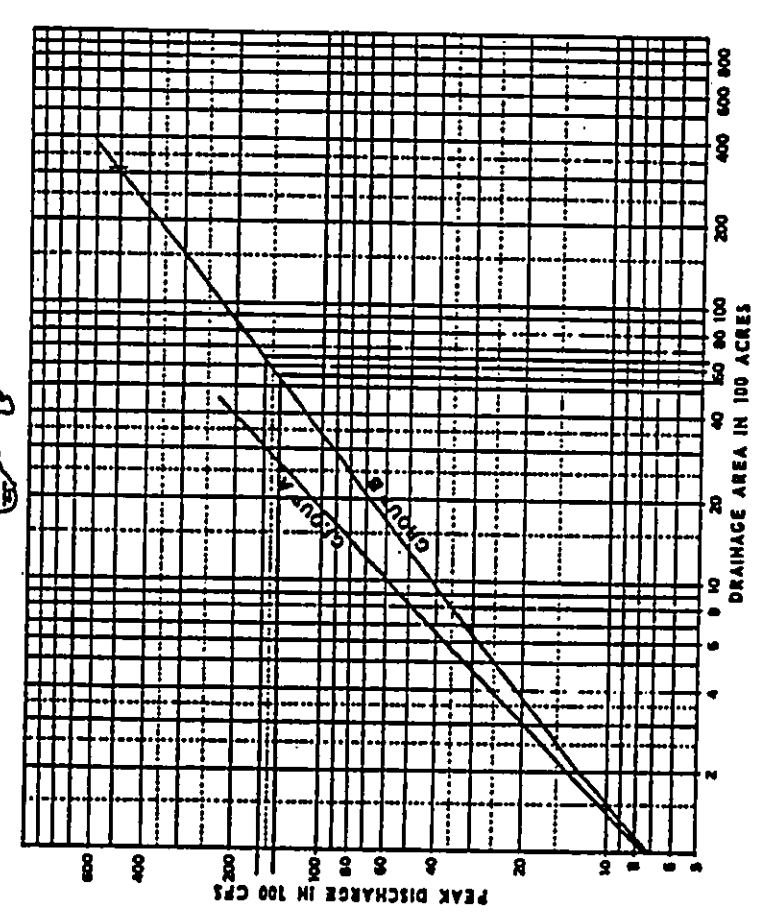
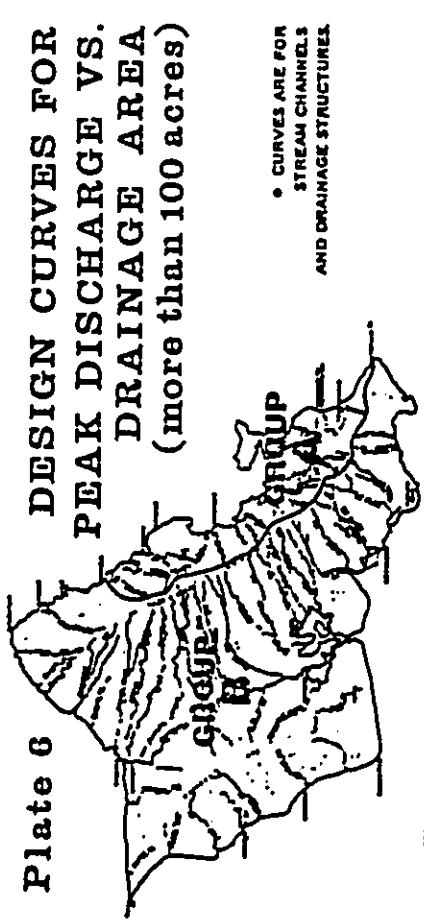


FIGURE A-2
SOURCE: U.S. ARMY CORPS OF ENGINEERS

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

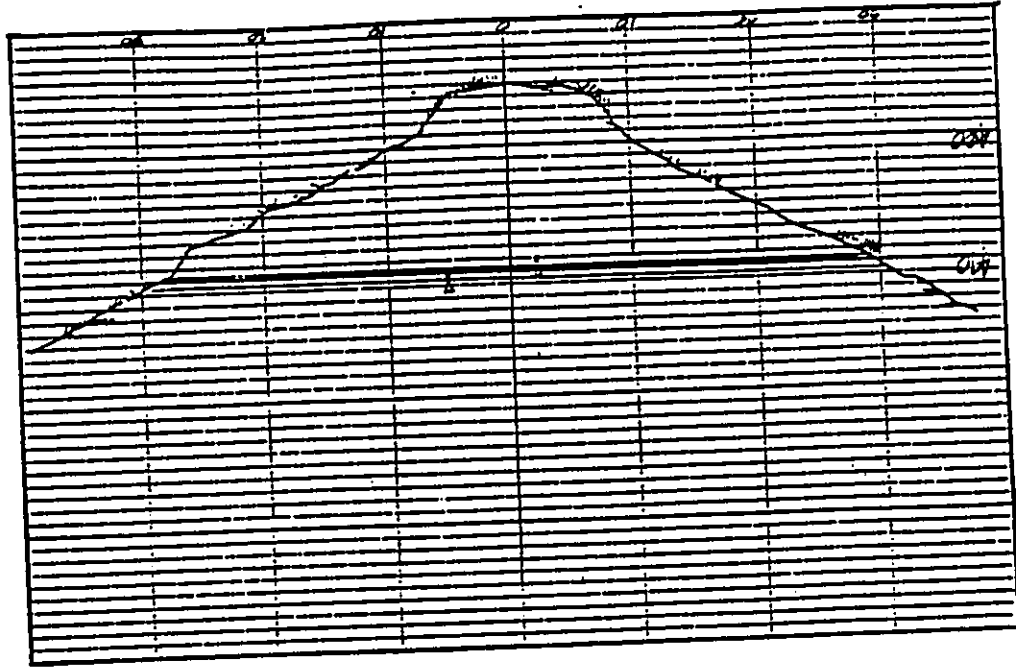
... DETERMINATION OF NORMAL DEPTH
... STUDY AREA 1

ASSUMPTIONS:
 $n = 0.035$
 $s = 0.0120$ ft/ft
 STANDARD:
 "STORM DRAINAGE STANDARD" CITY AND COUNTY OF
 HONOLULU, MARCH, 1986
 MANNING'S EQUATION
 $C = (1.486/n)AR^{(2/3)S^{(1/2)}}$

Q (CFS)	A (SF)	UP	R	AR ^(2/3)
14,000	710.5	84.9	8.368669	2928.655
14,000	726.2	85.7	8.473745	3018.374
16,000	750	87.1	8.610792	3150.818
	790.5	89.3	8.852183	3382.741
	798.7	89.8	8.894209	3428.640
	832	91.6	9.082769	3621.945

* dn for 14,000 cfs
 ** dn for 16,000 cfs

SECTION 1 STUDY AREA 1
 1"=10' Vert. & Hor.



APPENDIX B
STUDY AREA 2



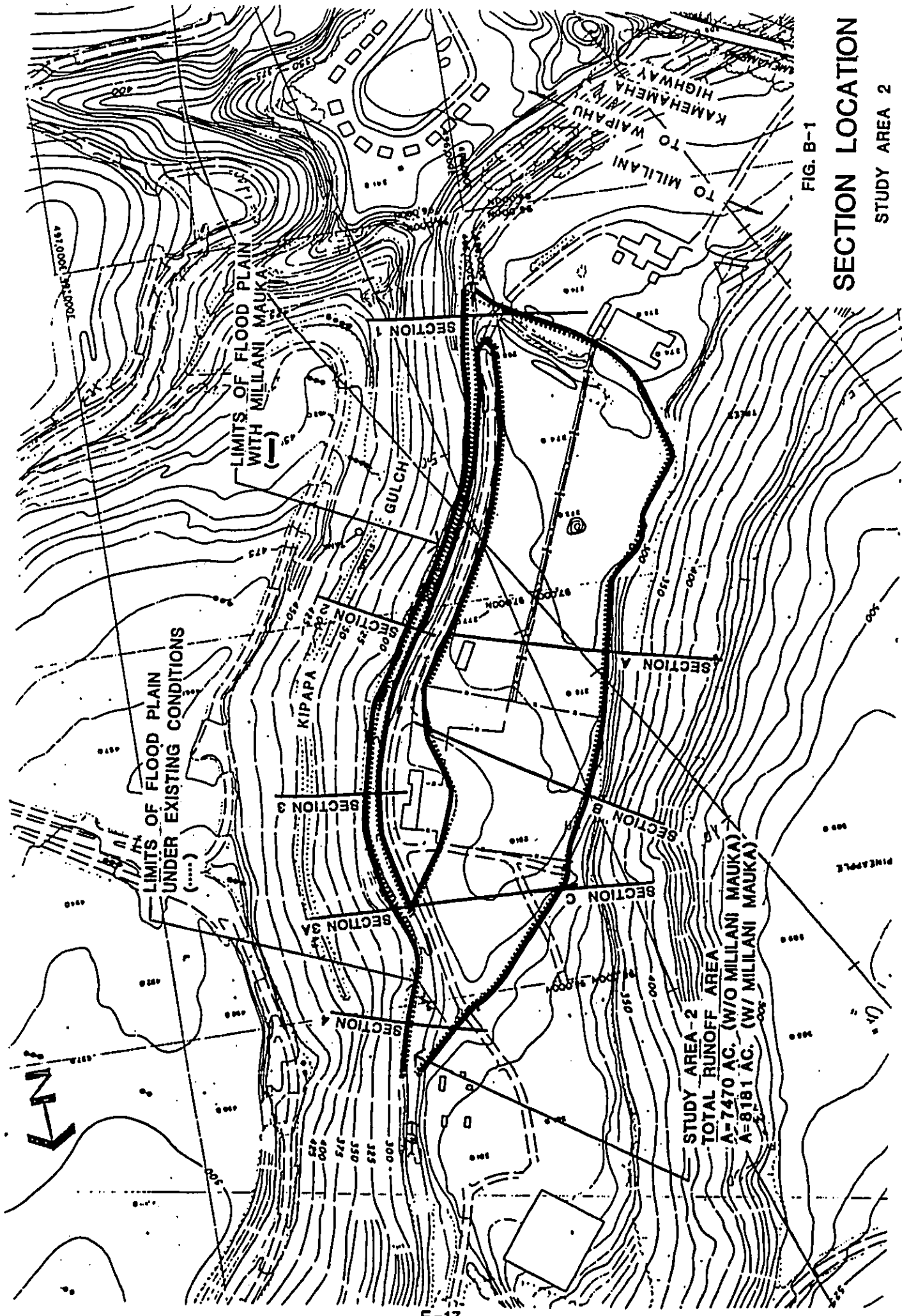
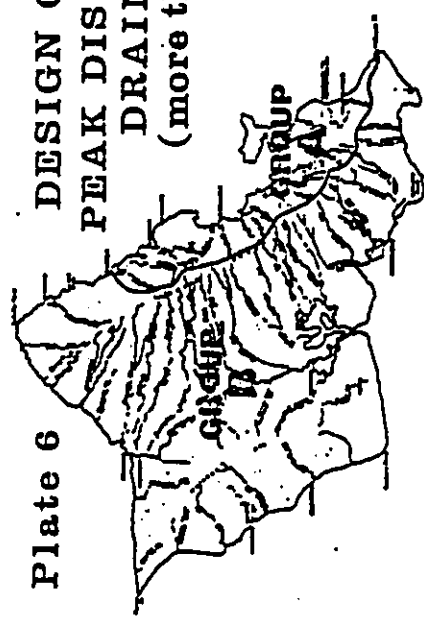


FIG. B-1

SECTION LOCATION
STUDY AREA 2

Plate 6 DESIGN CURVES FOR
PEAK DISCHARGE VS.
DRAINAGE AREA
 (more than 100 acres)



• CURVES ARE FOR
 STREAM CHANNELS
 AND DRAINAGE STRUCTURES.

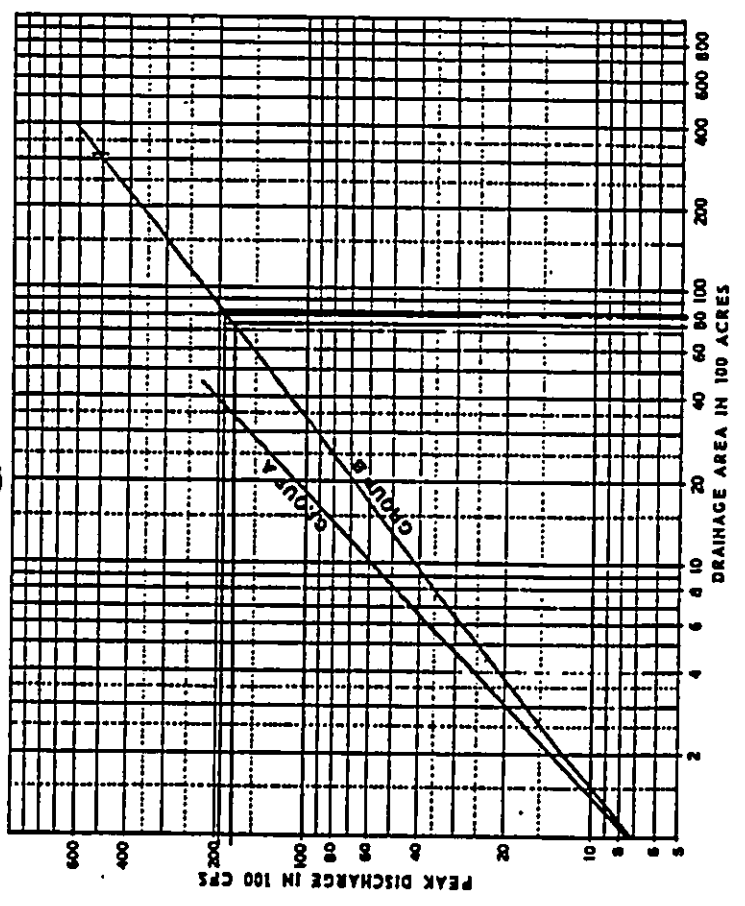


FIGURE B-2
 SOURCE: MULTIPURPOSE GEOLOGICAL SURVEY



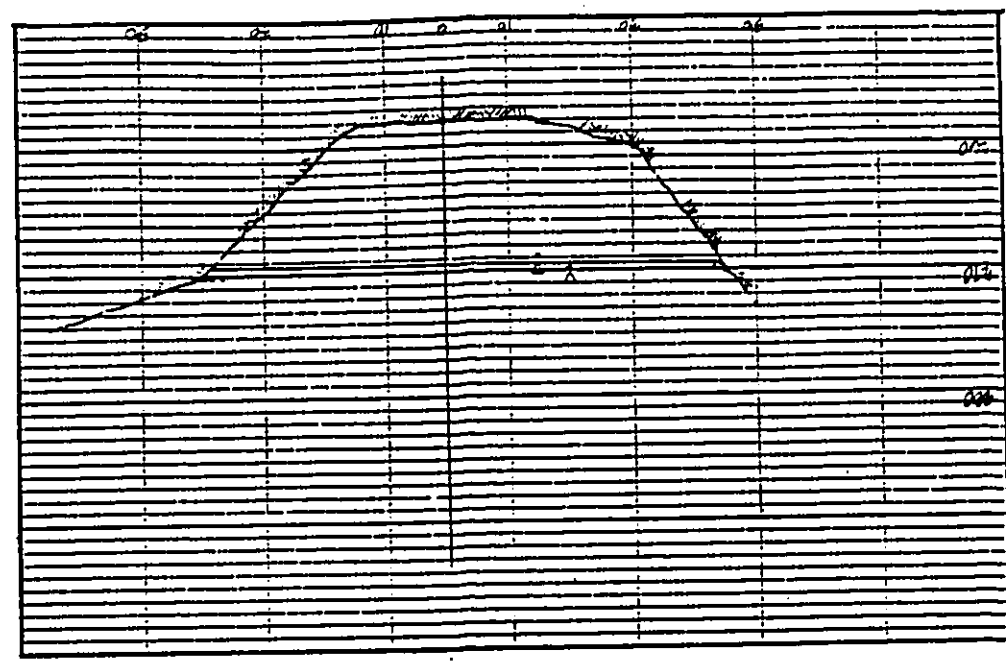
DETERMINATION OF NORMAL DEPTH:
STUDY AREA 2

SECTION 1 ASSUMPTIONS:
 $n = 0.035$
 $s = 0.0250$ ft/ft
 "STORM DRAINAGE STANDARD" CITY AND COUNTY OF HONOLULU, MARCH, 1986
 MANNING'S EQUATION $Q = (1.486/N)AR^{2/3}S^{1/2}$

Q (CFS)	AR ^(2/3)
18,000	2,681
19,500	2,905

D (FT)	A (SF)	UP	R	AR ^(2/3)
15	1004	112.5	8.92444	4319.705
14	898	111	8.09090	3618.916
13	802	97.5	8.22564	3268.041
12	713	91	7.83514	2812.688
11.5	671	90	7.45555	2560.801

* dn for 18,000 CFS
 ** dn for 19,500 CFS



SECTION 1 STUDY AREA 2

1\"/>

DETERMINATION OF NORMAL DEPTH
STUDY AREA 2

SECTION 2
ASSUMPTIONS:

n = 0.035
S = 0.0150 ft/ft

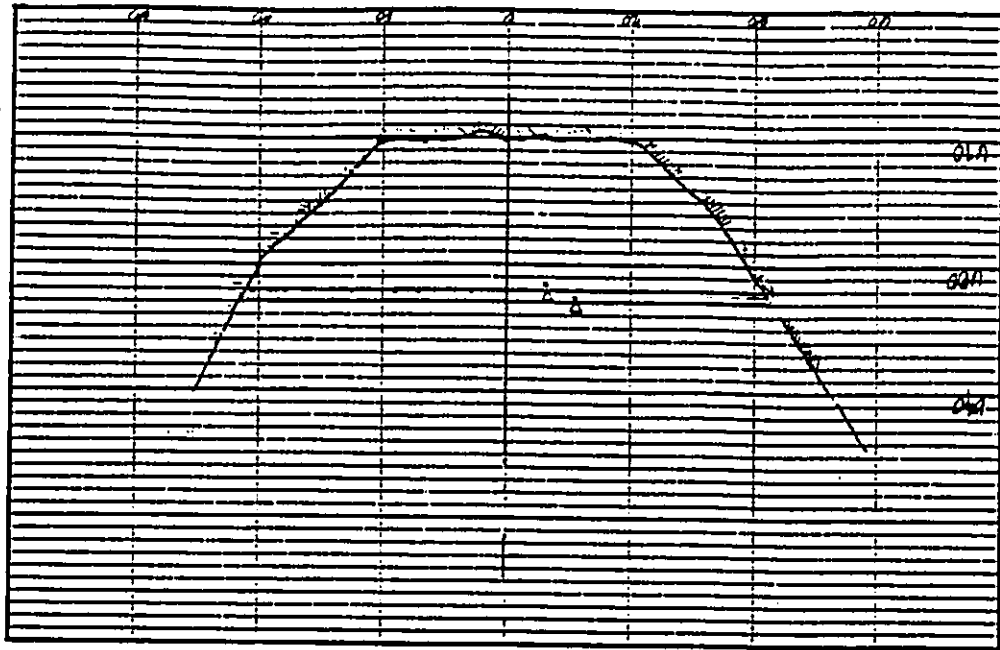
STANDARD: "STORM DRAINAGE STANDARD" CITY AND COUNTY OF HONOLULU, MARCH, 1986

MANNING'S EQUATION $Q = (1.486/N)AR^{2/3}S^{1/2}$

Q (CFS)	AR ^{2/3}
18,000	3,462
19,500	3,750

D (FT)	A (BF)	WP	R	AR ^{2/3}
15	1863	100.5	10.37810	4962.453
14	954	97.1	9.824922	4376.240
13	867	93.7	9.252934	3821.249
12	783	90.3	8.671096	3304.794

* dn for 18,000 CFS
** dn for 19,500 CFS



SECTION 2 STUDY AREA 2

1"=10' VERT.
1"=20' HOR.

DETERMINATION OF NORMAL DEPTH
STUDY AREA 2

SECTION 3
ASSUMPTIONS:

$n = 0.035$
 $s = 0.0090 \text{ ft/ft}$

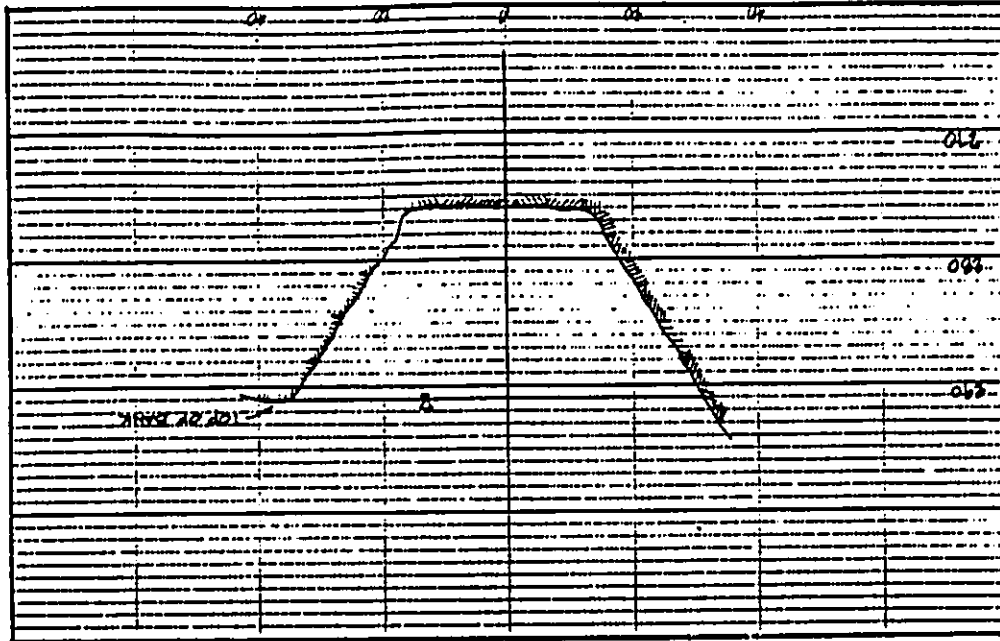
STANDARD: "STORM DRAINAGE STANDARD" CITY AND COUNTY OF
HONOLULU, MARCH, 1986

MANNING'S EQUATION $Q = (1.486/N)AR^{2/3}S^{1/2}$

Q (CFS)	AR ^(2/3)
18,000	4.469
19,500	4.841

D (FT)	A (SF)	WP	P	AR ^(2/3)
15	723	77	9.389610	3217.881

IF $AR^{(2/3)} = 3218$, $Q(\text{MAX}) = 12,962 \text{ CFS}$



1"=10' Vert.
1"=20' Hor.

SECTION 3 STUDY AREA 2

DETERMINATION OF NORMAL DEPTH
STUDY AREA 2

SECTION 3A
ASSUMPTIONS:

$n = 0.035$
 $s = 0.0100$ ft/ft

STANDARD:

"STORM DRAINAGE STANDARD" CITY AND COUNTY OF
HONOLULU, MARCH, 1986

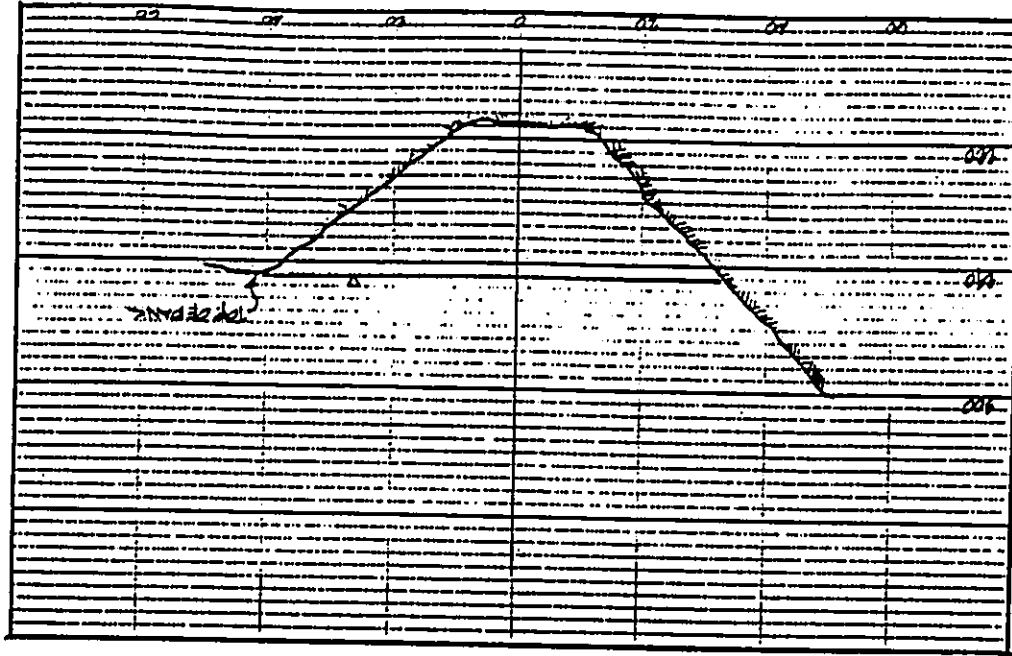
MANNING'S EQUATION

$$Q = (1.486/N)AR^{2/3}S^{1/2}$$

Q (CFS)	AR ^{2/3}
18,000	4,239
19,500	4,592

D (FT)	A (SF)	WP	R	AR ^{2/3}
12	502	69.5	7.23021	1,875.784

IF $AR^{2/3} = 1,876$, $Q(\text{MAX}) = 8,000$ CFS



1" = 10' Vert.
1" = 20' Horz.

DETERMINATION OF NORMAL DEPTH
STUDY AREA 2

SECTION 4
ASSUMPTIONS: $n = 0.035$
 $s = 0.0100$ ft/ft

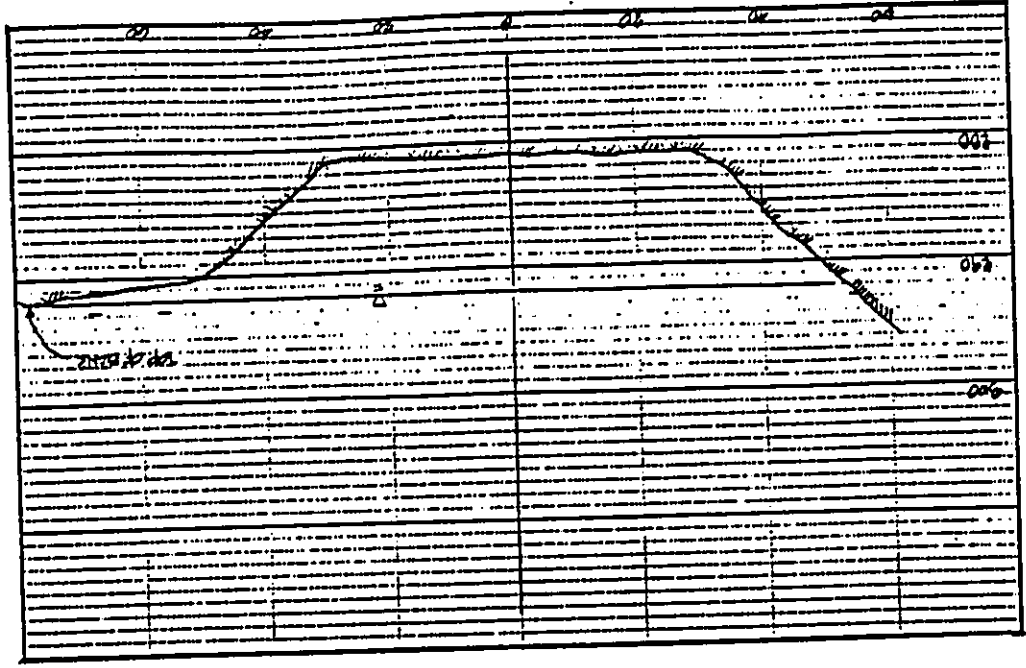
STANDARD: "STORM DRAINAGE STANDARD" CITY AND COUNTY OF
HONOLULU, MARCH, 1986

MANNING'S EQUATION $Q = (1.486/N)AR^{2/3}S^{1/2}$

Q (CFS)	AR ^{2/3}
18,000	4,239
19,500	4,592

D (FT)	A (SF)	UP	R	AR ^{2/3}
11	970	142	6.830985	3492.158

IF $AR^{2/3} = 3,492$, $Q(MAX) = 14,826$ CFS



1"=10' Vert.
1"=20' Hor.

SECTION 4 STUDY AREA 2

DETERMINATION OF NORMAL DEPTH
STUDY AREA 2

SECTION A
ASSUMPTIONS:

n = 0.035
s = 0.0100 ft/ft

STANDARD:

"STORM DRAINAGE STANDARD" CITY AND COUNTY OF
HONOLULU, MARCH, 1986

MANNING'S EQUATION

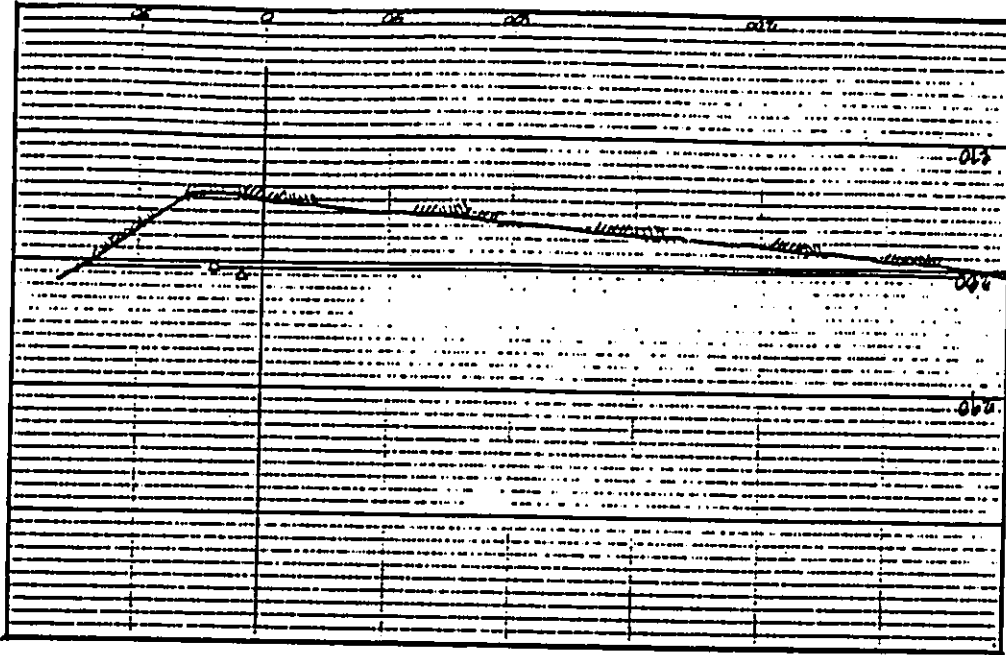
$$Q = (1.486/n)AR^{2/3}S^{1/2}$$

Q (CFS)	AR ^(2/3)
10,035	2,364
11,535	2,717

D (FT)	A (SF)	UP	R	AR ^(2/3)
5	1013	375	2.701333	1764.864
5.5	1205	383	3.146214	2587.294 *
6	1396	390	3.579487	3266.625 **

* dn for 10,035 cfs

** dn for 11,535 cfs



SECTION A STUDY AREA 2

1" = 10' VERT.
1" = 50' HOR.

DETERMINATION OF NORMAL DEPTH
STUDY AREA 2

SECTION B
ASSUMPTIONS:

n = 0.035
s = 0.0140 ft/ft

STANDARD:

"STORM DRAINAGE STANDARD" CITY AND COUNTY OF
HONOLULU, MARCH, 1986

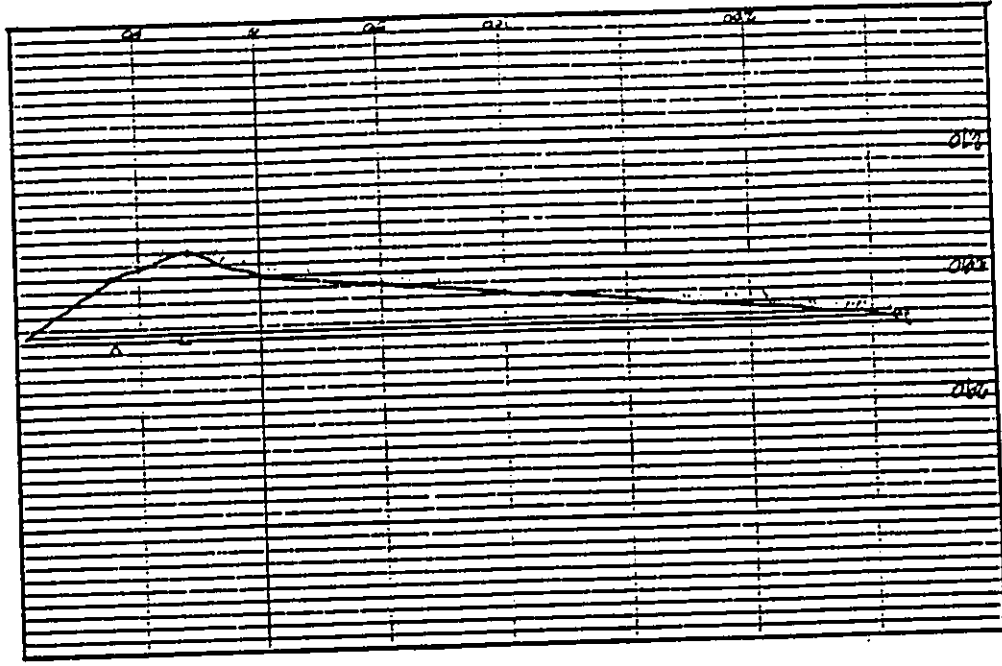
MANNING'S EQUATION

$$Q = (1.486/N)AR^{2/3}S^{1/2}$$

Q (CFS)	AR ^(2/3)
10,035	1,998
11,535	2,296

D (FT)	A (SF)	UP	R	AR ^(2/3)
6.5	1006	390	2.579487	1892.161
6.7	1201	408	2.943627	2466.786

dn for 10,035 cfs
dn for 11,535 cfs



SECTION B STUDY AREA 2

1"=10' Vert.
1"=50' Hor.

DETERMINATION OF NORMAL DEPTH
STUDY AREA 2

SECTION C
ASSUMPTIONS: $n = 0.035$
 $s = 0.0140 \text{ ft/ft}$

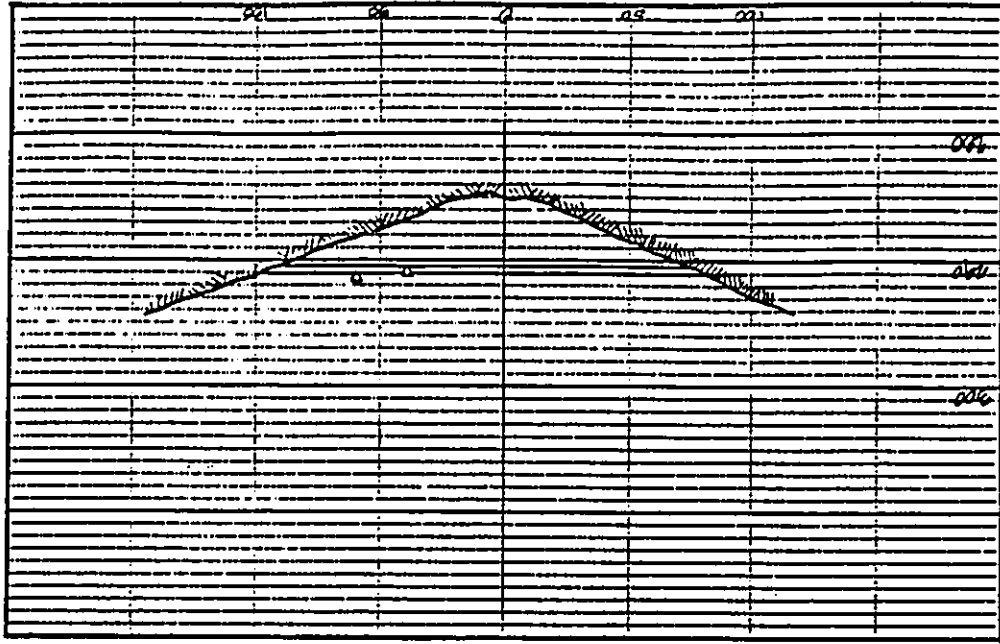
STANDARD: "STORM DRAINAGE STANDARD" CITY AND COUNTY OF
HONOLULU, MARCH, 1986

MANNING'S EQUATION $Q = (1.486/N)AR^{2/3}S^{1/2}$

Q (CFS)	AR ^(2/3)
10,035	1,998
11,535	2,296

D (FT)	A (SF)	UP	R	AR ^(2/3)
5.5	872	280	3.114285	1859.611
6	1012	300	3.373333	2276.250

* dn for 10,035 cfs
** dn for 11,535 cfs



SECTION C STUDY AREA 2

1"=10' Vert.

RECEIVED OCT 29 1986
C.C. AIR MAIL HASTING

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

630 SOUTH KING STREET
HONOLULU, HAWAII 96813



FRANK P. PAH
DIRECTOR

RUSSELL L. SMITH, JR.
DIRECTOR AND CHIEF ENGINEER

12-0335

October 27, 1986

KDP Hawaii, Inc.
1164 Bishop Street, Suite 1515
Honolulu, Hawaii 96813

Gentlemen:

Subject: Your Letter of October 20, 1986,
Regarding the Preliminary Drainage Report
for Mililani Mauka - TMS: 9-5-01 and 9-5-02

The preliminary drainage report and your proposal to divert 711 acres of runoff from Mililani Mauka to Waialeale Stream is acceptable. However, a preliminary drainage plan showing the method and location of the proposed diversion will be required prior to the approval of any construction plans.

We will retain the preliminary drainage report for our files.

Very truly yours,

RUSSELL L. SMITH, JR.
Director and Chief Engineer

APPENDIX F

Central and Leeward Oahu Transportation Study (Draft).

Parsons, Brinkerhoff, Quade and Douglas, Inc. May 1986

CENTRAL AND LEeward OAHU TRANSPORTATION STUDY

EXECUTIVE SUMMARY

BACKGROUND

Recent growth in residential development in the central and leeward areas of Oahu, in combination with the high concentration of the island's employment base in the primary urban center (PUC), has created traffic congestion in the H-1 transportation corridor connecting the central and leeward portions of the island with the PUC. The island's topography significantly constrains the range of available improvement options by restricting the development of transportation facilities to a narrow strip of land where the H-1 freeway corridor runs adjacent to Pearl Harbor.

The result of these factors has been increasing levels of traffic congestion in the H-1 corridor, particularly inbound to the PUC during the morning peak period. The increasing congestion has, on the one hand, spurred efforts by the City and County of Oahu and the State of Hawaii to search for methods of increasing the traffic capacity in this section of the H-1 corridor; at the same time, it has raised questions about the consequences of permitting further development in central and leeward Oahu.

The Hall 2000 Study, recently conducted by the Oahu Metropolitan Planning Organization (OMPO), studied long range transportation needs on an island-wide basis, using traffic projections for the Year 2000. Socioeconomic projections utilized to prepare the traffic forecasts envisioned a significant amount of growth in leeward Oahu, including development of a secondary urban center. Subsequent to the formation of these population and employment projections, proposals for additional residential and employment development in central Oahu have been put forth by property owners in the area. These proposals represent a significant change from the assumptions embodied in the Hall 2000 Study, and therefore raise new questions about short and long term transportation needs in the corridors serving central and leeward Oahu.

The State Department of Transportation has recently conducted an analysis of short and longer range transportation needs in the H-1 and H-2 corridors, and recommended a phased set of improvements to increase the person carrying capacity of the transportation system in these corridors. This analysis was performed without the benefit of recent population and employment projections for the central and leeward areas of Oahu, and was instead based on an approach of developing the most plausible, implementable, and fundable transportation improvements in the corridor over the next 10 to 15 years.

PURPOSE OF STUDY

Recognizing the significance of the regional transportation issues, and the need to expand upon the OMPO and state analyses, Oceanic Properties retained Parsons Brinckerhoff to analyze the regional transportation issues affected by potential development in central and leeward Oahu. The study would utilize the most recent available projections of population and employment to project transportation demands, and determine appropriate growth strategies and/or transportation improvements to provide acceptable future traffic conditions.

CENTRAL AND LEeward OAHU TRANSPORTATION STUDY

DRAFT REPORT

(EXECUTIVE SUMMARY)

Prepared for:

OCEANIC PROPERTIES, INC.

Prepared by:

PARSONS BRINCKERHOFF QUAADE & DOUGLAS, INC.

May 1986

The purpose of this study, therefore, is to analyze the implications for the regional transportation system of the latest population and employment projections; to analyze alternative means of accommodating the long range transportation demands, whether by increasing travel capacity or reducing travel demand; to analyze the transportation implications of alternative growth scenarios in central and leeward Oahu; and to recommend a program of transportation system capacity improvements, travel demand reduction strategies, and growth policies which will combine to provide acceptable short range and long range transportation conditions in the H-1 and H-2 corridors.

ISSUES

Through discussions with representatives of Oceanic Properties, the City, State, and OMPPO, the following questions were identified as the key issues to be addressed in this study:

- Can existing traffic congestion be relieved in the H-1 corridor between the Waialua and Halaia interchanges?
- What will be the impacts on the transportation system of anticipated development in the central and leeward areas of Oahu?
- Would the development of major employment centers in central and leeward Oahu reduce peak period travel demands to and from downtown? How much reverse commuter traffic would be attracted by these employment centers?
- What would be the relative impacts on the transportation system of various employment scenarios in central and leeward Oahu (i.e., will greater employment concentration in these areas help to alleviate congestion problems)?
- What transportation improvements or travel demand reduction strategies would be necessary to accommodate anticipated development in the central and leeward areas of Oahu?
- How much could a ridesharing coordination program reduce travel demands?
- Is a rail rapid transit system to Milliani physically feasible and justifiable in the long-term?
- Will anticipated development in the central and leeward areas of Oahu create traffic congestion problems in the H-1 corridor between Ewa and H-2?

PROBLEM STATEMENT

The transportation problems addressed in this study include regional-scale problems associated with development in the central and leeward areas of Oahu. The list of problems was prepared from various sources, including consultant experience in the affected corridors; consultation with representatives of landowners, City, State, and regional agencies; plus review of recent studies which pertain to the corridors being considered. The identified problems have been divided into existing transportation problems and potential future transportation problems. The potential future problems are based on future conditions as projected by recent planning studies, this study's traffic model forecasts, and professional judgement about future transportation conditions with additional development in the central and leeward areas.

Existing Problems

The most significant regional problem related to development in the central and leeward areas of Oahu is the lack of sufficient traffic capacity in the H-1 corridor between the Waialua and Halaia interchanges. This corridor is significantly congested during peak periods in the peak direction of travel. The morning peak period congestion is more severe than the afternoon peak period.

A related problem is the lack of sufficient capacity on the transition from H-2 to H-1 in the Waialua interchange. During the morning peak period, this bottleneck on this transition ramp combines with the H-1 capacity constraint to back up traffic onto H-2.

Potential Future Problems

Without improvements to the existing circulation system or reductions in travel demand, the existing transportation problems are expected to worsen with continued development in the central and leeward areas of Oahu. In addition, this development could create other regional level problems; these potential problems include the following:

- Peak period traffic congestion in the H-2 corridor between Milliani and the Waialua interchange.
- Peak period congestion in the off-peak direction as well as the peak direction in the H-1 corridor between the Waialua and Halaia interchanges.
- Peak period congestion in the H-1 corridor between Ewa and the Waialua interchange.
- Peak period congestion through the Waialua interchange for traffic traveling between central and leeward Oahu.

DEVELOPMENT ALTERNATIVES

Alternative growth scenarios were evaluated for the Years 1995 and 2005. The purpose of testing alternative growth scenarios was twofold: 1) to evaluate a range of plausible future conditions to compensate for the uncertainty of future development projections; and 2) to evaluate the desirability, from a transportation perspective, of establishing growth policies for central and leeward Oahu which would help mitigate traffic congestion problems. For these purposes three alternative growth scenarios were tested.

Moderate Growth

This alternative assumes moderate population and employment growth in the central and leeward areas of Oahu.

High Growth

This alternative assumes high population and employment growth in the central and leeward areas of Oahu.

Moderate Population, High Employment

This alternative assumes that growth policies are adopted for Oahu which result in the high level of employment growth and the moderate level of population growth in the central and leeward areas of Oahu.

TRANSPORTATION ALTERNATIVES

To test the impacts of various capacity improvements and travel demand reduction strategies, four transportation alternatives were analyzed in combination with each of the three growth scenarios. These alternatives were selected to represent a range of realistic improvement options, from low-cost transportation system management (TSM) strategies to high-level investment in a rail transit system.

Alternative 1: Existing and Committed System

This alternative represents the existing system plus improvement projects which have already been budgeted. It includes the following committed improvements:

- Widen H-1 to five lanes in each direction between the Waiawa and Halawa Interchanges.
- Widen H-1 to three lanes in each direction between the Palialai and Kunia Interchanges.
- Complete construction of H-1 to eight lanes from the airport to Middle Street separation.
- Construct Paia Interchange on H-1.
- Construct Waipio Interchange on H-2.
- Widen Kamehameha Highway to four lanes from H-1 to Cemetery Road.

- Expand the bus system consistent with the base case transit system in the Hall 2000 Study.

Alternative 2: Transportation System Management

This alternative represents relatively low-cost strategies to encourage ridesharing and reduce peak hour traffic demand. It includes the existing plus committed system plus the following improvements:

- Reserve the median lane of the H-1 Freeway between the Waiawa and Halawa Interchanges for HOVs in the peak direction of travel during the morning and afternoon peak periods.
- Provide a contra-flow bus lane for peak direction buses on H-1 between the Waiawa and Halawa Interchanges during the morning and afternoon peak periods. Three travel lanes would be available for traffic in the off-peak direction.
- Reserve the median lanes of the H-1 Freeway from Palialai to Waiawa for HOVs during peak periods.
- Reserve the median lanes of the H-2 Freeway from Milliani to Waiawa for HOVs during peak periods.
- Increase existing levels of peak period express bus service from central and leeward Oahu to downtown.
- Develop park-and-ride lots in Milliani, Ewa, and Waiawa.
- Establish carpool matching information programs for residents of central and leeward Oahu.
- Establish ridesharing coordinators at major employers.
- Encourage implementation of flex-time or staggered work hours.

Alternative 3: Busway

This alternative represents a higher investment in express bus transit, emphasizing exclusive bus facilities. It includes all improvements in Alternatives 1 and 2 with the following exceptions:

- The contra-flow lane on H-1 is eliminated. In its place, an exclusive busway would be built along the OR&L right-of-way from West Beach to Halawa.
- Peak period express bus service would be increased from central and leeward Oahu to downtown Honolulu.
- Bus lanes are added to Kamehameha Highway from Milliani to Waiawa, with direct connections to the busway on the OR&L right-of-way.

Alternative 4: Rail Transit

This alternative represents a high level of investment in a high-capacity transit system. It substitutes a light rail system for the OR&L and Kam Highway busways in Alternative 3. The assumed rail alignment is similar to Alternative E in the Hall 2000 Study; it extends from West Beach to the University of Hawaii Manoa campus and Waikiki, with an extension from Milliani to Waiawa. The alignment would be primarily at-grade except for the segment in Honolulu which would be grade-separated. Park-and-ride lots would be provided at stations in the outlying areas (e.g., Milliani, Ewa, Waiawa).

ANALYSIS OF FUTURE TRAFFIC CONDITIONS

The adequacy of the transportation system to accommodate projected traffic demands was based on the projected peak hour volume/capacity (V/C) ratios at critical locations in the H-1 corridor. For each development scenario and each transportation system alternative, peak hour traffic volumes for the Year 2005 were projected, and compared with the hourly traffic capacity. A V/C ratio of 1.00 indicates that the traffic volume equals the total vehicle capacity.

For the purpose of this analysis, a V/C ratio of 0.90 or less is considered an acceptable ratio for peak hour conditions. This corresponds with Level of Service (LOS) 'D'. It should be noted that the peak hour V/C ratios at the most congested locations in the H-1 corridor were over 0.90 (LOS 'E') in 1980, and were over 1.00 (LOS 'F') in 1985. Under these conditions, traffic flow breaks down and significant congestion results; therefore, to maintain an acceptable traffic flow, Level of Service 'D' is utilized as the desired peak hour operating condition.

Table S-1 summarizes peak hour level of service at the critical location in the H-1 corridor. The key points of this analysis are highlighted below:

- In all growth scenarios, traffic conditions in 1995 are projected to be better than the existing condition. This improvement can be attributed to the planned H-1 capacity increase between the Waiawa and Halawa interchanges.
- Low-cost strategies to increase ridesharing could achieve the desired Level of Service 'D' in 1995.
- By 2005, traffic conditions will have again deteriorated to unacceptable levels, and will be worse than existing conditions unless travel demand is reduced.
- A growth policy of moderate population growth and high employment in central and leeward Oahu could help to alleviate the traffic problems in the H-1 corridor. High growth of both population and employment would result in the worst traffic conditions of the three growth scenarios.
- None of the tested development/transportation alternatives would achieve the desired p.m. peak hour level of service in 2005. Level of Service 'D' could be achieved in the morning peak hour by implementing a growth policy and ridesharing incentives.

TABLE S-1
PEAK HOUR LEVEL OF SERVICE
AT CRITICAL LOCATION IN H-1 CORRIDOR
(Peak Direction of Travel)

		Morning Peak Hour Level of Service	Afternoon Peak Hour Level of Service
1980		D	D
1985		F	F
1995	Moderate Growth	Alternative 1	D
		Alternative 2	D
		Alternative 3	D
High Growth	Moderate Population High Employment	Alternative 1	E
		Alternative 2	D
		Alternative 3	D
2005	Moderate Growth	Alternative 1	F
		Alternative 2	E
		Alternative 3	E
High Growth	Moderate Population High Employment	Alternative 1	F
		Alternative 2	F
		Alternative 3	F
Moderate Population High Employment	Moderate Population High Employment	Alternative 1	F
		Alternative 2	D
		Alternative 3	D
Moderate Population High Employment	Moderate Population High Employment	Alternative 1	F
		Alternative 2	D
		Alternative 3	D

FINDINGS

The findings of the analysis are summarized below. Each of the study's key issues is listed, followed by a summary of the relevant findings.

- Can existing traffic congestion be relieved in the H-1 corridor between the Waiawa and Halawa Interchanges?

The programmed improvement to widen H-1 to ten lanes between the Waiawa and Halawa Interchanges will significantly increase the peak hour capacity of the H-1 corridor, thereby providing significant near-term congestion relief in this critical area. Combined with ridesharing incentives (such as computer matching and HOV lanes), this improvement would result in acceptable traffic conditions through 1995.
- What will be the impacts on the transportation system of anticipated development in the central and leeward areas of Oahu?

Projected population growth in these areas will continue to add traffic to the H-1 corridor. Even with the development of new employment centers in the central and leeward areas of Oahu, some of the new residents would undoubtedly work in the PUC, so the peak hour traffic demand in this critical corridor would continue to increase.
- Would the development of major employment centers in central and leeward Oahu reduce peak period travel demands to and from downtown? How much reverse commuter traffic would be attracted by these employment centers?

The issue of travel demand to and from downtown is more dependent on the growth of residential development in the central and leeward areas than on employment growth. Certainly, if the new employment centers were not created, travel demands in the H-1 corridor would be even higher than this study has projected. However, the high employment growth provides the greatest traffic reduction when combined with more modest population growth.
- What would be the relative impacts on the transportation system of various employment scenarios in central and leeward Oahu (i.e., will greater employment concentration in these areas help to alleviate congestion problems)?

In the high growth scenario, both population and employment in central and leeward Oahu are greater than in the moderate growth scenario. The effect of the higher employment level is to attract more work trips from within these areas, thus reducing traffic in the peak direction from central and leeward Oahu to the PUC. However, the additional traffic generated by the increased population more than offsets the travel reductions which higher employment would provide. The net result is that under the high growth scenario, traffic is greater in both directions than under the moderate growth scenario. In the scenario with moderate population and high employment growth, the net result is a significant reduction in peak direction traffic and a slight increase in the off-peak direction.

• What transportation improvements or travel demand reduction strategies would be necessary to accommodate anticipated development in the central and leeward areas of Oahu?

For the Year 2005, improvement on the existing level of congestion can be realized only if:

- central and leeward Oahu do not experience high population growth;
- a ridesharing coordination program is set up for central and leeward Oahu;
- HOV lanes are added to freeways as a ridesharing incentive;
- transit service levels and operating speeds are improved; and
- expanded use of flexible working hours is achieved.

To achieve LOS 'D' in both peak hours, additional travel reduction strategies would be required. Possible strategies which offer the potential for significant additional traffic reduction include:

- parking charges for P.U.C. employees;
- user charges for peak period drivers.

• How much could a ridesharing coordination program reduce travel demands?

Research into the effectiveness of a ridesharing coordination agency in the San Francisco Bay Area found that it had increased the number of carpools by approximately 10 percent. This study's analysis of Year 2005 traffic volumes indicates that a ridesharing coordination program could increase the number of carpools in central and leeward Oahu from 10,000 to 11,000. As a result of this increase, the peak hour traffic volume in the H-1 corridor is projected to decrease by 3%.

The addition of HOV lanes to H-1 and H-2 would attract more carpools during the peak travel periods. Research into the effectiveness of HOV lanes in Portland and Los Angeles found that implementation of HOV lanes increased peak hour vehicle occupancy by .03-.04 persons per vehicle. A comparable vehicle occupancy increase in the H-1 Corridor would reduce peak period traffic volumes by approximately 2 percent.

Widespread utilization of flex-time could spread out traffic volumes over a greater time period during the morning peak period. This would reduce the concentration of traffic in the peak hour, and spread the peak traffic more evenly throughout the morning peak period. Flex-time would not significantly improve traffic conditions in the afternoon peak period.

• Is a rail rapid transit system to Milliani physically feasible and justifiable in the long-term?

Construction of a light rail line from Waiawa to Milliani appears to be feasible from an engineering standpoint, making use of the H-2 right-of-way and some existing structures. However, a costly new structure across the Kipapa Gulch would be required, together with potentially extensive measures to reduce the grades in the H-2 alignment. These obstacles raise serious questions about the justifiability of such a rail extension.

- Will anticipated development in the central and leeward areas of Oahu create traffic congestion problems in the H-1 corridor between Ewa and H-2?

Available capacity in this part of the H-1 corridor would accommodate projected Year 2005 traffic volumes.

- Other significant findings not directly related to the key issues are summarized below:

The provision of exclusive bus lanes and/or an exclusive busway, combined with increased frequency of express bus service to downtown Honolulu, would reduce traffic volumes during peak periods in the peak direction.

Implementation of a contra-flow bus lane on the H-1 freeway would not create morning peak hour congestion in the off-peak direction, even with projected 2005 traffic volumes. However, it would create afternoon peak hour congestion in the off-peak direction in 2005.

Construction of a light rail system could provide greater capacity for transit passengers than express bus service. However, because express buses operating on an exclusive facility would have greater travel speeds than a light rail system, the volume of work trips using transit from central and leeward Oahu to downtown Honolulu would be lower with a light rail system than with the projected express bus service. Work trips to other destinations in the PUC would be enhanced by the light rail system, since the assumed express bus service is limited to downtown Honolulu and the Ala Moana area.

Improvements in the frequency and capacity of transit service will not by themselves dramatically reduce the congestion problem in the H-1 corridor. However, such improvements in transit service are important if travel reduction strategies are implemented, since realistic alternative travel modes must be available for commuters who choose not to drive their own cars.

If flex-time successfully spreads out the morning peak hour traffic, the most serious congestion will occur during the afternoon peak hour.

Although the combination of moderate population growth with high employment growth appears beneficial from the perspective of traffic congestion relief, it may not be feasible or desirable from the standpoint of housing costs, economic impacts, and so forth. These impacts have not been explored in this study, and should be analyzed prior to the adoption of such a growth policy.

RECOMMENDATIONS

Several actions are needed to accommodate future travel demands in the H-1 and H-2 corridors. The recommended actions will require the cooperative efforts of the City, State, OMOPO, major employers and property owners.

- A policy which encourages high employment growth combined with moderate population growth in central and leeward Oahu could significantly reduce peak traffic in the H-1 corridor. The feasibility and economic impacts of such a growth policy should be analyzed, to determine the socioeconomic impacts of such a policy.

- Establishment of a ridesharing coordination program, implementation of HOV lanes, greater utilization of flexible working hours, increases in express bus service, and provision of exclusive bus facilities will all help to reduce peak hour traffic congestion. These measures should be implemented. The need for a higher-capacity (i.e., rail) long-range transit system to serve central and leeward Oahu cannot be specifically determined by this analysis; however, it appears that such a system would not by itself help to reduce peak traffic demand in the H-1 corridor.

- To accommodate the projected Year 2005 traffic volumes at an acceptable level of service, and to accommodate growth beyond 2005, additional measures should be implemented to increase vehicle occupancy, reduce the number of single occupant vehicles, and/or increase the vehicle capacity of the H-1 corridor. Possible measures could include:

- charging tolls for vehicles entering the PUC.
- increasing parking rates in the PUC.
- rationing gasoline.
- prohibiting or restricting single occupant vehicles on certain roadways.
- changing school hours.
- widening or double-decking H-1 or Kamehameha Highway.
- constructing a new highway tunnel across Pearl Harbor.

- The ramps connecting H-2 with H-1 (toward Ewa) should be widened to two lanes prior to 1995.

APPENDIX G

Traffic Impact Study; Mililani Town Master Plan.

Parsons, Brinkerhoff, Quade and Douglas, Inc. May 1984

TRAFFIC IMPACT STUDY

G-1

MILILANI TOWN MASTER PLAN

Millilani Town, Inc.

May 1984

Parsons Brinckerhoff
Guade & Douglas, Inc.

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INTRODUCTION

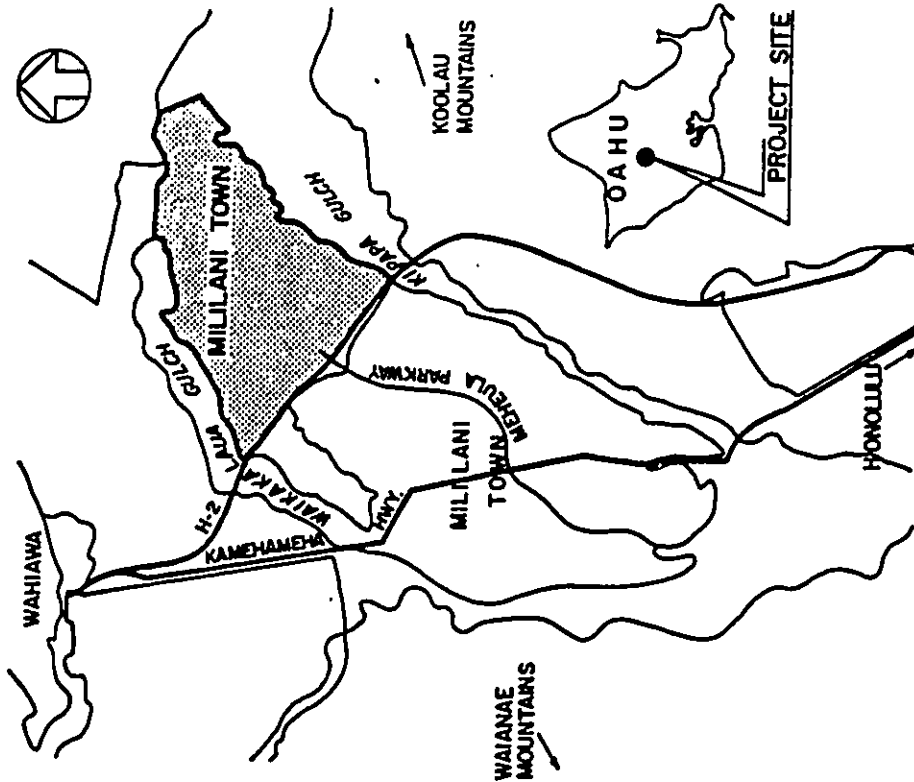
Millilani Town, Inc. plans to complete the implementation of the Millilani Town Master Plan with development of lands located east, or Koolau, of the H-2 Freeway. This 1,250-acre site is planned to include 6,600 dwelling units and commercial centers, schools, churches, parks, and other uses.

This traffic study was conducted to identify the impacts of the proposed project on the adjacent roadway system. An analysis of regional impacts, which are expected to be significant, should include traffic due to other proposed developments; the Department of General Planning has determined that this would be best done by the agencies.

The evaluation of existing conditions indicate that peak periods occur in the mornings (5:45 - 8:00 A.M.) and afternoons (3:30 - 6:30 P.M.) of weekdays. Peak hours used in the evaluations are the AM peak hour (6:15 - 7:15 A.M.) and the PM peak hour (5:00 - 6:00 P.M.).

EXISTING CONDITIONS

The proposed project is located on the Koolau side of the H-2 Freeway between Kipapa and Waikalaua Gulches (Figure 1). The area is currently in agricultural (pineapple) use. Access will be provided by the extension of Meheula Parkway, a major arterial through Millilani Town.



LOCATION MAP
FIGURE 1

Roadway System

Meheula Parkway is the primary north-south corridor in Millilani Town, providing access to the H-2 Freeway through the Millilani Interchange. Within its 108-foot right-of-way, the parkway has a 20-foot landscaped median and two separate 36-foot roadways. The Millilani Interchange is configured in a full diamond, which allows all movements but also results in conflicting movements; traffic leaving the freeway and turning left onto Meheula Parkway is controlled by stop signs. All ramps are single lanes; Meheula Parkway at the H-2 bridge is striped for six lanes, two for through traffic and one for left turns in each direction (Figure 2).

Traffic Conditions

The State Highways Division conducted a traffic count in September 1983 of traffic on the H-2 ramps at Millilani Interchange.¹ The existing condition, which is also used to identify future traffic volumes due to existing development, is based on this count. Because of the agricultural use on the Koolau side, all of the counted peak hour ramp traffic is assumed to originate or travel to the existing developed Millilani Town. Existing volumes on H-2 are derived from the September 1983 ramp count and a March 1983 count on H-2 at Kipapa Bridge.² Existing peak hour volumes are shown in Figure 3.

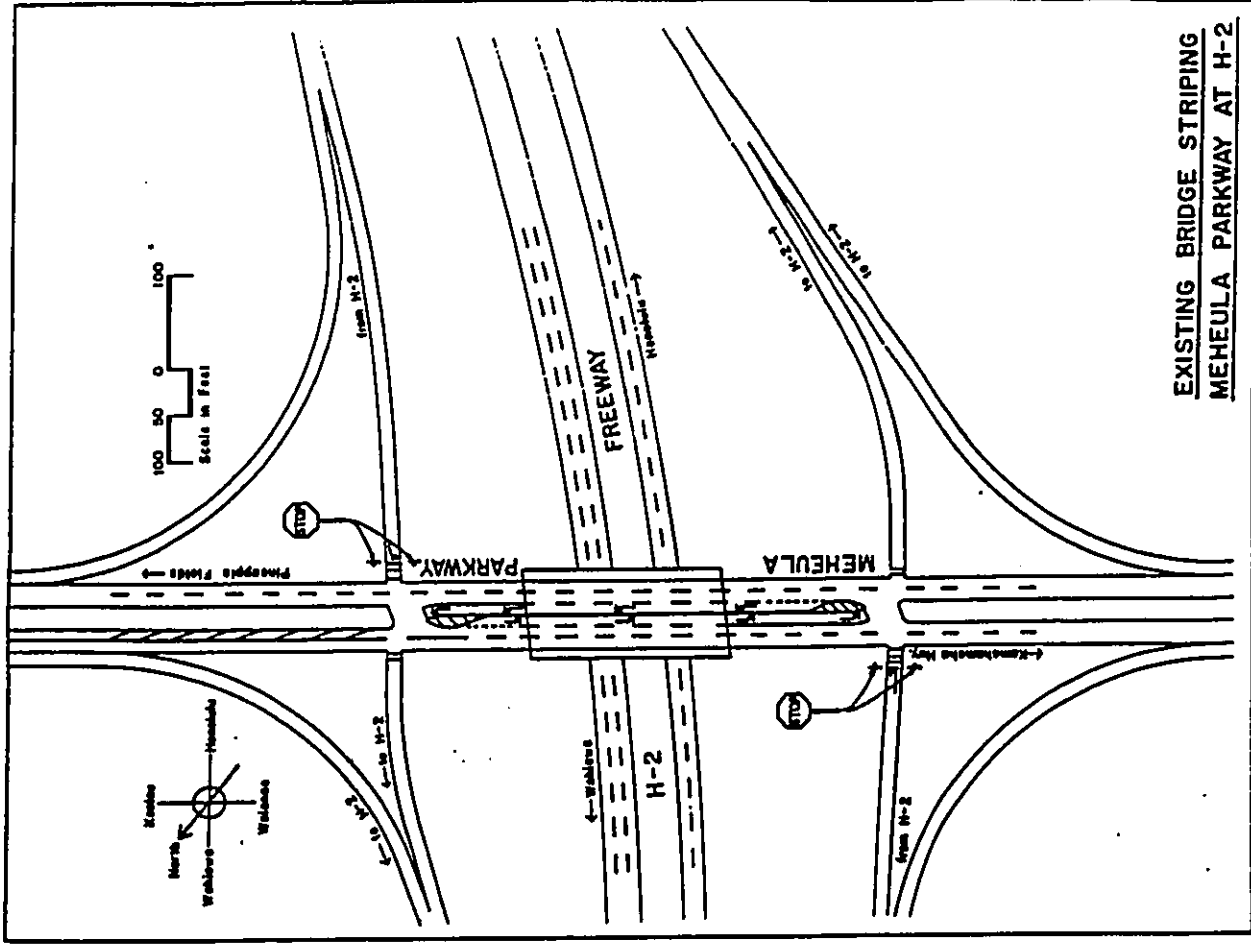
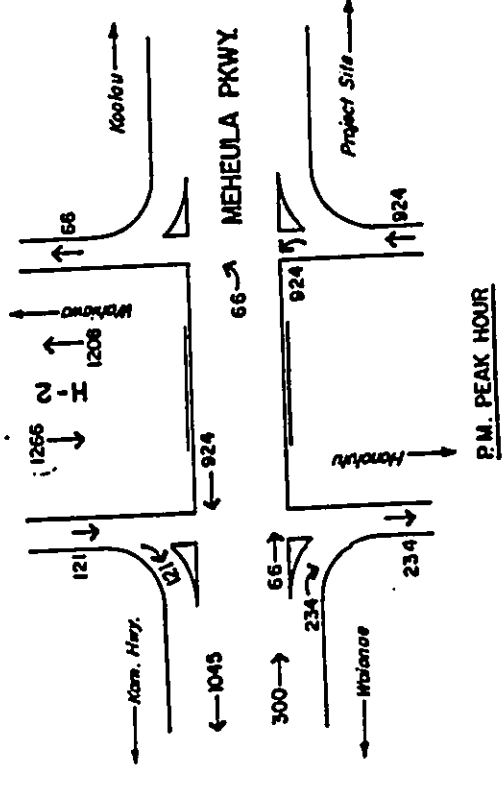
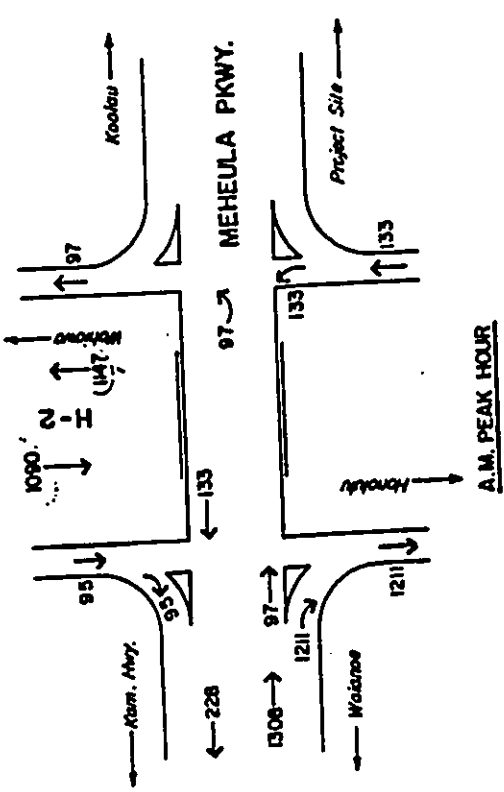


FIGURE 2

EXISTING BRIDGE STRIPING
MEHEULA PARKWAY AT H-2



Source: State Highways Division Traffic Counts, 1983.

EXISTING TRAFFIC VOLUMES

FIGURE 3

Existing levels of service for the unsignalized intersec-tions of Meheula Parkway and the H-2 off-ramps were determined using Circular 212 procedures.³ Morning (AM) peak hour levels of service are "A," while afternoon (PM) levels of service are "D" (Waianae side, Honolulu bound on-ramp) and "F" (Koolau side, Mililani bound off-ramp). Level "F" indicates that capacity is exceeded; field observation confirms this: many motorists desiring to turn left from the H-2 off-ramp onto Meheula Parkway will turn right, proceed to the end of the paved road, and make a U-turn. Levels of service are briefly described in the Appendix.

Other Considerations

Field observations in May 1984 also indicate that peak hour volumes at the interchange may be increasing at a quicker rate than would be expected for the rate of growth in Mililani. Previous studies^{4, 5} for other projects in the Central Oahu area have identified possible diversion of Kamehameha Highway traffic to H-2 because of traffic congestion downstream (toward Honolulu) on Kamehameha Highway; realization of this diversion could explain the increases.

The September 1983 Highways Division count also shows high "K" factors for the ramps in the Honolulu direction. The "K" factors, or peak hour volumes divided by daily volumes, are 218 and 178 for AM (toward Honolulu) and PM (from Honolulu).

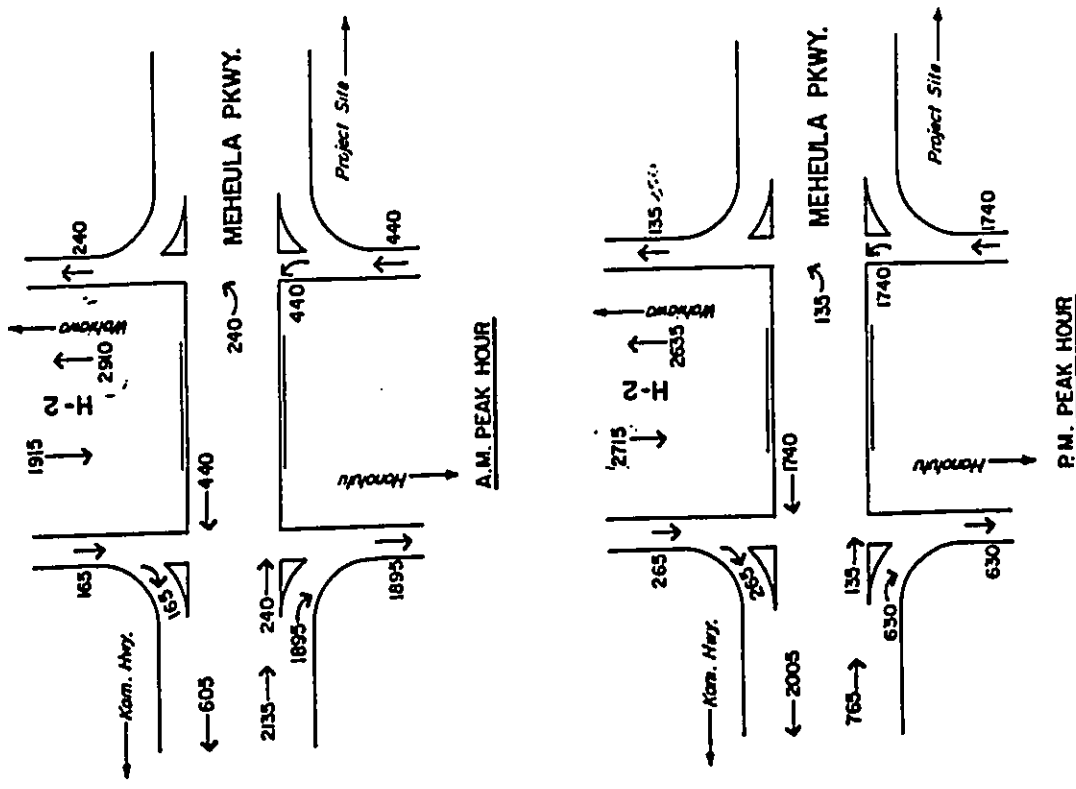
respectively. These factors indicate that some diversion due to Kamehameha Highway congestion may already be occurring.

Selection of the September 1983 counts as the existing traffic and as a basis for future traffic due to existing development represents some diversion due to Kamehameha Highway congestion, and assumes that the regional system will be able to adequately serve traffic demands without significant diversion of traffic flows.

FUTURE CONDITIONS WITHOUT PROPOSED PROJECT

Several developments are planned in Millilani Town which would add traffic to the Millilani Interchange. Peak hour traffic volumes added were identified in previous reports and are included in the future traffic assignments. Projects which will add traffic are the 300-unit cluster development⁶ at the end of Kipapa Drive near H-2, and the 2090-unit development⁷ around the new town center. Future H-2 traffic volumes assume full development of the Hawaii Technology Park north of Millilani.⁸ Other Millilani Town projects near Kamehameha Highway or west (Waianae side) of Kamehameha Highway are not expected to add traffic to Millilani Interchange. The future traffic assignment, without the proposed project, is shown in Figure 4.

Levels of service with existing roadway layouts were determined using Circular 212 procedures. Table 1 compares existing and future levels of service at the ramp intersections



**FUTURE TRAFFIC VOLUMES
(WITHOUT PROJECT)**
FIGURE 4

with Meheula Parkway. The increased volumes result in unacceptable conditions. A possible mitigative measure would be a double left turn lane for traffic from Honolulu with signalization of that intersection; levels of service for a signalized intersection at that location were determined using the Critical Movement Analysis described in Circular 212 and are also shown in Table 1.

TABLE 1
EXISTING AND FUTURE
LEVELS OF SERVICE

	AM Peak Hour	PM Peak Hour
Existing - Stop controlled off-ramp left turns Wahiawa bound off-ramps at Meheula Parkway Honolulu-bound off-ramps at Meheula Parkway	A A	F D
Future - Without proposed project, stop controls Wahiawa-bound off-ramps at Meheula Parkway Honolulu-bound off-ramps at Meheula Parkway	E C	F E
Future - With double left turn lane and signalization at Wahiawa-bound ramps Wahiawa bound off-ramps at Meheula Parkway Honolulu bound off-ramps at Meheula Parkway	A A	C A

Q
-
C

PROPOSED PROJECT

The proposed project is located east of the H -2 Freeway and will consist of residential and related uses. Total area to be developed is 1,250 acres, with approximate allocation of land as shown in Table 2. Access to the site will be provided by the extension of Meheula Parkway, which presently terminates in the vicinity of the H-2 Freeway.

Traffic Generation

Estimates of the traffic impact of the proposed project were based on the level of development. Vehicle trips from residential units were factored from the number and type of units. Trip attractions from commercial uses were factored from leasable floor areas, assuming two 15-acre sites with floor area-to-land area ratios of 0.4. School sites were assumed to be for elementary schools, with traffic generation based on employees; a total of 140 employees was used. Traffic

generation for other uses was related to the land area, with no traffic generated by open space, gulches, and roadways.

The total trip ends generated by the proposed uses were computed using traffic generation rates based on national studies compiled by the Institute of Transportation Engineers.⁹ The rates used are shown in Table 3.

The primary land use of the site will be residential. Other uses are intended to support the residential uses, allowing many shopping, school, recreational, and other trips to be satisfied internally. Estimates were made for internal trips (those which will not use or cross H-2) for each land use category, with internal trips ranging from 5 percent of residential generated trips to 70 percent for trips leaving school sites in the AM peak hour.

Each internal trip would equate to a reduction of two (one in, one out) external trips. The net effect of internal trips to the project traffic using the H-2 Milliani Interchange is shown in Table 4. Average net generation rates for the proposed development are listed in Table 5.

Traffic Distribution

Traffic distribution is used to determine the direction of travel of traffic generated by the proposed project. Future employment and population distributions on Oahu were used to predict traffic distribution. The proposed Hawaii Technology Park has been assumed at full employment for the distribution.

TABLE 3
PROPOSED LAND USES
(Full Development)

	Acres
4,350 Single Family Dwelling Units	725
2,250 Multi-Family and Cluster Dwelling Units	150
2 Sites Commercial Shopping Centers	30
Schools and other institutions	30
Churches	10
Recreation	80
Open Space, Gulches, Roadways, Others	225
Total	1,250 Acres

TABLE 3
TRAFFIC GENERATION RATES

Use	Daily Trip Ends			
	Residential	Single Family	Multi-Family/Cluster	Commercial
Residential	0.37	0.67	0.56	0.27
Single Family	0.23	0.44	0.42	0.14
Multi-Family/Cluster	0.25	0.23	0.1	0.5
Commercial	0.3	0.0	0.9	2.0
Schools	1.0	1.0	0.5	50.0
Churches	1.0	1.0	0.5	1.0
Recreation	1.0	1.0	0.0	0.0
Other	1.0	1.0	0.0	0.0
Offices	1.0	1.0	0.0	0.0

1. DU = Dwelling Unit
2. TRF = Thousand Square Feet Gross Leasable Area.

TABLE 4
TRAFFIC GENERATION, TOTAL & NET

	Total	Net
Daily (Productions and Attractions)	86,100	41,200
AM Peak Hour, Attractions	2,040	1,545
AM Peak Hour, Productions	3,565	3,070
PM Peak Hour, Attractions	5,195	2,975
PM Peak Hour, Productions	3,565	1,345

(Net = Trips to/from or across R-2)

TABLE 5
NET TRAFFIC GENERATION RATES
(to/across R-2)

	Trip Rate per Dwelling Unit
Daily	6.24
AM Peak Hour, Attractions	0.23
AM Peak Hour, Productions	0.47
PM Peak Hour, Attractions	0.45
PM Peak Hour, Productions	0.20

Gravity models were used to account for travel times and distances. Future traffic from the proposed project would travel to or from three directions: West on Meheula Parkway and south or north on H-2. Population and employment locations would affect traffic distributions in different ways, depending on direction and time of day. Table 6 summarizes the predictors used and the resulting distribution.

Traffic Assignment

The proposed project's net traffic generation was added to the future traffic estimate. Traffic on H-2 was assumed to remain constant at Waikakalaua Bridge, with the increased ramp volumes from the proposed project causing decreases in H-2 traffic under the Meheula Parkway crossing. Figure 5 shows the traffic assignment with full development of the master plan.

Proposed Interchange Improvements

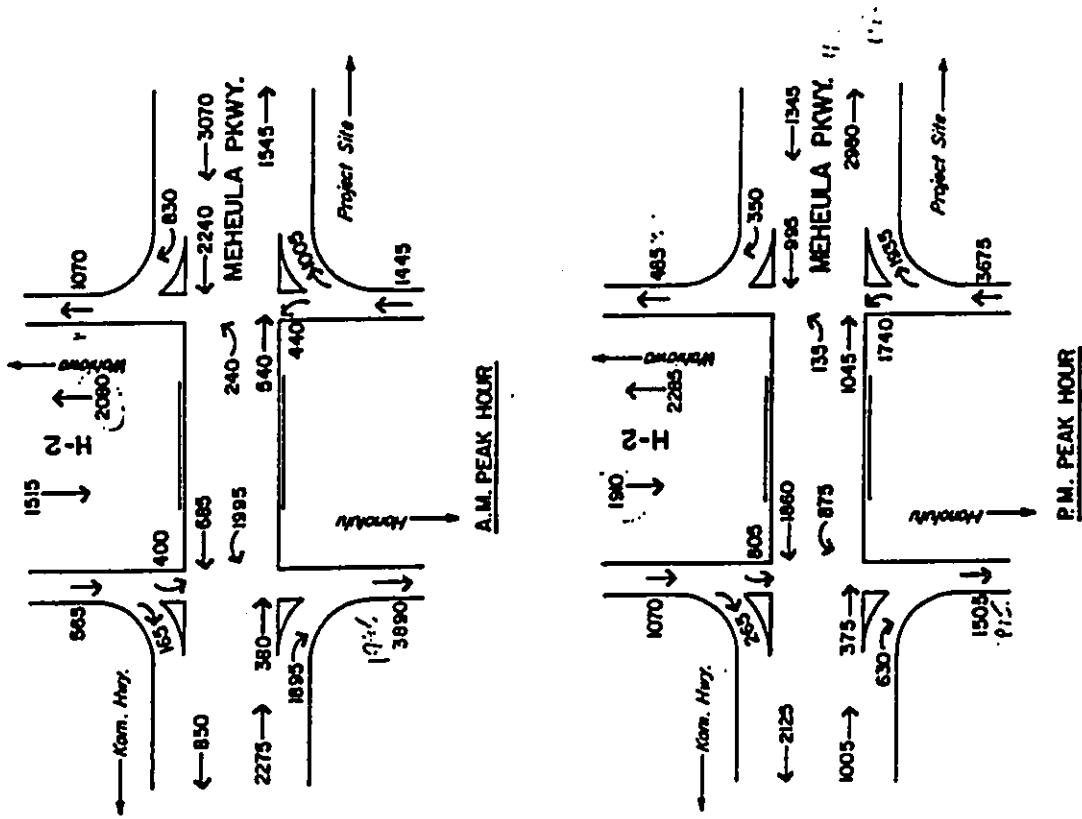
Various improvements were assumed to be implemented to maximize capacity on Meheula Parkway and at the Milliani Interchange. These include:

1. Signalization (3-phase operation) of the Meheula Parkway intersections with both off-ramps.
2. Ramp widening to two lanes for the Honolulu direction ramps.

TABLE 6

TRAFFIC DISTRIBUTION

Predictors	West	South	North
Population, (year 2000)	38	898	88
Employment (year 2000)	1	90	9
<u>Traffic Distribution (Future)</u>			
Daily	12	68	20
Peak hour, peak direction	8	65	27
Peak hour, off-peak direction	9	65	26



TRAFFIC ASSIGNMENT - FULL IMPLEMENTATION
 FIGURE 5

3. Restriping of the existing bridge to allow a double-lane configuration for the left turn to the Honolulu-bound ramp.
4. Widening of the west-(Maianae-)bound lanes of Meheula Parkway to increase capacity through the Koolau-side intersection.

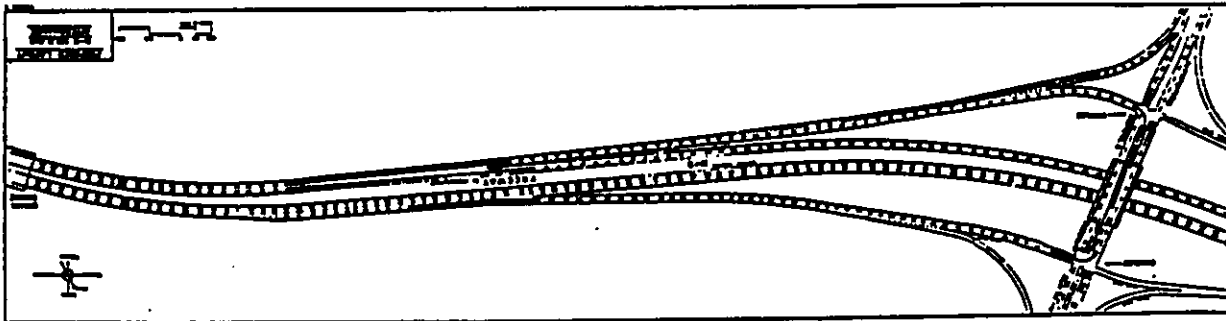
Figure 6 is a proposed layout which includes these improvements.

Traffic Analyses - Levels of Service

Intersection analyses using the Critical Movement Analysis method from Circular 212 indicated that both intersections would be over capacity in both peak hours, with volumes exceeding capacities by up to 20 percent.

PARTIAL IMPLEMENTATION

The traffic study also identified the level of development that could occur in the project site without exceeding roadway capacities. The two ramp/Meheula intersections and the on-ramp to H-2 merges were checked for both AM and PM traffic to determine the controlling location. The most critical location was found to be at the intersection of Meheula Parkway and the Honolulu bound off-ramp (Maianae side of H-2), where 64 percent of the traffic generated by the full proposed project would result in traffic demands equalling capacity.



Description

The implementation of the proposed project would occur over a period of many years, with the rate of residential development dependent upon home sales. Other uses have been assumed to be developed concurrently, in the same proportion as indicated in the master plan. With these conditions, the net traffic generation rates listed in Table 5 would be valid for partial implementation. Using these rates and the traffic distribution factors discussed previously, an assignment of traffic with partial implementation of the master plan, totalling 4,200 dwelling units, was developed and is shown in Figure 7.

Traffic Analyses - Levels of Service

Intersection analyses of the ramp/Meheula intersections were done using the Critical Movement Analysis method from Circular 212. Ramp merges on the Honolulu-bound on-ramp and the ramp diverge at the proposed two-lane off-ramp from Honolulu were analyzed using methods and charts from the Highway Capacity Manual.¹⁰ Levels of service and volume-to-capacity ratios (V/C) were determined at each critical location for the AM and PM peak hours. Highway levels of service and V/C ratios were also determined for adjacent sections of H-2 for comparison purposes; results are shown in Table 7.

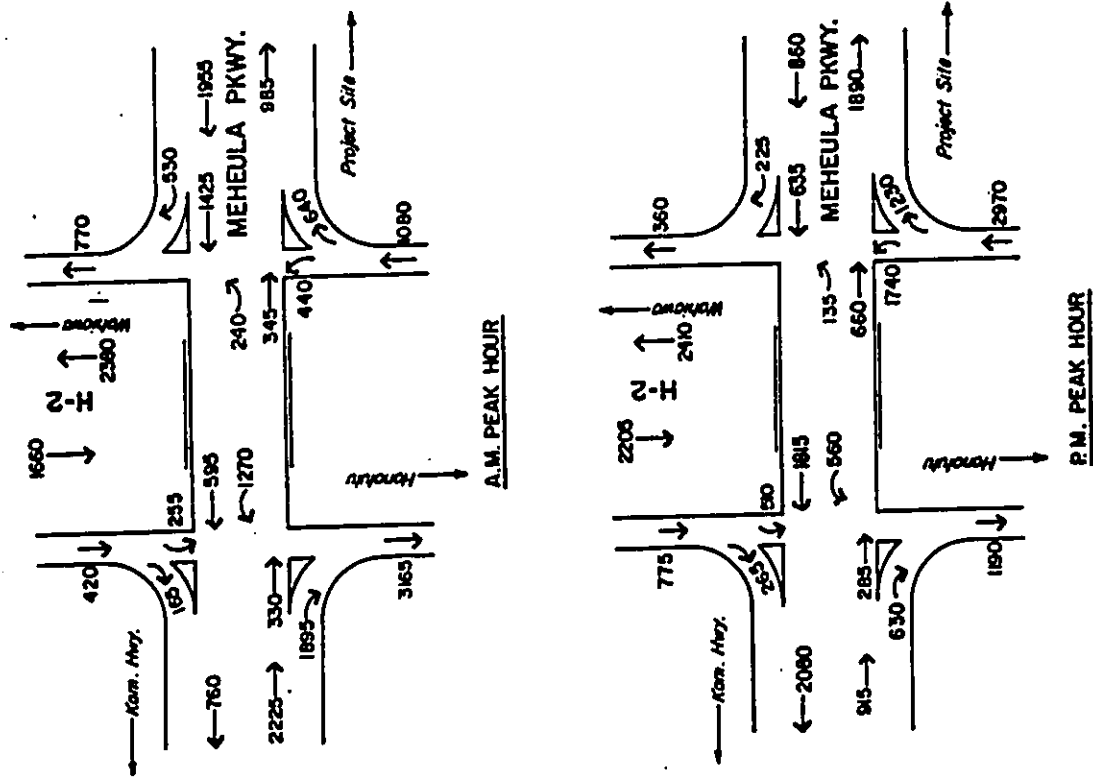


TABLE 7
LEVELS OF SERVICE
PARTIAL IMPLEMENTATION
(4200 D.U.)

	AM Peak Hour L.S.	V/C	PM Peak Hour L.S.	V/C
Meheula Parkway at E-2:				
Off/on ramps to E-2, Wahieva bound	D	0.83	E	0.99
Off/on ramps to E-2, Honolulu bound	D	0.84	E	0.995
Honolulu bound on-ramp merge	E	0.97	A	0.44
E-2, Honolulu-bound				
Waikakalua Bridge (2-lanes)	C	0.53	D	0.75
Mililani on-ramp	E	0.94	A	0.53
Kipapa Bridge (3-lanes)	D	0.81	B	0.57
E-2, Wahieva-bound				
Waikakalua Bridge (2-lanes)	D	0.80	D	0.70
Mililani off-ramp	A	0.41	E	0.91
Kipapa Bridge (3-lanes)	B	0.57	E	0.91

TRAFFIC ASSIGNMENT - PARTIAL IMPLEMENTATION
FIGURE 7

RECOMMENDATIONS

As a result of the findings of this study, recommendations are offered for the followings:

Existing and Future Traffic (Without Proposed Project)

1. Existing overcapacity conditions at the Wahiawa bound off ramp in the afternoon could be alleviated by re-placing the stop control with signalization. However, traffic volumes other than during three hours in the afternoon are small and a signal would not be warranted. Use of a police officer to override the stop control and simulate signal control during the afternoon peak hours would increase ramp capacity.
2. Future peak hour left turn demand from the Wahiawa bound off ramp indicates that a second lane would be required. Signalization would be needed to adequately control the double turn lane.
3. Improvements to Kamehameha Highway or other actions to relieve existing downstream congestion should be pursued so that the diversion of traffic from Kamehameha Highway can be reduced. Observations indicate that this diversion is increasing at a significant rate.

Proposed Project

1. Meheula Parkway and the H-2 Interchange should be improved to include additional lanage, as shown in Figure 6, to serve up to 4,200 dwelling units. Signalization of the intersections formed by the ramps and Meheula Parkway would control movements.
2. Development beyond 4,200 dwelling units may require new roadways or reevaluation of traffic conditions; since development would not occur overnight, monitoring of the traffic volumes as the number of units increases would provide data to determine roadway needs.
3. A park-and-ride station or other facility to encourage transit use or ridesharing should be considered in the layout and planning of the proposed site. Such a facility could decrease traffic impacts and improve transit service into the site.

CONCLUSIONS

The proposed development will increase traffic volumes on Meheula Parkway. Assuming that regional transportation facilities allow the continuation of present travel patterns, full implementation of the planned 6,600 dwelling units would result in overcapacity conditions at the H-2 ramps; roadway

capacities at Millilani Interchange would be reached with development of 4,200 dwelling units.

These conclusions are based on several assumptions. Future traffic demands at the interchange due to existing developed areas are assumed to be at the level measured in September 1983. The traffic counts taken at that time indicate that some diversion of Kamehameha Highway traffic had occurred during peak hours. Field observations and spot counts taken in May 1984 indicate that additional diversion may have occurred in the interim. The use of the September 1983 volumes imply that improvements will be made to the highway system to alleviate conditions which cause peak hour drivers to divert as much as two miles from their desired paths.

A similar assumption is made for traffic generated by other projects, whose traffic demands were assigned to the nearest highway. The future traffic estimate also assumes that increases in peak hour traffic volume at Millilani Interchange will occur despite near-capacity conditions downstream, such as at Waiawa Interchange.

The traffic generation of the proposed project is based on rates collected from locations across the nation in the late-1960s and 1970s and found to be applicable in Hawaii. The analysis procedure assumes that vehicle use patterns will not change and continue at present levels. Regional constraints, improved transit, and changing travel patterns could reduce the peak hour traffic volumes.

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APPENDIX

The Highway Capacity Manual defines six levels of service, labelled A through F, from the best to worst condition. Characteristics of each level of service for intersections and for highways are described below. Level of Service C is typically used for highway design and Level of Service D is considered adequate for urban arterials; corresponding Level of Service for rural highways are B and C.

Intersections

Level of Service A: Drivers operate in a free flow situation with no delays and easy turn movements.

Level of Service B: This level represents stable conditions; drivers may be slightly restricted in movements; however, no delays exceed one cycle.

Level of Service C: Small back-ups may occur behind turning vehicles and drivers may experience delays exceeding one cycle. Although movements may be somewhat restricted, they are not objectionable as stable operation continues.

Level of Service D: Drivers experience restrictions which approach instability. Delays may occur during short peaks; however, periodic clearance of developing queues prevents excessive back-ups.

Level of Service E: This level represents conditions at capacity which serve the most vehicles the intersection is able to accommodate. Long queues and substantial delays occur at capacity.

Level of Service F: Capacity of intersection exceeded. Conditions are jammed and volumes that can be carried are unpredictable. Congestion with excessive delays and very long queues are typical of this service level.

Highways

Level of Service A: A free flow situation with low volumes and high speeds. There is a high level of maneuverability with speeds controlled by driver discretion, speed limits, and physical constraints.

Level of Service B: A condition of stable flow, drivers may experience a slight reduction in operating speeds, but still have a reasonable amount of maneuverability.

Level of Service C: Stable flow continues although drivers may start to feel restricted as speeds and maneuverability become controlled by higher volumes. A satisfactory speed is still obtainable in this service level.

Level of Service D: Changes in operating conditions approach unstable flow. Volume fluctuations and temporary restrictions reduce operating speeds and maneuverability. Low comfort and convenience can be tolerated for short durations.

Level of Service E: Volumes are near or at capacity of the highway. Operating speeds are less than 30 mph and momentary stoppages may occur in this unstable flow.

Level of Service F: Capacity of highway section exceeded; conditions deteriorate. Forced flow situation with low speeds and unpredictable volumes dropping below capacity. Downstream congestion may cause delays of varying duration. The possibility exists that both speed and volume may drop to zero.

APPENDIX H

Loop Ramp Study: Mililani Town, Mililani, Hawaii.

Parsons, Brinkerhoff, Quade and Douglas, Inc. January 1985

LOOP RAMP STUDY

MILILANI MAUKA
MILILANI, HAWAII

Prepared for:
MILILANI TOWN, INC.

JANUARY 1985

Prepared by:
PARSONS BRINCKERHOFF
QUADE & DOUGLAS, INC.

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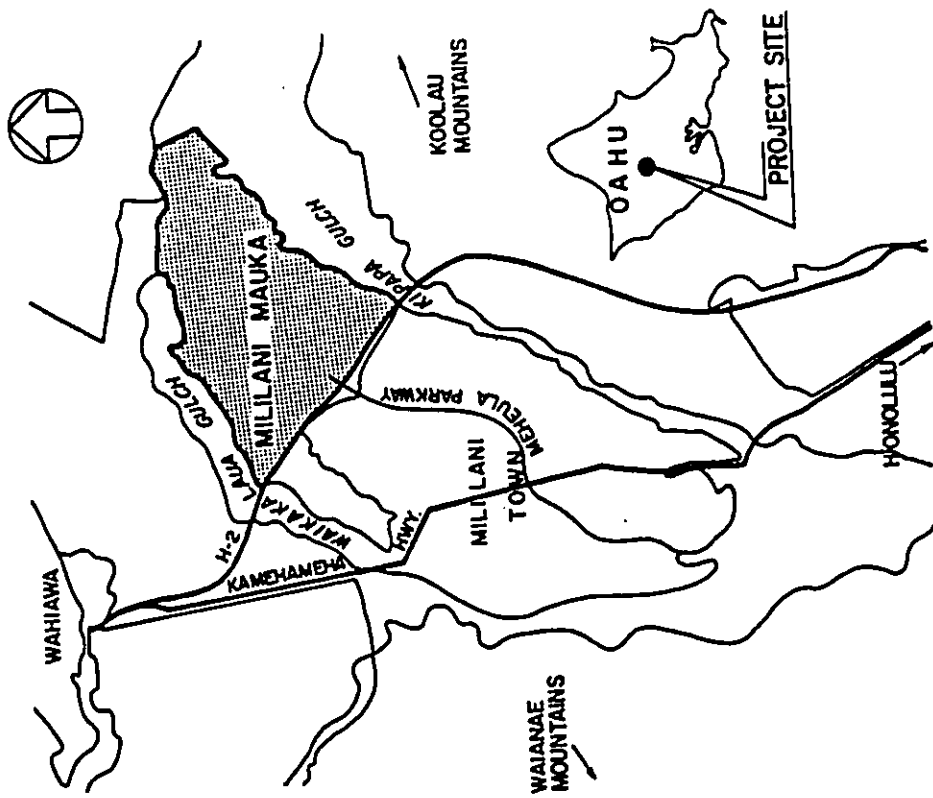
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INTRODUCTION

The proposed development of approximately 1,250 acres at Millilani Mauka (Figure 1) is expected to generate peak hour traffic demands which will exceed the capacity of an improved full diamond interchange at Meheula Parkway and H2 Freeway. The high volumes of conflicting movements, which would require 3-phase traffic signals for adequate control of the intersections formed by the freeway ramps and Meheula Parkway, are expected to reach capacity with development and occupancy of approximately 64 percent of Millilani Mauka.

Loop ramps would eliminate some of these conflicts and improve operations along Meheula Parkway. Two alternatives were developed and evaluated for full development of Millilani Mauka. The evaluation was limited to Millilani Interchange; however, needed improvements to other segments of the regional network, such as H1, Waialae Interchange, or other parts of H2, have been assumed. For example, a fourth lane on H2 in each direction between Millilani and Waialae Interchanges would be needed.



LOCATION MAP

FIGURE 1

ALTERNATIVES

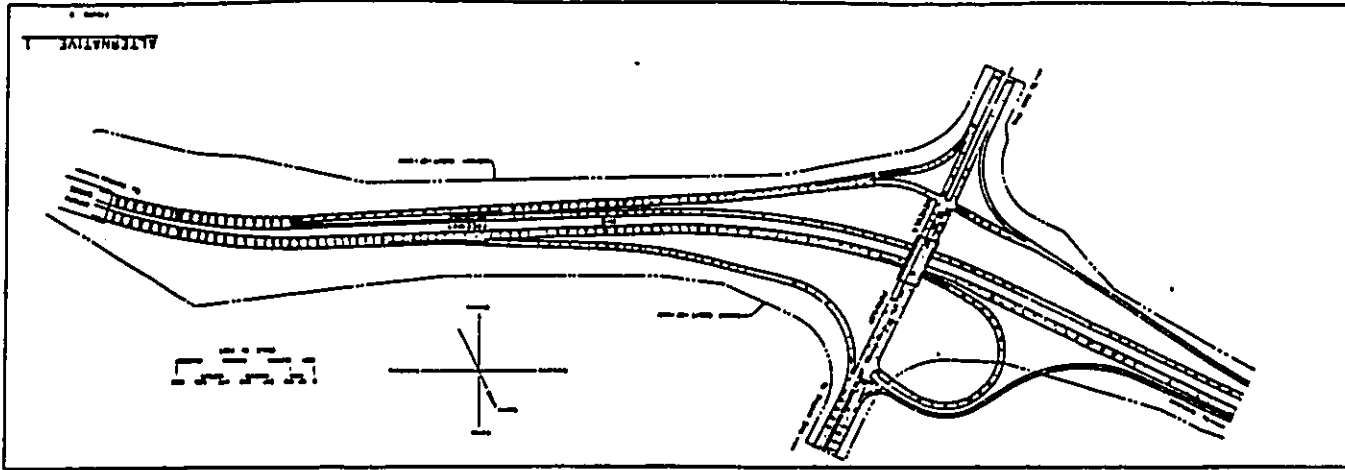
The existing Millilani Interchange is a full diamond interchange, in which all movements between H2 and Meheula Parkway are provided with single lane ramps. Meheula Parkway is six lanes wide on the bridge crossing H2; in each direction, two lanes are provided for through traffic and one for left turns onto the H2 ramps. Left turns from and onto Meheula Parkway are controlled by stop signs. The right turn movements at the interchange are served by separate, large radii roadways which add or drop a lane from the six-lane Meheula Parkway.

The initial evaluation¹ of the interchange assumed minimal improvements. These improvements include widening of ramp roadways and signalization. The initial evaluation concluded that the traffic expected to be generated by 4200 dwelling units in Millilani Mauka would result in capacity conditions.

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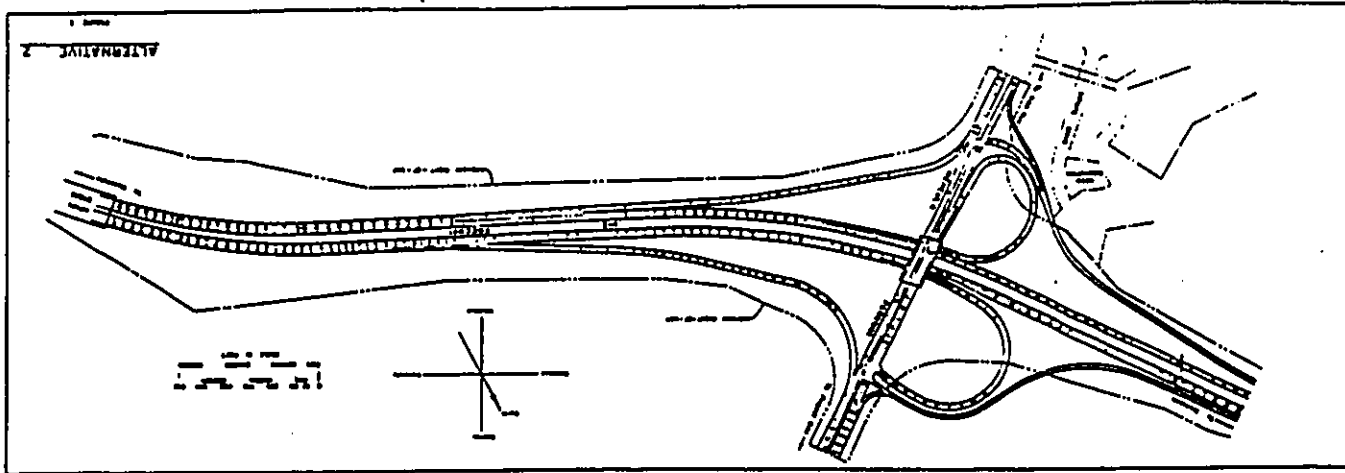
Alternative 1

Two alternatives which would increase the interchange's capacity were developed. In Alternative 1, a loop ramp in the Wahiawa-Koolau quadrant would serve traffic desiring to turn left from H2 (from Honolulu) to Meheula Parkway toward Waianae. The on-ramps to H2 toward Wahiawa would be relocated to the outside of the loop ramp; a traffic signal would control Waianae-bound Meheula Parkway traffic to reduce delays to traffic turning left from Meheula Parkway to the H2 ramp toward Wahiawa. Multiple lane approaches would be provided on the Waianae side of H2 to increase capacities at the signalized ramp/parkway intersection. Construction costs of this alternative has been estimated to be \$2.1 million. Figure 2 shows the proposed layout of Alternative 1.



Alternative 2

Alternative 2 includes loop ramps on both sides of H2, Wahiawa of Meheula Parkway, to serve the heavy turn movements which would otherwise turn left. Existing ramps in the two affected quadrants would be relocated. The loop ramps will each be two lanes wide; because an undesirable weave section would be formed on Meheula Parkway if traffic is merged, signalization is proposed at the Meheula Parkway end of the loop off-ramp Koolau of H2. An additional signal would be needed on the Waianae side to serve the off-ramp from Wahiawa. Construction costs of Alternative 2 has been estimated to be \$3.0 million; additional right-of-way would be needed. Figure 3 shows Alternative 2.



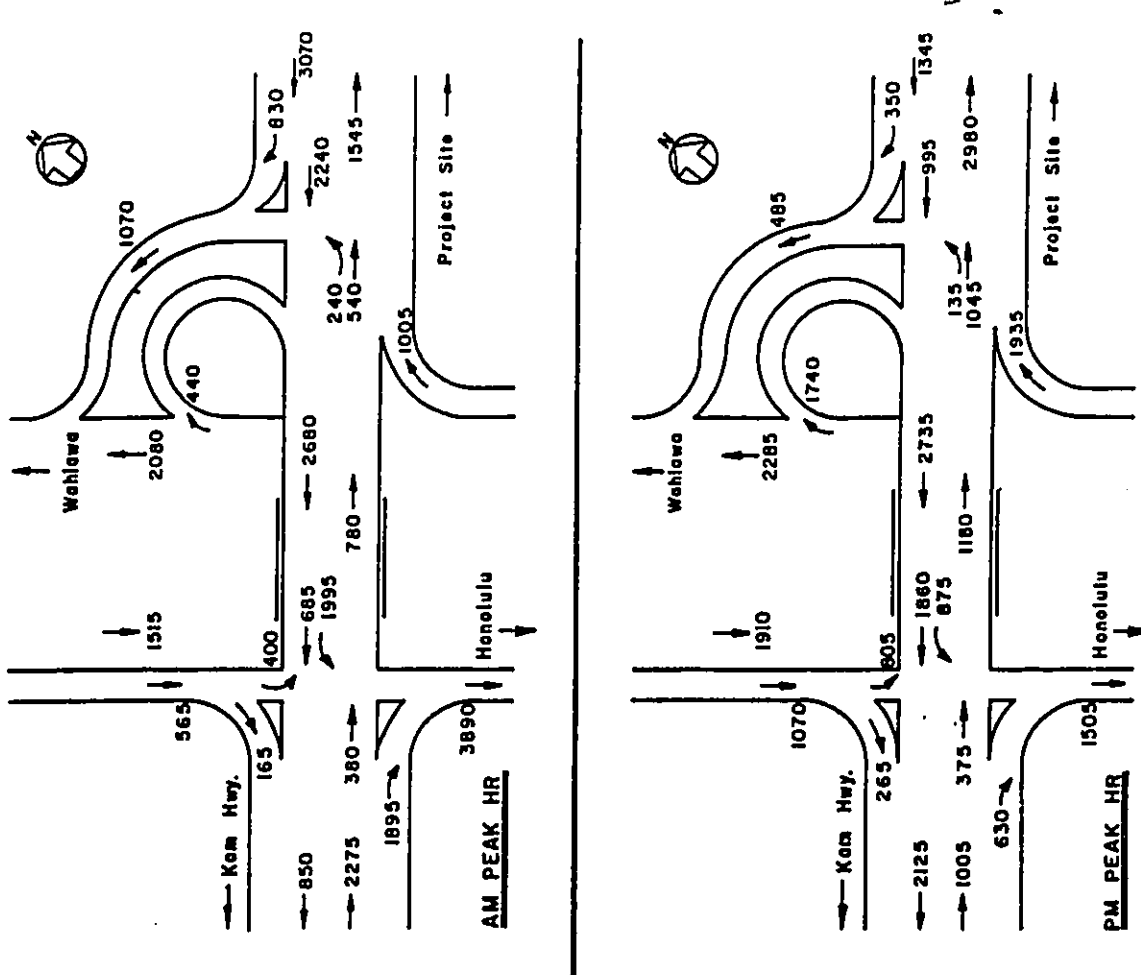
TRAFFIC ASSIGNMENT

A traffic assignment for full development of Millilani Mauka was developed in the earlier traffic study. This assignment estimated peak hour traffic volumes generated by primarily residential development, i.e. 6,600 dwelling units, two neighborhood shopping areas, and schools, churches, and recreational centers.

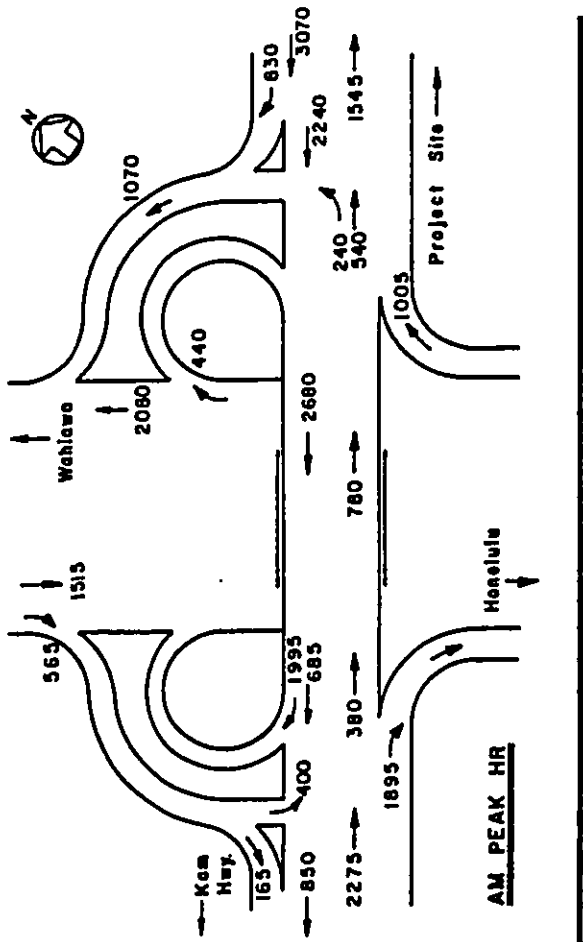
The location of major traffic attractors, such as a college campus, employment centers, or additional commercial space, would change the traffic generated by Millilani Mauka. Off-peak flows (into Millilani Mauka in the AM peak hour, out in PM) are expected to increase while peak flows could decrease because of higher internal movements.

The most critical traffic conditions, however, are expected if no or very little of these major traffic attractors are included in the project. This case was used in the earlier study and its traffic assignment will be used in this evaluation. Figures 4 and 5 show the peak hour traffic assignments for Alternatives 1 and 2 respectively.

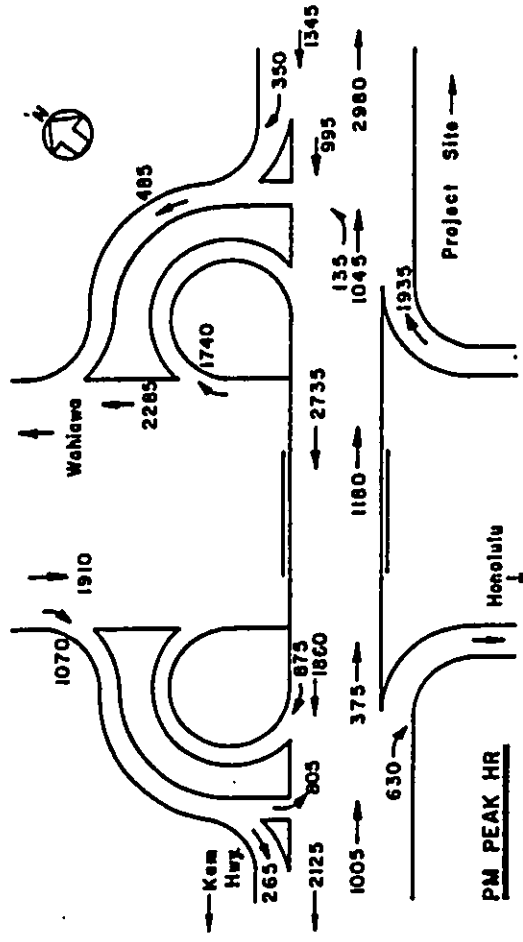
I
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**TRAFFIC ASSIGNMENT - FULL IMPLEMENTATION
ALTERNATIVE 1
FIGURE 4**



I-6



**TRAFFIC ASSIGNMENT - FULL IMPLEMENTATION
ALTERNATIVE 2
FIGURE 5**

TRAFFIC IMPACTS

Traffic levels of service were evaluated for the peak hour assignments at Milliani Interchange and on Meheula Parkway.

Ramp Operations

The traffic assignment indicates that H2, south (Honolulu) of Milliani Interchange, will need four lanes in each direction. North of the interchange, the existing 4-lane freeway (2 lanes each direction) will be adequate.

On-ramps to H2, Honolulu bound, from both the Waianae and Koolau sides on Meheula Parkway would need two lanes; similarly off-ramps from Honolulu will each be two lanes wide. The alternatives developed, therefore, combine lane drops and option lanes for Waiana or northbound traffic and added lanes and merges for Honolulu or southbound traffic.

The evaluation of ramp operations (Circular 281²) is based on maximum lane volumes using nomographs to estimate lane usage. In Alternative 1, the merge of the on-ramp with Honolulu-bound H2 was calculated to operate at Level of Service E, or capacity conditions, in the AM peak hour. All other merge or diverge locations in both alternatives would be at Level of Service D or better.

Meheula Parkway

The H-2 ramp connections with Meheula Parkway were considered as two separate intersections, one on the Koolau side of the bridge and the other on the Waianae side. Intersections were analyzed using Circulares 212³ and 281 methods. Levels of Service definitions are contained in the appendix.

Under Alternative 1 or 2 configurations, the intersections on the Koolau side of the bridge would operate at Level of Service E in the AM peak hour and at Level A during the PM peak hour without signalization. However, in Alternative 2, merge

conflicts on Meheula Parkway between the vehicles from the H-2 (Maui-bound) loop off-ramp destined for the Milliani (Maui) area and the vehicles from Milliani (Koolau) headed toward Honolulu would tend to lower operating conditions. Signalization of the Koolau intersection would separate these movements which would eliminate the merge conflicts in Alternative 2 and reduce delays for left-turn vehicles from Milliani (Maui) to H-2 (Maui-bound) in both alternatives.

Projected traffic volumes on Meheula Parkway at the Maui side of the bridge would exceed capacity without signalization under either alternative. The Alternative 1 configuration of the Maui intersection would necessitate a three-phase cycle, whereas a two-phase cycle would be sufficient for Alternative 2. Intersection levels of service are shown in Table 1.

Table 1
INTERSECTION LEVELS OF SERVICE
H-2/MEHEULA PARKWAY

	AM Peak Hr	PM Peak Hr
Unsignalized Koolau Intersection Alternative 1	E	A
	E	A
Maui Intersection Alternative 1	F	F
	F	F
SIGNALIZED Koolau Intersection Alternative 1	C/D	C
	C/D	C
Maui Intersection Alternative 1	E	E
	A	D

CONCLUSIONS AND RECOMMENDATIONS

The existing H-2/Meheula Parkway full diamond interchange will not have adequate capacity to accommodate the projected traffic volumes with the full implementation of the Millilani Town Master Plan. However, improvements such as loop ramps and signalization as shown in Alternative 1 or 2 would sufficiently increase capacity of the interchange to serve the expected traffic volumes. The H-2 freeway would also require widening to eight lanes, four lanes in each direction.

Of the two alternatives evaluated, Alternative 2, which would have loop ramps in two quadrants of the interchange, is recommended. Alternative 2 provides better traffic service at levels of service which would be less sensitive to change if the project includes traffic attraction uses, thereby allowing greater flexibility to accommodate plan updates in the future.

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References

1. Parsons Brinckerhoff Quade & Douglas, Inc., Traffic Impact Study - Millilani Town Master Plan, May 1984.
2. Transportation Research Board, National Research Council, Transportation Research Circular 281, Proposed Chapters for the 1985 Highway Capacity Manual, Washington, D. C., June 1984.
3. Transportation Research Board, National Academy of Sciences, Transportation Research Circular 212, Interim Materials on Highway Capacity, Washington, D. C., 1980.

APPENDIX

Although the Highway Capacity Manual, the Critical Movement analysis in Circular 212, and the ramp analysis in Circular 281 require different calculations in the determination of service levels, the service level definitions are similar. Six levels of service, labelled A through F, from the best to worst conditions are defined. Characteristics of each level of service for signalized and unsignalized intersections and ramps are described below. Level of Service D is considered adequate for design of urban arterials and freeways.

Signalized Intersections

Level of Service A: Drivers operate in a free flow situation with no delays and easy turn movements.

Level of Service B: This level represents stable conditions; drivers may be slightly restricted in movements; however, no delays exceed one cycle.

Level of Service C: Small back-ups may occur behind turning vehicles, and drivers may experience delays exceeding one cycle. Although movements may be somewhat restricted, they are not objectionable as stable operation continues.

Level of Service D: Drivers experience restrictions which approach instability. Delays may occur during short peaks, however periodic dispersal of queues prevents excessive back-ups.

Level of Service E: This level represents conditions at capacity which serve the most vehicles the intersection is able to accommodate. Long queues and substantial delays occur at capacity.

Level of Service F: Capacity of intersection exceeded. Conditions are jammed and volumes that can be carried are unpredictable. Congestion with excessive delays and very long queues are typical of this service level.

Unsignalized Intersections (stop or yield control)

- Level of Service A: Little or no delay
- Level of Service B: Short traffic delays
- Level of Service C: Average traffic delays
- Level of Service D: Long traffic delays
- Level of Service E: Very long traffic delays at extreme congestion-failure
- Level of Service F: Intersection blocked by external causes.

Ramps

Level of Service A: Merge or diverge movements have little effect on freeway flows as drivers operate under unrestricted conditions. Merge movements fill gaps smoothly with only minor speed adjustments; diverge movements experience no or very little turbulence.

Level of Service B: Freeway flows are generally smooth and stable, vehicles not directly involved in merge or diverge movements remain unaffected. Merging vehicles must adjust speed to fill gaps; diverging vehicles operate without significant turbulence.

Level of Service C: Freeway flows are generally smooth and stable, vehicles not directly involved in merge or diverge movements remain unaffected. Merging vehicles must adjust speed to fill gaps; diverging vehicles operate without significant turbulence.

Level of Service D: Overall speed and density of freeway flow remain stable, but the lane adjacent to the lanes directly

involved in merging and diverging movements may be affected by these movements. Both merge lanes must adjust speed to provide smooth merging and minor ramp queuing may occur with large on-ramp volumes. Vehicles may also decrease speeds in diverge areas.

Level of Service D: Several freeway lanes are affected by turbulence from merge and diverge movements. Disruptive queues may form at ramps with large demand volumes. Vehicles in merge lanes must adjust speeds to avoid conflicts as smooth merging becomes difficult to attain. Vehicles in diverge areas also encounter distinct decreases in speed.

Level of Service E: This service level represents capacity conditions. Vehicles are significantly affected by turbulence, but do not create noticeable freeway queuing. Vehicles not directly involved in ramp movements attempt to avoid the turbulence by moving towards the median lanes. On-ramp queues may be significant and queues may also form in diverge areas. Diverging movements experience a significant decrease in speeds.

Level of Service F: Considerable turbulence is created by ramp movements and vehicles attempting to change lanes to avoid ramp areas. Long delays are encountered in the vicinity of ramp terminals and may possibly extend for some distance upstream on the freeway. Merging lanes experience extensive breakdowns as merge movements occur on a stop-and-go basis. Traffic conditions change constantly and vary widely, resulting in unstable conditions with waves of alternately good and forced flows.

APPENDIX I

Hierarchy of Agricultural Lands Study; Central Oahu Lands.

**Diversified Agriculture Task Force, Castle and Cooke, Inc.
March 1984**



INTER-OFFICE CORRESPONDENCE
CASTLE & COOKE, INC.
DIVERSIFIED AGRICULTURE TASK FORCE

To: M. Haight
From: M. W. Paty, Jr.
Date: March 1, 1984
Subject: Castle & Cooke Hierarchy of Agricultural Lands
Study--Central Oahu Lands

Attached is the Central Oahu increment of the Castle & Cooke "Hierarchy Study." The Kona and Lanai sections are underway and are scheduled to be completed before summer.

The basic input covering pineapple and sugar was generated by the operating managers of those entities. The diversified crop work came from the Diversified Agriculture Task Force. Reports prepared by and discussions with personnel from: The College of Tropical Agriculture and Human Resources, The Co-operative Extension Service, The State of Hawaii Department of Agriculture and The Governor's Agricultural Coordinating Committee were of great help in providing information and direction for this report.

This study will provide company managers with objective information for long range land use decision making. In general, Castle and Cooke prime agricultural lands are lands which can be economically (drip) irrigated, have productive soil and good insolation. These lands are identified in this report.

EXECUTIVE SUMMARY

CASTLE & COOKE HIERARCHY OF AGRICULTURAL LANDS STUDY

Castle & Cooke, Inc. is currently reviewing and updating long-range regional land use policies and plans as they relate to agriculture. The study pertaining to Central Oahu lands, as they relate to agriculture, has been completed and a copy is attached.

The main focus of the study is on the economical agricultural potential of the 21,900 acres of Oahu land currently in agricultural production. This 21,900 acres include approximately 5,400 productive acres leased from other parties and used by Waialua Sugar Company and the Dole pineapple operations, in addition to the lands owned by Castle & Cooke in fee.

The study reviewed changes in product markets, energy costs, irrigation methods, world sugar prices, a search for new chemicals to control nematodes in pineapple fields and new advances in agricultural technologies that have led to changes in the way both sugar and pineapple are produced. In addition, it reviewed the work of the Castle & Cooke Diversified Agriculture Task Force, which has been established to identify opportunities in Hawaii for diversified agriculture.

The common denominator of the above changes, as they impact on land use, is the need for irrigation -- and

specifically for pineapple, sugar cane, and most diversified agricultural crops, drip irrigation.

The study points out that sugar, pineapple, and diversified crops each has a specific ecological range for economical cultivation; and, each crop has an economical production zone. The drier, lower and intermediate elevation fields which have high insolation (sunlight) and economical irrigation capability are considered the Company's prime agricultural land. The best economical production zones for sugar, pineapple and diversified crops are contained in these areas.

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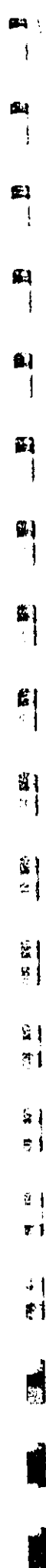
Exhibit II: Classification of Dole's pineapple lands, is pertinent to this general plan amendment, as it codes the lands above the H-2 freeway (planned for the High Technology Park and the expansion of Millland Town) as: (1) high rainfall with low production, or moderate to high rainfall with moderate production; (2) neither area has irrigation potential.

During the past decade, the Oahu Dole pineapple operation has evolved from processed (canning) operation to principally a fresh fruit operation. This shift from processed to fresh has had a significant impact on plantation practices. In addition, the recent decision by the Environmental Protection Agency to ban the use of the nematocide EDB on pineapple fields will have a definite impact on the ability to produce high tonnage on a year-round basis -- particularly at higher (wetter)

elevations. It appears that alternative approaches to nematode control will be limited to lower, drier fields.

In summary, the lower and intermediate elevation fields which can be drip irrigated are the prime fields for the Dole pineapple fresh fruit operations, and the higher elevation -- non-irrigated -- fields above the H-2 freeway are no longer considered to have the qualities associated with successful pineapple production. The same can be said for sugar and/or diversified crop opportunities.

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CASTLE & COOKE HIERARCHY OF AGRICULTURAL LANDS STUDY
CENTRAL OAHU LANDS

Page 2

studies are being conducted for the company's agricultural lands in the Kohala district on the island of Hawaii and on the island of Lanai.

Overview

In the State of Hawaii, Castle and Cooke is the largest corporate landowner with approximately 150,000 acres of land owned in fee. On Oahu, the company owns 40,000 plus acres located between the Waipahu area and the North Shore in the central plain of the island. The approximate land use breakdown for Castle and Cooke's Central Oahu lands are: 16,500 acres under field agriculture, 6,700 acres in forest reserve, 10,300 acres in waste lands (including 3,700 acres leased to the army for training purposes), and 7,600 acres leased to other parties. The main use of leased land is grazing.

The objective of this study is to review and update long-range regional land use policies and plans for Castle & Cooke's Central Oahu lands as they relate to agriculture. This study updates and expands the agricultural land capability aspects of a 1973 regional plan study conducted by Belt Collins titled "Oahu Land Study." The goal of this study is to provide managers with better information for decision making with regard to future land use. The main focus of this study is the economical agricultural potential of all 21,900 acres of Oahu land in agricultural production by Castle and Cooke operations (Exhibit 1). The 21,900 acres include approximately 5,400 productive acres leased from other parties and used by Wai'alua Sugar Co. and the Dole pineapple operations in addition to the land owned by Castle and Cooke in fee. Concurrent

Agricultural Analysis and Potential

A farmer has to work under risk from the whims of Mother Nature. Advances in agricultural technology have been aimed at improving overall production capabilities which include reducing the risks and uncertainties in farming. In looking at the agricultural suitability of Central Oahu lands, climate, crop suitability, soils and terrain, and water are the critical elements. The highly seasonal rainfall that occurs in the Central Oahu plain mandates irrigation for consistent profitable agricultural production. The general factors that determine prime agricultural land in the Central Oahu plain are: high insolation (clear sunny weather), productive agricultural soil and irrigation (drip) capability.

Climate

The Central Oahu climate is characterized by warm days with an average range from 82°-86°F with good solar radiation, and cool nights ranging from 59°-59°F in winter to 65°-70°F in summer. The diurnal temperature variations are 18°-20°F. Temperatures and solar radiation decrease with elevation. There is not enough rainfall in the major agricultural lands for optimum production of any crops. In discussing potential productivity and alternate crops, it is assumed that economical irrigation water will be available.

Crop Suitability

Central Oahu agricultural lands (see Exhibit 1) are best suited for crops requiring a period of low temperature for ripening or flower induction, such as sugar cane, pineapple, citrus and other fruit crops, and certain flowers and vegetables. The higher elevation lands of the Koolaus are generally less productive and not as well suited to crops where maximum lush vegetative growth is required, such as sugar, pineapple and forage crops. The reasons are that the soils are poorer, variable seasonal rainfall complicates field preparations, these areas are subject to drought periods and the cloud cover limits the amount of radiant energy (sunlight) available to the plant. Pollen sterility in sorghum and mishapen fruit in papaya may be caused by critically low night temperatures in the higher elevation lands.

Soils and Terrain

Most sugar cane and pineapple are grown on Low Humic Latosol soils, which are well suited for most agriculture, being generally well drained and productive. The majority of the usable agricultural lands are gently sloping (0% - 10%). Ranch lands are gently to severely sloping with poor soils and inferior plant cover. Forest lands range from steep gulch and mountain sides to inaccessible narrow plateaus.

Water

Water is the most important limiting factor to crop production in Central Oahu. Rainfall varies considerably (usually seasonally) within the area, from about 28 inches at Waialua, Kunia and Waipahu to between 50 inches and 90 inches in the upper Helemano and Opaehula cane lands.

The irrigation water resource system servicing Castle and Cooke lands on Oahu is an extensive system made up of wells, pipelines, holding reservoirs and the Mahiawa, Opaehua, Kamananui, upper Helemano and the Waiahole ditch systems. Except for the Waiahole ditch that collects water from the Windward side and from dike formations in the Koolaus, the others are dependent on rainfall in the watersheds of the upper Koolaus. Of these, the Mahiawa system is by far the largest and most extensive.

Approximately two-thirds of the irrigation water required for sugar operations and one-half the irrigation water for pineapple operations are pumped from artesian basins. This source is far more expensive than the mountain water sources due to the energy costs to pump the water to the surface. Mountain water sources are dependent upon rainfall which is less dependable. The cost of pumping water from deep wells and pumping ditch water to upper elevation lands is very expensive and in most cases not economically feasible for water intensive agricultural production. Exhibit 1 shows the areas that are currently under drip or furrow irrigation and the areas that have drip irrigation potential. The blue areas

are in drip irrigation in both sugar and pine. The green areas in pineapple operations are currently unirrigated, but have drip irrigation potential. The green areas in sugar operations are currently under furrow irrigation and in most cases can be put into drip irrigation.

The mauka, higher elevation fields (Exhibit 1, red areas) do not have irrigation capability. These areas have historically received high rainfall and did not require irrigation. Average yields in these areas are much lower than in the irrigated areas for both sugar and pineapple primarily due to the moisture stress the plants endure during dry periods and the lower level of sunlight caused by cloud cover. Moisture stress diminishes photosynthesis which slows or stops a plant from growing. Moisture stress also lowers the plant's resistance and ability to survive plant diseases and pest damage. The cost to develop irrigation capability in these areas would not be economically feasible. The cost of pumping water up to these areas is prohibitive for agricultural production and the cloudy climate in the upper mauka fields is not the optimum for crop production.

The best investment for Castle and Cooke in agricultural production is the development of drip irrigation systems in the lower drier fields for both the pineapple and sugar cane plantations (Exhibit 1, green and blue areas). Dole has spent in excess of \$3 million on drip irrigation installation on Oahu and further significant drip irrigation investment is scheduled. Waialua Sugar Company has spent in excess of \$5 million to develop water resources

and to install drip irrigation equipment. The sugar plantation is embarking on a program to convert the majority of the remaining furrow irrigation fields to drip irrigation.

Pineapple

As forecast in the "Oahu Land Study", during the past decade the Oahu Dole pineapple operation has evolved from a processed (canning) operation to principally a fresh fruit operation. When fruit is grown for processing, the greatest profit comes from packing the most product (cases of pineapple, juice, concentrate) at the lowest possible cost. When fruit is grown for the "fresh" market, success is measured in tons per acre of perishable product for supermarket and fruit stand sales. This shift from processed to fresh has had a significant impact on plantation practices at Dole's Central Oahu plantation. Fields which were considered best for growing fruit to be processed in the cannery are not always considered best for fresh fruit, and many fields which were historically considered to be marginal for cannery fruit are now looked upon to be prime areas for fresh fruit.

The primary consideration for a fresh fruit plantation is the ability to harvest a premium quality fresh pineapple year round. Exhibit 2 compiled by Dole Pineapple management graphically depicts the field production potential for Dole's Central Oahu fields. Quality year round production is affected by rainfall--which is

highly correlated with location. Higher elevation mauka fields (Exhibit 2, red areas) have high rainfall. Mauka fields have a relatively narrow "time window" of dry weather for preparing the soil and planting. Historically, that "window" has occurred during the summer: planting in the summer, harvesting during the spring two years after planting, and harvesting a ratoon or second crop, one year after that. Essentially, this has dictated that mauka fields are only effective for summertime operations.

The high success of the fresh fruit operation in Central Oahu has been realized through the ability to harvest premium quality fresh pineapple throughout the year. Lower and intermediate elevation land areas (Exhibit 2, dark and light blue areas) provide a broader time window for land preparation and planting. A successful fresh fruit operation essentially calls for planting 12 months a year in order to produce quality fruit on a year round basis. Therefore, rainfall is a primary factor in scheduling. It is also an important aspect for production, as the plants require water for optimum growth and development.

Another important element in any type of agriculture is soil condition. Properly prepared soil is one of the factors that results in profitable production. In the case of pineapple, soil that is too wet and thus becomes compacted during land preparation activities results in problems during the following four years of plant development and growth. In particular, compacted soil within the root zone inhibits good root development. This lowers the

vigor of the plant and increases nematode infestation, resulting in decreased yields.

Therefore, high rainfall areas have critical time restrictions with regard to land preparation.

A third factor in maximizing production yields on a year round basis is drip irrigation. Historically, the lower elevation drier fields (Exhibit 2, dark blue areas) were considered to be only marginal producers for cannerly fruit. Overhead irrigation expense was high and the system was inefficient. The pineapple plants were often under moisture stress between irrigation rounds, lowering the yield and quality factors for cannerly fruit from these areas. These fields formerly were marginal producers of fruit for the cannerly. Now under drip irrigation, these fields are prime producers for the fresh fruit market.

In addition to factors that relate to production--tons of fruit per acre--quality is of primary importance in marketing fresh pineapple. Veteran kamaaina pineapple connoisseurs know that winter fruit does not taste as "sweet" as fruit harvested in the summertime. However, fruit growing in selected locations is somewhat less acid than those growing in other locations. Two factors that greatly affect quality are temperature and sunlight. Since lower elevation fields correlate with higher temperatures and more sunlight, such fields can be expected to produce higher quality (lower acid) fruit in the wintertime...fruit that finds better acceptance in the market place.

Average minimum and maximum temperatures are 2 to 3.6°F higher in the lower and intermediate elevation Waipio and Brodie fields (Exhibit 2, light and dark blue areas). The higher minimum temperatures are critical, because the pineapple plant stops growing vegetatively at 60°F, triggering flower initiation in the larger plants. In the higher elevation fields, premature flowering of the pineapple can occur, yielding unacceptable fruit. The 60°F minimum temperature is reached later in the year in these fields. The higher year round temperatures allow more control in plantation induced "fruit forcing" and provides a faster and longer growing season than the mauka higher elevation fields.

In summary, when considering the scheduling of fields and the optimization of production, a high quality field is a field that will produce higher tonnage of quality fresh pineapple on a consistent basis and will allow the flexibility of producing fruit during a wide range of time during the year.

The news media has given substantial coverage to the problems of pesticides in the Central Oahu water supply. The recent decision by the Environmental Protection Agency (EPA) to ban the use of the nematocide EDB on pineapple fields will have a definite impact on the ability to produce high tonnage on a year round basis--particularly at higher (wetter) elevations. A new substitute nematocide, Telone II, is being used to replace EDB.

The reason for using such substances as EDB and Telone II is to kill nematodes, a microscopic organism that feeds on the roots of pineapple plants--and a wide variety of other crops.

Telone II is a short lived nematocide and can only be applied to a field before planting. It kills only adult nematodes that it comes in contact with immediately after application. Nematode eggs and adult nematodes imbedded in plant root debris and soil clods are not killed by the Telone II application. It is necessary to "clean fallow" fields prior to the Telone II application. A clean fallow is clearing the land of all pineapple roots, stumps and plant debris, applying herbicides to keep nematode host weeds out of the field and either discing or letting weather break down soil clods.

The purpose of the clean fallow is to deplete the nematode population and, most important, the residual nematode egg and adult population of the field. Nematodes will hatch out under moist field conditions and can continue to survive under moist field conditions with minimum host plant material. The perfect fallow situation is to have moist soil conditions followed by three to six months of dry soil conditions. The nematodes that hatch will die of starvation before laying eggs under dry soil conditions. The fallow period in the upper mauka fields must be considerably longer than the lower elevation dry fields because of their high frequency of rainfall. A clean fallow period in the upper mauka fields could take over one year versus three to six months in the lower dry, drip irrigated areas.

The perfect field situation for a Telone II application would be soil moisture of approximately 30% and all nematodes in the adult stage in the soil. However, there is no such thing as a perfect field situation for the application of Telone II. There will always

be a residual population of nematodes left in the fields. In the drip irrigation fields, other nematocides can be applied through the drip irrigation lines after planting. In the upper mauka fields, this opportunity is not available so there is risk that the residual nematode population after the Telone II preplant treatment could cause significant damage to the pineapple crop.

In summary, Telone II is a very volatile substance. It therefore requires application to the right kind of soil moisture condition (approximately 30%)--which basically excludes the higher, wetter areas. Telone II is applied to the soil before planting. Telone II is not a persistent nematocide and kills only the adult nematodes that come in contact with it. Clean fallowing to reduce the field nematode population is extremely difficult to achieve in the upper mauka fields due to the high variable rainfall throughout the year. Residual nematode populations cannot be controlled in the mauka high rainfall fields because there is no way of applying post plant nematocides in non-drip irrigated fields. In high rainfall areas, nematocides and other pesticides are more susceptible to being deeply leached into the ground water. In the dry lower and intermediate elevation fields, the nematocides and other pesticides remain in the upper levels of the soil where they are degraded into harmless substances. Another problem is that in years of extremely high rainfall, wetter fields are susceptible to heart rot and other diseases that are less likely to occur in lower, drier areas.

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The important salient points of Exhibit 2, Classification of Dole Pineapple Lands are:

The red line drawn from the State Department of Agriculture map of Oahu indicates annual rainfall of 1,500 millimeters, or approximately 60 inches. Fields above that line can expect to receive higher levels of rainfall for an average year, while fields below the line can expect lower levels. Therefore, the field areas marked in red are characterized generally as having high rainfall and low production.

Moving below the 60-inch line are yellow colored field areas which indicate moderate to high rainfall. While these two areas are in relatively close proximity, the difference between the upper levels of the field and the lower parts is considerable, representing 20-25 inches of rainfall a year. The yellow areas can have excellent production in years when the annual rainfall is evenly dispersed throughout the year. In an above average wet year, the production problems are similar to the red colored areas. In a very dry year, the plants will stop growing, as the yellow areas are also non-irrigated, and the potential for irrigation is low because there is no existing irrigation water source, and the costs to develop a resource would not be financially feasible.

The green areas are similar to the yellow, except that these areas do have water resources available which can be developed to provide drip irrigation. This may hold some promise for the future of several new nematocides (which may have potential to replace EDB)



which can be injected through a drip irrigation system. These nematocides are currently going through various testing programs. To date, the success and effectiveness of the nematocides is unproven. However, this may provide the industry with some long-term answers for fields where drip irrigation is a possibility.

The blue colored field areas on the map are currently in drip irrigation. The lighter blue areas, which are on the Wai'alea side of Mahiwa town, are extremely good producing intermediate elevation fields. The darker blue areas, nearer to Gentry, are lower elevation drip fields characterized by higher temperatures and very rapid growth rates. In this area, wintertime fruit is harvested with acceptable acidity.

Another advantage of the lower elevation rapid growth areas is that crop cycles are shorter: A two crop cycle in the higher (red) slower growing cool areas requires a little over four years. A two crop cycle in the dark blue areas can be completed in three years. The result is significantly higher production in terms of tons per acre per month.

In summary, the lower dry land and intermediate elevation fields which can be drip irrigated are the prime fields for the Dole Pineapple fresh fruit operations. The reasons are: ability to harvest year round, ability to plant and cultivate year round, ability to produce a premium quality fresh pineapple year round, a broader time window for proper low soil moisture for application of the nematocide Telone II, ability to inject nematocides throughout

the crop to control nematodes, less disease problems than in higher elevation fields, greater yields, overall higher temperatures which provide for more crop control and a shorter crop cycle, and a shorter and more effective nematode fallow period than the higher elevation non-irrigated mauka wetter fields.

Sugar

The 1973 "Oahu Land Study" predicted that sugar would continue as the major crop in Central Oahu, and that profitability would improve through the development of new techniques and operating efficiencies. The report summarized that future worldwide demand and the price of sugar appeared good for the next decade.

Unfortunately, a combination of factors, including high energy costs, a proliferation of artificial sweeteners, subsidized foreign competition, and lack of sufficient price supports for domestic sugar growers in the face of low world sugar prices have left the Hawaiian sugar industry in a financially stressed condition.

Since Hawaii growers have no control over world sugar prices, operating efficiency--minimizing the cost per ton of sugar--is the key to profitability.

In efforts to improve operating efficiency and reduce unit operating costs, the plantation is attempting to more efficiently utilize its better lands--lands that have drip irrigation capability by converting furrow irrigation to drip (Exhibit 3, green areas).

As is the case with pineapple, drip irrigation for sugar cane is desirable as it improves yields (tons of sugar per acre) and lowers operating expenses.

The most recurring limiting factor in sugar operations at Waialua is water. Sugar is a plant that utilizes great quantities of water. Sugar cane assimilates carbon during the day. This requires that the stomata (small pores on the leaves "that breathe") be open so that transpiration can occur. The sugar plant loses great quantities of water through the stomata during transpiration. Moisture stress greatly affects the yields, disrupting the carbon assimilation cycle. In drip irrigation, water is applied only to the root zone area of the plant. Consequently, the sugar cane plant is under less moisture stress in drip irrigation fields. In furrow irrigation, the entire field area must be wetted to achieve wetting the root zone. Weeds are more likely to germinate in furrow fields and fertilizer applied to the irrigation water is not concentrated in the root zone. Therefore, drip irrigation is a more efficient way of applying water and fertilizers. The sugar plant performs better under drip irrigation, providing yield improvements averaging from one and one-half to two tons of sugar per acre at Waialua.

Drip irrigation requires a better prepared seedbed than furrow or non-irrigated fields. Soil clods must be broken down into a fine seedbed. This operation is quicker and less labor intensive than installing furrow irrigation. However, there is an initial high capital installation expense and a recurring drip lateral tube expense for each crop cycle with drip irrigation.

Waialua Sugar Company monitors the cost elements per ton of sugar involved in production on a field by field basis. Given the current and the foreseeable future low price for sugar, the company is giving up fields that are not profitable to farm. The vast majority of these fields are the non-irrigated higher elevation mauka fields (Exhibit 3, cross-hatched areas).

The non-irrigated fields are dependent upon rainfall for watering the cane. In the past with higher sugar prices, lower energy costs and more favorable rainfall, it was worth the business risk to cultivate these upper fields. During the last five years, Waialua has experienced erratic weather conditions in these upper mauka fields ranging from drought to monsoon type rainfalls. The yields received from these fields in some cases were lower than the direct production costs. Waialua is withdrawing 1,400 non-irrigated acres from production, leaving approximately 1,600 mauka acres in non-irrigated cane. Of the 1,600 acres of mauka cane, approximately 1,000 acres will be set aside for seed cane, since optimum sugar production is not required for seed cane. The remaining 600 acres that are scheduled to be in production have historically been low cost non-irrigated producers.

Currently at Waialua Sugar, 5,746 acres are under drip irrigation (Exhibit 3, blue areas) and the company is embarking on a program to convert most of the remaining 5,520 furrow irrigated fields into drip irrigation in a long-term effort to become, and stay profitable.

Diversified Agriculture

The 1973 Oahu Land Study stated "There is no single crop which could replace the areas now occupied by sugar and pineapple." The study evaluated possible alternatives against such factors as "high market value and revenue per acre, ready market, non-objectionable environmental effects, agriculturally suitable, and return on investment." From the evaluation, recommended crops were nursery and ornamentals, vegetables and melons, seed farms and guavas.

During the past ten years, Oole and Waialua Sugar as well as the HSPA, University of Hawaii and several other Hawaii companies have searched for economically viable agricultural alternatives. Success has been less than spectacular and those successes that have occurred, have happened with relatively small, entrepreneur-type operations.

The Castle & Cooke lands in Central Oahu over the years have experienced very seasonal rainfall. Historically, the usual rainfall pattern has provided usually wet winters, moist springs, dry summers and dry falls. There is wide deviation from the average in a year. In the extreme case, the majority of the annual rainfall for a specific area can occur in a time period of less than a month. Vegetable farmers need to deliver fresh produce to the market on a continuous basis year round, cycling fields to produce a high quality crop in weekly or bi-weekly increments as required by the

Waialua Sugar has determined that, similar to pineapple, sugar also has problems working higher elevation, wetter fields. While land preparation is not as critical as for pineapple, successful planting is dependent on predictable post planting rainfall, thereby limiting the size of the "time window" opportunities for working non-irrigated fields. Harvest operations are severely hampered by heavy rainfalls. Harvesting equipment is also easily damaged under wet field conditions. Wet fields can be severely compacted by harvesting operations. Poor cane fires result in an excess of cane trash coming to the mill. This cane trash lowers the sugar juice quality and increases hauling costs.

In sugar production, as with all agricultural operations, technology is always moving forward. New advances in varieties, herbicides, fertilizers, pesticides and machinery are continuously being monitored and implemented by Waialua Sugar Co. in an effort to increase the efficiency of sugar operations. However, sugar operations are encumbered by heavy fixed capital costs and do not have the flexibility of fresh pineapple operations or diversified agricultural operations to plant in accordance with the market. Waialua Sugar Co. is minimizing production costs per ton of sugar over the volume of production necessary to meet fixed costs. The goal of Waialua Sugar Co. is to produce 80,000 tons of raw sugar with 620,000 tons of cane in the most efficient way possible to return an acceptable profit.

market. It is essential for the vegetable farmer to achieve excellent quality and dependable continuous production to service the needs of the market. Irrigation capability is essential to insure year round quality production of vegetables. Irrigation could be either drip or overhead, depending upon which crop is grown.

Vegetable crops (leafy vegetables, tomatoes, melons and cucumbers) are moisture stress sensitive crops. Lettuce is the most sensitive. A period as short as several hours under moisture stress on a hot dry day can destroy an entire lettuce crop. The variability of rainfall and the lack of rainfall on Oahu's central plain would require a vegetable grower to have irrigation capability in order to produce a high quality crop on a year round basis.

Vegetable production, as with sugar cane and pineapple operations, derives more control over the whims of Mother Nature by growing in irrigated dry lower elevation areas. In the wetter, higher elevations, vegetable crops are more susceptible to fungus and bacteria diseases that thrive in moist climates. Nematodes and certain insect pests are also more of a problem in the upper elevation fields. Bird and vermin pests are prevalent in the conservation land bordering the upper mauka fields.

Nematode infestations are prevalent and less subject to control in the upper non-irrigated fields due to the favorable moist soil conditions and host weed infestations. Weeds are also more difficult to control in high rainfall areas for three reasons: rainfall causes increased germination of weeds, weeds survive in

adjacent areas providing constant weed seed source, and rainfall can effectively wash away herbicide applications. In addition, insect pests can survive on the abundant natural vegetation in any adjoining uncultivated lands, and rainfall washes off insecticides, rendering insect control ineffective. Fertilizer management is also a problem as applications are more subject to being leached away from the rootzone in high rainfall areas, resulting in fertilizer programs being costly and difficult to maintain in such areas.

Vegetable farming is significantly different from sugar and pineapple operations as the fields are required to be worked on a year round basis. Vegetables, in general, have a comparatively shorter field cycle: Lettuce can be harvested within eight weeks after transplanting, and tomatoes can be harvested within six months after transplanting. Most other vegetables fall within this field cycle time of eight weeks to six months. A grower would have to replant a field from two to six times a year. Therefore, it is even more critical to the vegetable farmer than the pineapple operations to have a broad time window throughout the year to plant and work the fields.

Castle and Cooke's upper mauka fields are unsuitable for vegetable farming because of a lack of economical irrigation resources. Pineapple and sugar in these fields can withstand some periods of drought, suffering yield declines. Adequate moisture throughout the year is critical for the success of vegetable

farming. The short growing cycles of vegetable crops cannot survive drought conditions.

Ornamental greenhouse crops (foliage plants and flowers) are usually grown in specialized media and not soil. It would be wasteful to place a greenhouse on top of prime deep agricultural soil. Ornamental stock plants do not require prime agricultural lands. Ornamental greenhouses require areas that have high insolation (clear sunny weather), a supply of clean irrigation water and electricity.

Commercial production of papayas could be hampered in the Central Oahu plain because of the prevalence of mosaic virus. Pilot plots of papayas required drip irrigation for economically feasible production experiments.

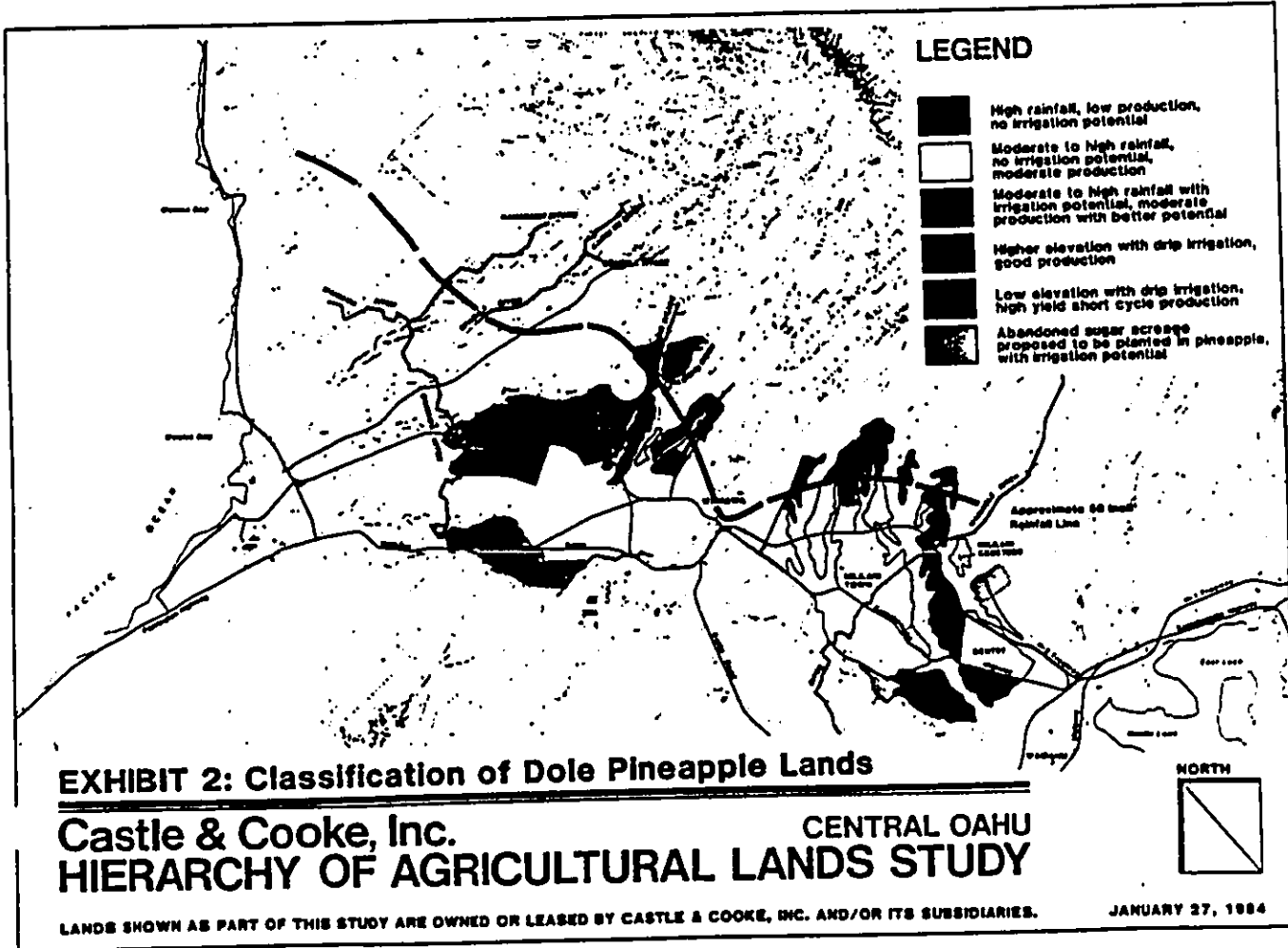
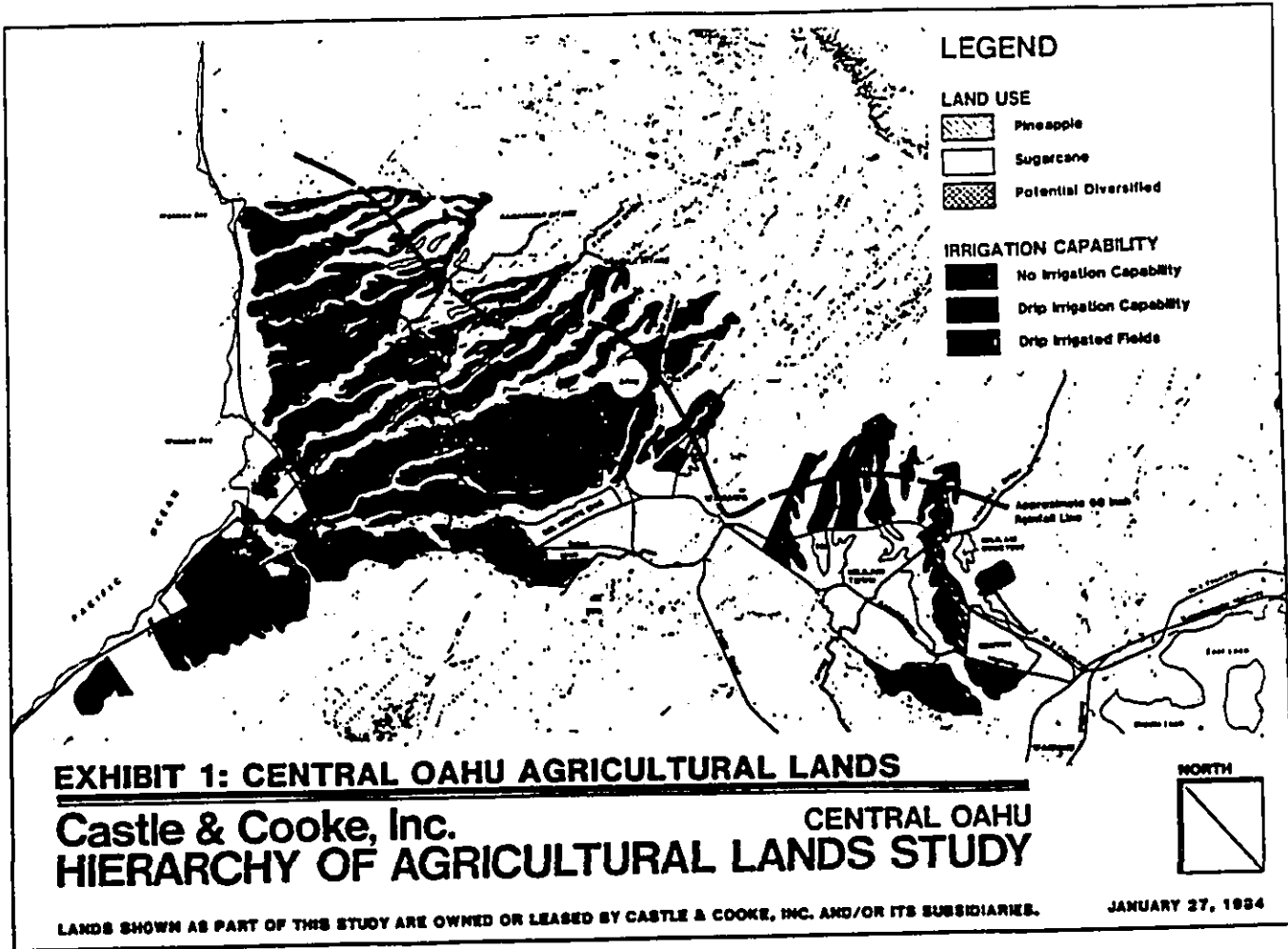
Macadamia can grow from sea level to 2,500 foot elevation with 60 to 120 inches of rainfall. Drip irrigation would be necessary to achieve economically feasible production of macadamia nuts in the Central Oahu area.

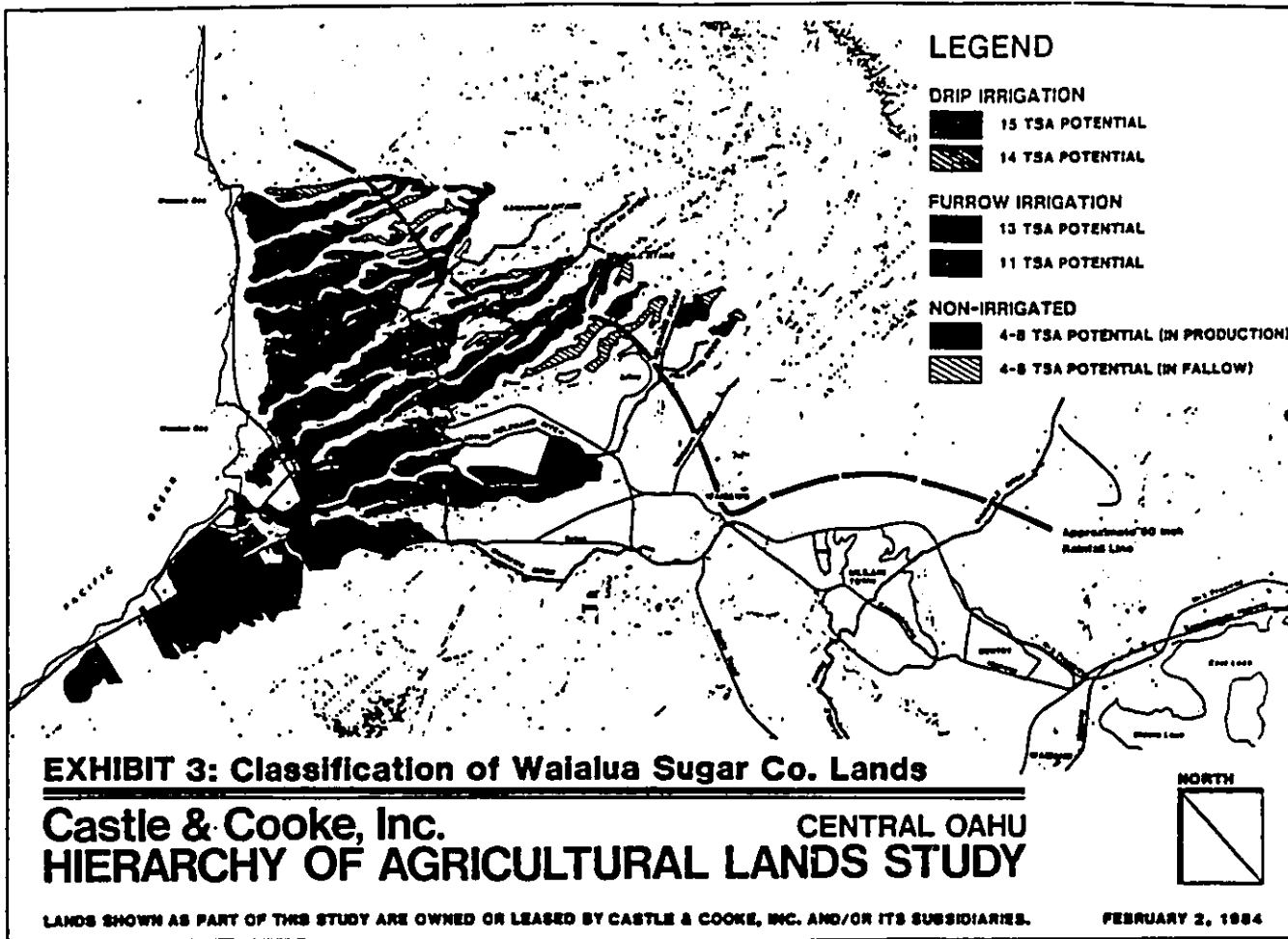
In an effort to find viable alternatives for sugar and pineapple, Castle & Cooke established the Diversified Agriculture Task Force in mid-1983 to study crop alternatives for all of its agricultural lands in Hawaii. To date, one conclusion has been firmly established: On Oahu, any meaningful diversified crop activity would require irrigation. Therefore, new farming activities would necessarily fall into basically the areas now identified for continuing pineapple and/or sugar cultivation. The green and blue areas of Exhibits 1, 2 & 3.

Summary and Discussion

The purpose of this study was to review, update and expand the agricultural land capability aspects of the 1973 "Oahu Land Study" in an effort to provide managers with better information for decision making with regard to future land use.

Changes in product markets, energy costs, irrigation methods, world sugar prices, a search for new chemicals to control nematodes in pineapple fields and new advances in agricultural technology are some of the events that have led to changes in the way both sugar and pineapple are produced. The common denominator of these changes, as they impact on land use, is the need for irrigation--and specifically for pineapple, sugar cane and most diversified agricultural crops, drip irrigation. Sugar, pineapple and diversified crops each have a specific ecological range for economical cultivation. Each crop has an economical production zone. The drier, lower and intermediate elevation fields which have high insolation and economical irrigation capability are Castle and Cooke's prime agricultural lands (the green and blue areas of Exhibits 1, 2, & 3). The prime economical production zones for sugar, pineapple and diversified crops are contained in these areas.





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APPENDIX J

**Terrestrial Flora and Fauna Survey:
Proposed Mililani-Mauka Project, Island of O'ahu.**

Winona P. Char, Char & Associates. August 1985

TERRESTRIAL FLORA & FAUNA SURVEY

PROPOSED MILILANI-MAUKA PROJECT, ISLAND OF O'AHU

INTRODUCTION

The study area consists of approximately 1,200 acres of land, presently zoned Agriculture, located mauka of Mililani Town, 'Ewa District, island of O'ahu. The majority of the land is in pineapple cultivation; more or less undisturbed vegetation can be found in the two smaller gulches which run almost the length of the study area and on the peripheries of the study area.

Much of the existing vegetation on the study area would be removed or destroyed for the proposed housing development, however, these developed areas would be primarily on those lands already in cultivation. The vegetation in the two smaller gulch areas will be preserved and incorporated into a park. Jogging paths are included in the park plans. The vegetation on the peripheries is either on steep slopes or in forest reserve and will not be affected by construction activities.

A survey to assess the flora and fauna of the study area was conducted on 10 August 1985. A walk-through survey method was used. Access into the study area was by unpaved, dirt roads which run throughout the pineapple fields. Notes on the major vegetation types as well as species identification were made in the field. Species which could not be positively identified in the field were collected for later determination in the laboratory and herbarium. Notes were also made on the vertebrate fauna encountered during the survey.

TERRESTRIAL FLORA & FAUNA SURVEY

PROPOSED MILILANI-MAUKA PROJECT, ISLAND OF O'AHU

By

Winona P. Char

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Honolulu, Hawaii

Prepared for:

HEIDER, HASTERT, VAN HORN & KIMURA

August 1985

forming rather dense thickets are Christmasberry (Schinus terebinthifolius) and strawberry guava (Psidium cattleianum). California grass (Bracharia nutans) is abundant in the open areas at the head of the gulches.

The native species such as 'ohi'a, koa, naupaka-kuahivi (Scaevola taudichaudiana), puiaue (Styphelia tameiameia), and 'aki'a (Wikstroemia sp.) are generally found on the steep, open areas of the gulches and periphery slopes.

Summary

No rare, threatened or endangered species were found during this survey.

The vegetation in the study area consists primarily of pineapple fields. The proposed housing development will be sited on these cultivated areas. The two small gulches found within the study area and the periphery areas will not be used for housing; both areas are steep. Portions of the gulches may be used for a jogging path and small park. The native species found in the gulches occur on the steep slopes and will not be affected by the park plans. These species also occur throughout the Hawaiian Islands in similar types of habitat.

TERRRESTRIAL FAUNA

The vegetation in the study area consists primarily of cultivated areas and the forests which are found in the study area and adjacent lands consists largely of introduced trees. These types of introduced vegetation do not provide suitable habitat for any of the endemic forest birds and mammal.

Airfauna - Eight species of birds were recorded from the study area (Table 1); all of them introduced (Berger 1981). Birds were seen primarily in the forested areas. These areas provide nesting sites and food for fruit and seed eaters. Birds were seen flying over the pineapple fields but

A total of 32-man hours were spent to gather the technical data contained in this report.

TERRRESTRIAL FLORA

The majority of the 1,200 acres has been in pineapples (Ananas comosus) cultivation for some time, as a result other species are rare and consist of weedy species. The vegetation in the two small gulches as well as the periphery areas support largely introduced species, although scattered patches of native plants such as 'ohi'a (Metrosideros collina sp., Polymorpha) and koa (Acacia koa) trees can be found.

Of the 145 plant species found during the survey, 8 are endemic, 9 indigenous, 126 exotic (or introduced), and 2 of Polynesian origin.

Vegetation types

Two major vegetation types can be found in the study area and are discussed below. A checklist of the vascular plant species found during this survey can be found in Appendix A.

1. Pineapple fields - The pineapple fields occupy the majority of the study area. Only a few weedy species associated with cultivated lands are found in the fields or along the roadsides; these include Craspedium crepidioides, sourgrass (Eriocakna insularis), slender amaranth (Amaranthus viridis), and several Paspalum species.

2. Mixed forests - This vegetation type is found in the two small gulches and the periphery areas. It consists of a mixture of introduced tree species such as Eucalyptus spp., Java plum (Syzygium cumini), silk oak (Grevillea robusta), and Formosan koa (Acacia confusa); and the native tree species, 'ohi'a (Metrosideros collina sp., Polymorpha) and koa (Acacia koa). In some places, a dense thicket of guava shrubs (Psidium guajava) is found among the scattered trees. Less abundant but also

rarely foraging in these areas—the fields have few weedy species to provide an adequate seed source.

The barred (Geopelia striata) and spotted (Streptopelia chinensis) doves were the most frequently encountered birds. The red-vented bulbul (Pycnonotus cafer) was commonly observed feeding on ripe guava fruits in the gulch areas.

Mammals - The only endemic Hawaiian land mammal is the Hawaiian hoary bat (Lasiurus cinereus scroetus). It is not known to occur in this type of habitat (Tomich 1969).

Several introduced species of mammals are probably present in the study area, although they were not observed during this survey. These species include small mammals such as the roof rat (Rattus rattus), Polynesian rat (Rattus exulans), house mouse (Mus musculus), and small Indian mongooses (Herpestes auropunctatus). A number of ripe guava fruit appeared to have been gnawed. A few feral cats (Felis catus) may also be present in the study area.

Summary

No endangered bird or mammal species were observed in the study area. It is highly unlikely that they would occur here as the habitat has been greatly disturbed and modified.

All of the species found in the study area are introduced and some are serious pests to man and his cultivated crops.

TABLE 1

Bird Species Occurring in the Mililani-Maui Study Area

Family	Species (Scientific name/Common name)	Status
Columbidae	<u>Streptopelia chinensis chinensis</u> Spotted dove, lace-necked dove	F
	<u>Geopelia striata striata</u> Barred dove	F
Pycnonotidae	<u>Pycnonotus cafer</u> Red-vented bulbul	F
Sturnidae	<u>Acridotheres tristis tristis</u> Common mynah	F
Zosteropidae	<u>Zosterops japonica japonica</u> Japanese white-eye	F
Fringillidae	<u>Cardinalis cardinalis</u> Cardinal	F
Phasianidae	<u>Carduelis mexicanus frontalis</u> House finch, papaya bird	F
	<u>Phasianus colchicus</u> Ring-necked pheasant	F

F = Foreign. Introduced into Hawaii by man.

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APPENDIX A

CHECKLIST OF VASCULAR PLANTS. MILILANI-MAUKA, O'AHU

Families are listed alphabetically within each of three groups: Ferns and Fern Allies, Monocotyledons and Dicotyledons. Genera and species are also arranged alphabetically. Names used for the Ferns and Fern Allies follow Lamouraux's unpublished checklist; names of the flowering plants (Monocotyledons and Dicotyledons) follow St. John (1973), except where more commonly accepted names are used. Hawaiian names are in accordance with Porter (1972) or St. John (1973).

For each species the following information is provided:

1. Scientific name with author citation.
2. Common English or Hawaiian name, when known.
3. Biogeographic status of each species:

E = Endemic = native to the Hawaiian Islands only, not occurring naturally elsewhere

I = Indigenous = native to the Hawaiian Islands and also to one or more other geographic area(s)

P = Polynesian introduction = plants brought by the Polynesians prior to Cook's discovery of the islands

X = Exotic or introduced = not native to the Hawaiian Islands; brought here by man, intentionally or by accident.

Milliani-Mauka	Scientific name	Common name	Status
	<i>Cenchrus echinatus</i> L.	common sandbur, 'ume'alu	X
	<i>Chloris inflata</i> Link	swollen fingergrass, mau'ulei	X
	<i>Chloris</i> sp.		X
	<i>Chrysopogon aciculatus</i> (Retz.) Trin.	golden beardgrass, pili-pili'ula	X
	<i>Cynodon dactylon</i> (L.) Pers.	Bermuda grass, manienie	X
	<i>Digitaria adscendens</i> (HBK.) Henr.	Henry's crabgrass	X
	<i>Digitaria radicata</i> (Presl) Miq.		X
	<i>Digitaria</i> sp.		X
	<i>Eleusine indica</i> (L.) Gaertn.	goosegrass, manienie-ali'i	X
	<i>Melinis minutiflora</i> Beauv.	Molassesgrass	X
	<i>Oplismenus hirtellus</i> (L.) Beauv.	beakgrass, honohono-kukui	X
	<i>Panicum maximum</i> Jacq.	Guinea grass	X
	<i>Paspalum conjugatum</i> Berg.	Hilo grass, mau'u-Hilo	X
	<i>Paspalum dilatatum</i> Poir.	Dalligrass	X
	<i>Paspalum orbiculare</i> Forst. f.	Ricegrass, mau'ulaiki	X
	<i>Paspalum urvillei</i> Steud.	Vaseygrass	X
	<i>Pennisetum purpureum</i> Schumacher	elephantgrass	X
	<i>Phyllostachya bambusoides</i> Sieb. & Zucc.	fishpole bamboo	X
	<i>Rhynchospora repens</i> (Willd.) C.E. Hubb.		X
	<i>Setaria geniculata</i> (Poir.) Beauv.	Matal redtop	X
	<i>Sporobolus africanus</i> (Poir.) Robyns & Tourney		X
	<i>Stenotaphrum secundatum</i> (Walt.) Ktze.	African dropseed buffalo grass, manienie-mabiki	X
	<i>Tricachne insularis</i> (L.) Nees	sourgrass	X
	LILIACEAE		
	<i>Aloe vera</i> L.	aloe, panini 'ava'ava	X
	<i>Asparagus densiflorus</i> (Kunth) Jessop cv. 'Sprengerii'	asparagus fern	X
	<i>Cardiophloe taraiensis</i> (L.) Kunth	ti, ki	X
	<i>Dianella sandwicensis</i> H. & A.	'uki, 'uki-'uki	X
	<i>Sansevieria thyraiflora</i> Thunb.	African bow string heap	X
	MUSACEAE		
	<i>Musa</i> sp.	banana, mai'a	X
	CERIBACEAE		
	<i>Epidendrum</i> sp.	epidendrum	X
	<i>Spathoglottis plicata</i> Bl.	ground orchid	X

Milliani-Mauka	Scientific name	Common name	Status
	FERN & FERN ALLIES		
	BLECHNACEAE		
	<i>Blechnum occidentale</i> L.	blechnum	X
	CHELANIACEAE		
	<i>Dicranopteris linearis</i> (Swrn.) Underw.	ulube, ulubi	X
	HYPOLEPTIDACEAE		
	<i>Pteridium aquilinum</i> var. <i>decompositum</i> (Gaud.) Tryon	braken fern, kilau	X
	LINDERACEAE		
	<i>Sphecomeris chinensis</i> (L.) Maxon	pala's	X
	NEPHROLEPTIDACEAE		
	<i>Nephrolepis multiflora</i> (Roxb.) Jarratt ex Morton	swordfern	X
	POLYPODIACEAE		
	<i>Phlebodium aureum</i> (L.) J. Sm.	rabbit's foot fern	X
	<i>Phymatosorus scolopendria</i> (Swrn.) Pic.-Serm.	snake-scented fern, launua	X
	PSILOTTACEAE		
	<i>Pellaea nudica</i> (L.) Beauv.	boa	X
	POWOCOTTLEDONES		
	AMARYLLIDACEAE		
	<i>Hippeastrum</i> sp.		X
	BROMELIACEAE		
	<i>Ananas comosus</i> (Sticks.) Merr.	Pineapple, hala-habiki	X
	COMPOSITAE		
	<i>Cosmilia banghalensis</i> L.	hairy honohono	X
	<i>Zabrusa pendula</i> Schmal.	wandering jay, honohono-'ula	X
	GRAMINEAE		
	<i>Andropogon virginicus</i> L.	broomsedge	X
	<i>Bambusa vulgaris</i> Schrad. ex Hendl.	feathery bamboo	X
	<i>Bracharia nutica</i> (Forst.) Stapf.	California grass	X
	<i>Cenchrus ciliaris</i> L.	buffelgrass	X

Milliam-Name	Scientific name	Common name	Status
	Palms		
	<i>Livistona chinensis</i> (Jacq.) Mart.	Chinese fan palm	X
	<i>Phoenix</i> sp.	date palm	X
	Ericaceae		
	<i>Heulandias gracilis</i> Baker	scarlet-flowered ruellia	X
	Amaranthaceae		
	<i>Amaranthus spinosus</i> L.	spiny amaranth, pakai-kuku	X
	<i>Amaranthus viridis</i> L.	slender amaranth, pakai	X
	Amorcanthaceae		
	<i>Mangifera indica</i> L.	mango, manako	X
	<i>Schinus terebinthifolius</i> Raddi	Christmas berry, vilelakai	X
	Apocynaceae		
	<i>Plumeria rubra</i> L.	plumeria	X
	Araliaceae		
	<i>Prasemia acinophylla</i> Endl.	octopus tree	X
	Basellaceae		
	<i>Bommesingaultia gracilis</i> Miere form <i>pseudobaselloides</i> Hamman	Madeira vine, 'uaki-tupe	X
	Bignoniaceae		
	<i>Dorstenia unguis-cati</i> (L.) Miere	cats-claw climber	X
	Cactaceae		
	<i>Myllocereus undatus</i> (Haw.) Britton & Rose	night blooming cereus	X
	Caryophyllaceae		
	<i>Carica papaya</i> L.	papaya, pikana	X
	Casuarinaceae		
	<i>Casuarina</i> sp.	ironwood	X
	Compositae		
	<i>Ageratum conyzoides</i> L.	ageratum, malle-boboco	X
	<i>Bidens pilosa</i> L. var. <i>pilosa</i>	beggar's tick, ko'oko'olau	X
	<i>Bidens pilosa</i> var. <i>minor</i> (Bl.) Searff	white-flowered bidens	X
	<i>Craspedopetalum crepidioides</i> (Benth.) S. Moore		X

Milliam-Name	Scientific name	Common name	Status
	<i>Emelia fobergii</i> Nicolson	red pua-lele	X
	<i>Emelia sonchifolia</i> (L.) DC.	lilac pua-lele	X
	<i>Erechtites hieracifolia</i> (L.) Raf.	fireweed	X
	<i>Eriogon bougainvillae</i> L.	hairy horseweed, ilioha	X
	<i>Montanoa hibiscifolia</i> (Benth.) C. Koch	montanoa	X
	<i>Sonchus oleraceus</i> L.	sow thistle, pua-lele	X
	<i>Vernonia cinerea</i> (L.) Less.	ironweed	X
	<i>Wedelia trilobata</i> (L.) Hitchc.	wedelia	X
	Convolvulaceae		
	<i>Ipomoea congesta</i> R. Br.	koali-awahia	X
	Crassulaceae		
	<i>Kalanchoe pinnata</i> (Lam.) Pers.	air plant, 'oliwa-ku-kahakai	X
	Cucurbitaceae		
	<i>Momordica charantia</i> var. <i>pavel</i> Grants	balsam apple	X
	Ericaceae		
	<i>Styphelia tameiameia</i> (Cham.) P. Muell.	pukiawe	X
	Euphorbiaceae		
	<i>Aleurites moluccana</i> (L.) Willd.	kukui, tutui	X
	<i>Bryonia disticha</i> Forst.	snow bush, lau-kalakoa	X
	<i>Euphorbia glomerifera</i> (Millsp.) L.C. Wheeler	garden spurge	X
	<i>Euphorbia hirta</i> L.	pyralic nut, kuku'ihl	X
	<i>Jatropha curcas</i> L.	Ceara' rubber	X
	<i>Manihot glaberrima</i> Muell.-Arg.	Phyllanthus weed	X
	<i>Phyllanthus debilis</i> Klain ex Willd.	castor bean, koki	X
	<i>Ricinus communis</i> L.		X
	Coccolicaceae		
	<i>Scaevola gaudichaudiana</i> Cham.	naupaka-kuahivi	X
	Lauraceae		
	<i>Persea americana</i> Mill	avocado	X
	Leguminosae		
	<i>Acacia confusa</i> Merr.	Formosan koa	X
	<i>Acacia koa</i> Gray	koa	X
	<i>Albisia falcataria</i> (L.) Fosb.	albisia	X
	<i>Albisia</i> sp.		X
	<i>Cassipouira bonduc</i> (L.) Roxb.	yellow nickera, kakalaioa	X
	<i>Casuarina</i> sp.		X

Milliani-Manuka	Scientific Name	Common Name	Status
	<i>Leptocarpus scoparium</i> J.R. & G. Forst.	manuka	X
	<i>Metrosideros collina</i> sp. polymorpha (Gaud.) Rock	'ohi'a, 'ohi'a-lehua	X
	<i>Paidium cattianum</i> Sabine forma cattianum	strawberry guava, uniaui	X
	<i>Paidium cattianum</i> forma lucidum Deg.	yellow strawberry guava	X
	<i>Paidium guajava</i> L.	guava, huava	X
	<i>Syzygium cumai</i> (L.) Skeels.	Java plum, palama	X
	<i>Syzygium jambos</i> L.	rose apple, 'ohi'a-loke	X
	MUTAGINACEAE		
	<i>Bougainvillea glabra</i> Choisy	bougainvillea	X
	OMALIDACEAE		
	<i>Omalis corniculata</i> L.	yellow wood sorrel, 'ihi	I
	PASIFLORACEAE		
	<i>Pasiflora edulis</i> Sims. forma edulis	purple liliko'i	X
	<i>Pasiflora edulis</i> forma flavicarpa Deg.	yellow liliko'i	X
	<i>Pasiflora ligularis</i> Juss.	sweet granadilla, lili-wai	X
	<i>Pasiflora suberosa</i> L.	husua-hoole	X
	PROTEACEAE		
	<i>Crevillea robusta</i> A. Cunn.	silk oak, 'oka-kilika	X
	RUTACEAE		
	<i>Citrus aurantium</i> L.	sour orange	X
	<i>Citrus</i> sp.		X
	SANTALACEAE		
	<i>Santalum freycinetianum</i> Gaud.	sandalwood, 'ili-ahi	X
	SAPINDACEAE		
	<i>Dodonaea</i> sp.	'a'ali'i	X
	SOLANACEAE		
	<i>Solanum nigrum</i> L.	black nightshade, popolo	I?
	STROBILACEAE		
	<i>Waltheria indica</i> var. americana (L.) R. Br. ex Hoehna	hi'aloa, 'uhaloa	I
	TRICHELARACEAE		
	<i>Vibretoclea</i> sp.	'alia	X

Milliani-Manuka	Scientific Name	Common Name	Status
	<i>Cassia lechenaultiana</i> DC.	partridge pea, lanki	X
	<i>Crotalaria incana</i> L.	fussy rattlespod, kukae-hoki	X
	<i>Crotalaria pallida</i> Aiton	succrose rattlespod	X
	<i>Desmanthus virgatus</i> (L.) Willd.	virgate mimosa	X
	<i>Desmodium triflorum</i> (L.) DC.	3-flowered beggarweed	X
	<i>Desmodium uncinatum</i> (Jacq.) DC.	Spanish clover	X
	<i>Indigofera suffruticosa</i> Mill.	indigo, 'iniko	X
	<i>Leucaena leucocephala</i> (Lam.) de Wit & Walp.) Griseb.	koa-hoals	X
	<i>Mimosa pudica</i> var. <i>unijuga</i> (Duchass.)	sensitive plant, pus-hila-hila	X
	<i>Phaseolus lathyroides</i> L.	cow pea	X
	LOGANIACEAE		
	<i>Buddleja asiatica</i> Lour.	butterfly bush, dogtail, husio-'ilio	X
	MALVACEAE		
	<i>Hibiscus rosa-sinensis</i> L.	red hibiscus	X
	<i>Malvastrum coromandelianum</i> (L.) Gärcke	false mallow, haunoi	X
	<i>Sida spinosa</i> L.	prickly sida	X
	MELASTOMACEAE		
	<i>Cleistantha hirta</i> (L.) D. Don	Koster's curree	X
	MELIACEAE		
	<i>Melia azadirach</i> L.	pride of India, Chinaberry, 'inia toon	X
	<i>Toona</i> sp.		X
	MENISPERMACEAE		
	<i>Coccolus ferrandianus</i> Gaud.	Huhua, hua'ie	X
	MORACEAE		
	<i>Artocarpus heterophyllus</i> Lam.	jackfruit	X
	<i>Ficus elastica</i> Roxb. ex Hornem.	Indian rubber tree	X
	<i>Ficus microcarpa</i> L. f.	Chinese banyan	X
	<i>Ficus</i> sp. 1	banyan	X
	<i>Ficus</i> sp. 2	banyan	X
	MYRTACEAE		
	<i>Eucalyptus citriodora</i> Hook.	lemon-scented gum	X
	<i>Eucalyptus deglupta</i> Bl.	Bagra eucalyptus	X
	<i>Eucalyptus robusta</i> Sa.	swamp mahogany	X

<u>Millani-Mauka</u>	<u>Scientific name</u>	<u>Common name</u>	<u>Status</u>
	<u>URTIKACEAE</u>		
	<i>Apium tenuifolium</i> (Koenig) Thell. ex Hegl	apium	X
	<i>Centella asiatica</i> (L.) Urban	Asiatic pennywort, pohakula	X
	<u>VERBENACEAE</u>		
	<i>Lantana camara</i> L.	lantana, lakana	X
	<i>Stachytarpheta australis</i> Mold.	Cayenne vervain	X
	<i>Stachytarpheta urticifolia</i> (Hallb.) Sims		X

APPENDIX K

Archaeological Study.

William Barrera, Jr., Chiniago, Inc. July 15, 1985

CHINIAQO INC.
Archaeological Consulting

1040-B SMITH STREET • HONOLULU, HAWAII 96817 • TELEPHONE: (808) 521-2785

July 15, 1985

Mr. Mark Hestert
Heiber, Hestert, Van Horn and Kimura
2222 Kalanianaʻahele Avenue
Suite 1507
Honolulu, Hawaii 96815

Dear Mr. Hestert:

We have completed our literature search and archaeological reconnaissance survey of the area to be developed as the final phase of Mililani Town. Our fieldwork consisted of a brief pedestrian inspection of the area now planted in pineapple and somewhat more intensive pedestrian inspections of the two shallow gulches located on the property. No evidence of archaeological or historical remains was located during this fieldwork.

The literature search included inspection of Handy's The Hawaiian Planter (1940), McAllister's Archaeology of Oahu (1933), Sterling and Summers' Sites of Oahu (1978), old maps on file at the State of Hawaii Survey Office, site maps on file at the State Historic Preservation Office, and reports and publications in the Hawaiian collection of the University of Hawaii. The literature search revealed a legend referring to Waikakalea and Kipapa Gulches, quoted in McAllister's 1933 study Archaeology of Oahu:

"Site 132. Waikakalea and Kipapa Gulches. According to Forannder Waikakalea is the place where the invading chiefs from Hawaii met Ma-likukahi, mo'i of Oahu, in battle:

"The fight continued from there to Kipapa Gulch. The invaders were thoroughly defeated, and the gulch is said to have been literally paved with the corpses of the slain, and received its name 'Kipapa' from this circumstance. Punaluu was slain on the field which bears his name, the fugitives were pursued as far as Waimano, and the head of Hilo was cut off and carried in triumph to Honolulu, and stuck up at a place still called Poo-Hilo."

Also, McAllister recorded two sites in Kipapa Gulch:

"Site 130. Moaula heiau, on the Honolulu side of Kipapa Gulch just above Heiau o Uai, to which it is said to be a companion structure. The site is now covered with cane.

"Site 131. Heiau o Uai, was just northeast of the government road in the bottom of Kipapa Gulch on the slight elevation at the foot of the pali on the Honolulu side. The level elevation can still be seen, though planted in cane.


Handy's 1940 The Hawaiian Planter gives the following on page 82:

"It is said that terraces formerly existed on the flats in Kipapa Gulch for at least 2 miles upstream above its junction with Waikale. Wild taros grow in abundance in upper Kipapa Gulch."

In conclusion, if any structural remains of an archaeological or historical nature ever existed on the subject property, pineapple cultivation has long since erased any such evidence. There thus is no archaeological reason why the development of Mililani Town cannot proceed as planned.

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

Sincerely yours,


William Barrera, Jr.
President

APPENDIX L

**Mililani-Mauka Planning Program Newsletter.
Numbers 1-6.**

Mililani Town, Inc. October 1984-June 1985

MILLILANI - MAUKA Planning Program NEWSLETTER

October, 1981

Number 1



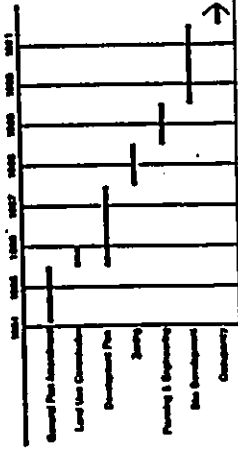
MILLILANI-MAUKA PLANNING PROCESS UNDERWAY. Efforts to develop a master plan for the Millilani-Mauka area began on Tuesday, September 29, with the first in a series of meetings. Millilani Town personnel and their consultants met with an Advisory Committee comprised of representatives from 27 community organizations. The committee will act as a sounding board for the planning process. Meetings held once a month will provide an opportunity for consultants to present information and plan formulations, answer questions, and receive comments and suggestions from the committee.

A newsletter will be produced after each meeting to record the highlights of that session and report other pertinent information about planning activities. Committee members will be mailed a copy of the newsletter; additional copies are available from Millilani Town, Inc.

TO START OFF, WALLY HIRAIWA, MILLILANI TOWN'S PRESIDENT, WELCOMED COMMITTEE MEMBERS, and explained that their mission is to provide important community input so that new development is harmonious with the existing planned community and perpetuates a desirable quality of life. Wally explained that the 130-acre site south of the M-2 Freeway has been part of the Millilani Town concept since the first master plan was developed in the early 1960's, although there are no detailed plans for the area. The present planning program, therefore, seeks to identify appropriate development objectives and effective land use relationships to achieve them.

Seven years is the estimated lead time before ground can be broken in the Millilani-Mauka area. The existing community will reach the end of its construction program in several years so to keep a continuous inventory of homes on the market, it's important to begin planning now. This is just the start of a protracted process, but like any successful journey, gearing up appropriately is the first critical step.

ESTIMATED DEVELOPMENT TIMELINE

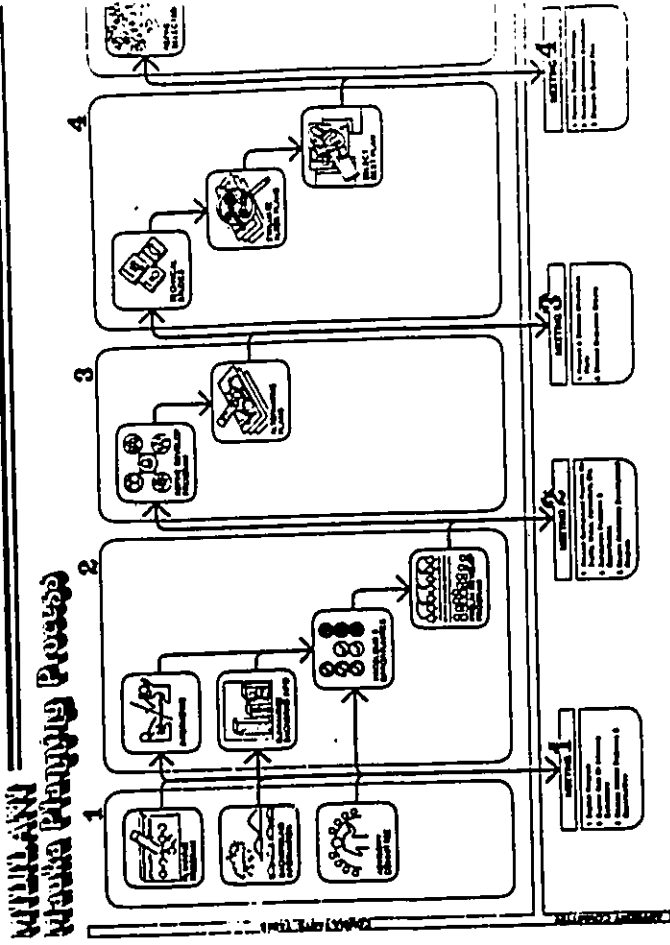


CONSULTANTS AROUND THE MILLILANI-MAUKA PLANNING PROGRAM.

Ty Kusano, a planning consultant, will moderate the monthly meetings. Ty developed the application to amend the Oahu General Plan.

Wack Mastert and Glenn Mauna of the planning firm Mastert, Mastert, Van Horn & Mauna (Mauna), will be working on the actual master plan. Participation is the key to the planning process. Wack pointed out at Tuesday's meeting. He also noted that this emphasis is something new for Millilani planning, and one that everyone is enthusiastic about.

Other consultants, such as engineers and technical specialists, will be hired as necessary.

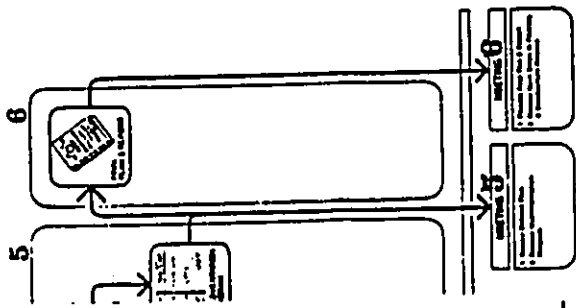


COMMITTEE MEMBERS REPRESENT THE DIVERSITY OF MILLILANI INTERESTS.

American Legion Post #14 Thomas Traylor	Millilani Garden Club Doris Farrell	Millilani Tennis Club Michael Fietze
American Youth Soccer Assn. Joanna Traylor	Millilani Golden Years Club Mark Sob	Millilani Town Association Paul Yeters
Can. Oahu Youth Baseball League Charlotte Heitke	Millilani Boy Scouts Shane Kinsler	Millilani/Neighbors/Neighbors Neighborhood Board No. 25 Jerry Heitke
Christ Lutheran Church of Millilani Joan Sullivan	Millilani Jade Academy Charlotte Hill	Millilani-Maui Recreation Advisory Council Jill Lohry
Church of Jesus Christ of Latter Day Saints Lorraine Kikawa	Millilani Lions Club Berold Eln	Protestant Church of the Pacific Jerry Acosta
Elmhurst American Veterans Fred Bell, Jr.	Millilani Orchid Club Allan Jensen	Pop Warner Football Betsy Kikawaya
Leeward Training Club Yana Chada	Millilani Presbyterian Church Mark Chada	St. John Apostle & Evangelist Catholic Church Terry Taylor
Millilani Baptist Church Mr. G. W. Kirk	Millilani Shopping Center Merchants' Association Richard Ingersoll Audrey Shab (Lit.)	Tabernacle of Malicious Church Sharon Collins
Millilani 4-4 Club Ann Salte		Malama-Malama Rotary Club William Farrell



GRAPHIC CHARTS PLANNING PROCESS. The flow chart used to illustrate the planning process is reproduced on the following page. Each module represents work to be completed in a month. Consultant's tasks are identified in the top portion of the chart. The advisory committee's involvement will center around the meetings. Between meetings, however, committee members are encouraged to keep their organizations apprised of their activities so that questions and concerns can be reported at subsequent meetings. Advisory committee members are encouraged to make arrangements for presentations about the planning process and its progress to date.



RECAP OF QUESTIONS AND ANSWERS ...

- How many units will be built in the Mililani-Mauka area?
The General Plan application indicates 6,600 units. At present, there are 6,800 units in Mililani with an approximate ratio of 40 percent multi-family residences to 60 percent detached single family houses.
- Is the area appropriately zoned?
No, the 1,250 acres is in a State Agriculture District which requires reclassification to the Urban District. Similarly, the land is designated for agricultural use on the Central Oahu Development Plan so that reclassification will be needed to conform to the land use configuration proposed in the master plan.
- Are we going to have enough water?
Plans for future development in the area will call for a slight shift in water allocation from agricultural to urban uses. This subject will be studied further as part of the planning process and as part of ongoing islandwide forums.

- What will be the price of homes 7 years from now; what market is being targeted?
Prices in Mililani Town have been directed toward several markets, and this pattern will continue in the future. Residences are designed for first time buyers, as well as those seeking executive homes. In the past, Mililani Town has also made at least 10 percent of the units affordable to moderate-income households.
- Is there anyway of speeding up the approval process to avoid future price increases?
Timetables for permit approvals are specified in the rules and regulations that govern public agencies. Besides these timetables, which are mandated by law and therefore relatively inflexible, it is Mililani Town's objective to conduct a thorough planning program early in the process to resolve significant problems.
- Original proposals have changed over time, for example, Mililani Marketplace and schools. Can this be avoided?
Building plans have changed in response to altered circumstances. While plans should provide guidelines for future action, implementation of these plans must consider existing conditions. Furthermore, implementation may be partly the responsibility of entities with their own set of planning criteria, such as the Department of Education in the case of schools.

QUESTIONS CONCERNING PROBLEMS AND OPPORTUNITIES IN MILILANI were distributed to the committee members. Completed questionnaires were collected at the end of the meeting, but if you found yourself saying "Gee, I wish I had written about," pass those comments to Mark Rafter at (Ph.) 921-9579. All information provided will be kept anonymous, but a summary will be presented at the next meeting of the Advisory Committee on October 23.

ALSO ON THE AGENDA FOR TUESDAY, OCTOBER 23, are the following items:

- Review of the General Plan/Development Plan amendment processes
- Report on housing needs
- Report on traffic
- Report on agricultural lands
- Review of the preliminary development program

A REMINDER ABOUT FUTURE MEETINGS.

Meeting	Date
1	September 25
2	October 23
3	November 13
4	December 11
5	January 15
6	Open

All meetings will be held on Tuesdays, starting at 7:30 P.M., at the Mililani Sales Office, unless notified otherwise.

MILILANI - MAUKA Planning Program

Mililani Town Inc
130 Merchant Street
P O Box 2780
Honolulu Hawaii 96803



MILLILANI - MAUKA Planning Program



November, 1981

Number 2

NEWSLETTER



MILLILANI TOWN'S APPLICATION TO AHEAD OAHU'S GENERAL PLAN, the first step in urbanizing the 1250-acre mauka area, is under review according to planning consultant Ty Kuno. Staff review by the City Department of General Planning is expected to be completed by February 1982, at which time their recommendations will be sent to the Planning Commission. The application traces the history of the entire 3500-acre Millilani Town development, requests certain amendments to the General Plan, and examines the application's conformance with both the General Plan and the Hawaii State Plan. It calls for reevaluation of the General Plan in three policy areas:

- Central Oahu's proportion of the year 2000 island-wide population;
- clarification of the urban-fringe policy; and
- amendment of the Year 2000 Urbanized Areas map.



15,300 HOUSING UNITS ARE NEEDED IN CENTRAL OAHU BY YEAR 2000, concluded a housing study by Ty Kuno. This figure is approximately 19 percent of the housing demand for the entire island, which is expected to be 80,486 units or 8,100 units per year. These projections were based on Oahu's anticipated population in 2000, average household size, the need to replace dilapidated units, and vacancy allowance. The 15-year projection compares with 77,100 units constructed during the 10-year boom period from 1970 to 1980. On the supply side of the projections, housing developments now in the planning pipeline, including Millilani-mauka, add up to 14,900 units.



YEAR AFTER YEAR, MILLILANI PURCHASERS REMAIN FAIRLY CONSISTENT, according to a Millilani Sales and Marketing Report that tracked home buying patterns over the last 16 years. Compiled by realtor Bill Barrett, the statistics show consistency in two areas: what buyers are looking for in the housing market and the profile of buyers themselves. Since 1973, the demand for detached single-family homes at Millilani has outpaced supply, except during brief periods of high interest rates. Because of this strong preference, Millilani Town has discontinued multi-family units and replaced them with smaller homes on smaller lots--at prices comparable to multi-family units. Based on enthusiastic responses, they are expected to become a major housing product in Millilani's inventory. Starting in 1981, Millilani Town has also started to offer a limited number of executive homes.

Buyer Profile. Surprisingly few changes have been recorded in the characteristics of single-family home purchasers as a whole since the Sales Office began collecting information in 1971. The average age of buyers (husbands and wives) is in the mid-30s, seventy percent have children, an average of 1.6 per family. Occupational data (gathered for husbands only) show that the largest proportion are engaged in services (33) followed by the professions (18), although the latter category is increasing. Working wives make up 86 percent of the total. Emerging trends in house design include adaptation to single-parent families (equal-sized bedrooms with bath) and end executive homes for the increasing number of professional people in this housing market.

Buyers gave as reasons for buying in Millilani: planned/see simple community (38), price/quality (23), and location/neighborhood (20). Similar reasons were given in a separate survey conducted earlier this year comparing Millilani with competitive developments in Central Oahu in which satisfaction was found among 80 percent of Millilani home purchasers.



FUNDAMENTAL CHANGES IN CENTRAL OAHU'S AGRICULTURE are due to several factors according to agriculturalist Bill Barrett in the case of pineapples. Cultivation has been affected by a change in production practices, from canned to fresh fruit and the 8-2 freeway with higher rainfall. For example, pineapple fields mauka of the 8-2 freeway with higher rainfall are considered "prime" as land as long as the fruit was canned, but this designation is not suitable today. The lower, drier fields have naturally richer soils and receive more sunlight--two important ingredients for maximizing fresh fruit tonnage. Water is another and while it is true that water must be supplied through irrigation in these fields, this allows better control of its application and more control of the growing cycle to enable year-round harvesting. Drip irrigation also allows application of the pesticide Yelone II, which has replaced DDB. Control of nematodes, a pineapple infester, requires a field preparation process known as clean fallow which works best with drip fields. The fields Castle & Cooke now classifies as most ecologically suitable and economically productive are located south of Waialua around the extensive and Waialua ditches, and in the flat lands near Waipio. In addition, efforts are being made to swap fields with the economically troubled sugar cane, or plant quiet crops of pineapple between cycles of sugar cane.



WATER UPDATE. Wally Miyahira explained that Millilani Town is supplied by a self-contained water system; it has an interconnection with Waipio or Waialua. The developer has installed the basic water system for the entire 3,500 acres, including 8 wells, each with a 2 million gallons-per-day (mgd) pumping capacity (5 are operational), 2 reservoirs, and transmission lines. Currently, consumption by all Millilani users averages 3 mgd.

Water Constraints. Millilani's system is part of the Pearl Harbor Groundwater Control Area which has a cap on withdrawal of 275 mgd to avoid depletion of the aquifer. Millilani's share is 3.45 mgd. Given current consumption levels, it is clear that development cannot occur without an increase in well allocation. What are the chances for such an increase? The outlook seems optimistic because sugar operations are retrenching and, theoretically, would free water for domestic use.

Future Sources. The State has funded drilling of an exploratory well above the Millilani-mauka boundary line. Although testing is not completed, the water appears to be of good quality. Interconnection with the Waialua system is also under consideration.



Purification efforts continue. Millilani Town, Inc. is committed to building an activated carbon filtration plant near the 4 wells just south of the freeway. The plant's capacity will be 6 mgd and will service the entire area south of the freeway. Sids to acquire special equipment are under study now. Sids requests for construction are expected to go out in December and the plant should be operating by the summer of 1983. After the plant has been built, the developer will dedicate the facility to the City for operation and maintenance.

Wastewater flows. A secondary treatment system has been installed at the Millilani sewage treatment plant. The effluent is disposed of through a diversion line which runs through cane fields to the Waipahu system and out the Moanalua offshore outfall. Although the treated effluent was originally intended for sugar cane irrigation use, this part of the system has not been implemented because of difficulties encountered in the drip irrigation lines.



THE MILLILANI INTERCHANGE WILL BE A KEY TRANSPORT ELEMENT OF FUTURE DEVELOPMENT, reported traffic engineer Julian W. Existing levels of service for the unsignaled intersection between Moheula and the M-2 off ramp are already operating over capacity during the afternoon peak period, in part because of motorists diverting from congested downtown traffic on Kaa Highway. Full development of the Millilani-maui area (6,498 dwelling units maximum) is projected to generate 41,208 trips daily to/from or across the M-2 freeway. Based on existing travel patterns, peak hour traffic demands would exceed the capacity of the M-2 ramps. Roadway capacities at the Millilani interchange would be reached with partial development of the area (4,208 dwelling units). The engineer's preliminary design of improvements to reduce congestion includes: widening ramps on the Moheula side to two lanes; signaling both intersections with Moheula Parkway; restriping the existing bridge to allow double left turns to the Moheula-bound ramp; and widening Moheula to accommodate through traffic from the maui development. A park-and-ride station, or other ride-sharing or transit facility was also suggested for the maui area.

ADVISORY COMMITTEE MEMBERS EXPRESSED THEIR VIEWS about Millilani's assets, problems, and opportunities in questionnaires filled out at the first meeting. Some members also spoke with planners in telephone interviews. The survey findings (based on 21 completed questionnaires) were reviewed by Glenn Kinera and are summarized in the table below. Respondents' comments were used to formulate the preliminary development program.

MILLILANI-MAUI ADVISORY COMMITTEE SURVEY
Summary Table

Community Assets	No.	Improvements Suggested	No.	Comments/Issues	Ms.
No. of transp. modes (intermodal interchange)	3	Bus service Bike paths Pedestrian paths	5 2 6		
Better access of goods (shopping centers)	6	Day school Additional elem. school Intermediate school	2 2 2	College campus	4
Recreational facilities	13	Larger retail outlets Family restaurant Better path maintenance Outdoor lighting	2 4 4 2	Regional retail center	4
Library	4	Pollie Post office	2 4		
Physical services	13	Clean water/adeq. supply Nursery Job services Landscaping materials Misc. of other sites	11 3 3 4 4	High-tech park	3

PRELIMINARY DEVELOPMENT PROGRAM. Mark Eastert prefaced his review of the preliminary development program by explaining that, at this stage, the program is a list of all the things that can go into the maui area. "In effect, we're looking at a large area with nothing in it." As planning progresses, the planners and the developer, with input from the members of the Advisory Committee, will look into how the pieces fit together. Planning is a process that involves reiteration. As more information is added, and as alternative layouts of the community are considered, the planners can find successively better ways of achieving the desired results.

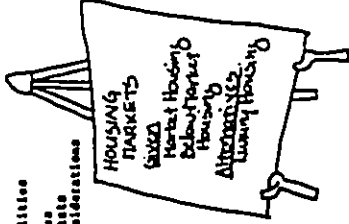
Workbooks were used to list different elements within the planning components. The elements were divided into two categories:

- (1) Given -- necessary items that have to go somewhere but whose locations are still indeterminate;
- (2) Alternatives -- optional items that may be included in the final plan or may be found inappropriate.

Several items overlooked by planners were suggested by committee members for inclusion in the preliminary development program: establishment of a mass transit terminal in Millilani, landscaped, community gardens, public phone, areas designated for retirement living, and consideration of aircraft noise. The development program will continue to be refined and Advisory Committee members will have opportunities to offer specific comments at later meetings.

PLANNING COMPONENTS

- Transportation
- Schools
- Shopping
- Public facilities
- Public services
- Brilliant
- Recreation
- Recreation types
- Recreation facilities
- Recreation programs
- Recreation services
- Recreation equipment



MARKETING OF MEETING 22, Wally Miyahira asked Advisory Committee members to gather information about children needing day care services because of the large number of two-earner families and the growing number of single-parent families. He also requested that recreational organizations look into requirements for field space and problems with scheduling.

AT THE NEXT MEETING ON NOVEMBER 13, a series of alternative plans will be presented and criteria for their evaluation will be discussed.

MILLILANI - MAUI Planning Program

Millilani Town Inc
130 Merchant Street
P O Box 2780
Honolulu Hawaii 96803



MILILANI - MAUKA Planning Program NEWSLETTER

November 1984

Number 3



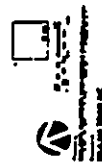
THE THIRD MEETING OF THE MILILANI-MAUKA ADVISORY COMMITTEE WAS HELD ON NOVEMBER 13 AND FOCUSED ON THE ALTERNATIVE PLANS.

SITE ANALYSIS REVEALS PHYSICAL CHARACTERISTICS OF MAUKA AREA. Glenn Kiewra and Mark Mastert conducted a first hand examination of the site so that its natural features are used to best advantage in the plan. Glenn reported that the site has distinct edges. The mauka boundary is marked by the K-2 Freeway and the mauka boundary abuts the forest reserve, a distance of about two linear miles. The Waikahalou Gulch and the Pipapa Gulch form the Mokuauia and Diamond Head boundaries, respectively.

NO MAJOR ENVIRONMENTAL CONSTRAINTS TO SITE DEVELOPMENT WERE FOUND BY THE PLANNERS. The land form is uniformly sloping toward the mauka boundary, most of it in the 8-15 degree range, with a few areas sloping as much as 15%. Some areas of the gulches are not suitable for residential use; however, they add interest to the site by breaking up the land mass and have the potential for other creative uses. Exceptional views of dense vegetation and mature trees are offered from the edges of the gulches. Panoramic vistas of the Maianai range and the ocean are viewed from the mauka slopes. Higher elevations also correspond to rainfall levels up to 70 inches yearly. Power lines that traverse the site, crossing the Koolau might have to be relocated or installed underground. Air Installation Compatible Use Zones (AICUZ) are designated by the military for areas impacted by aircraft overflights. The AICUZ for Wheeler AFB skirts the Mokuauia boundary of the mauka area. There is also some noise constraint adjacent to the K-2 Freeway.

MILILANI - MAUKA Planning Program

Site Analysis



FIVE ALTERNATIVE PLANS were developed from the list of planning elements that was presented at Meeting #2, and expanded by Committee Members. After further refinement and consideration of relevant site features, the list was translated into conceptual plans.

Each plan centers around a different theme for the project area, representing five different types of communities. Compatible uses from the preliminary planning program have been grouped to see how they may relate to each other functionally and spatially.

In this first attempt, uses were shown as colored blocks on the planning maps. Major uses were emphasized to establish the identity of the area and do not reflect projected space consumption. In-depth feasibility analyses are needed to determine actual use requirements.

The alternative plans were not meant to be accepted or rejected in their entirety. Rather, the planners felt that it would be useful for committee members to see different land use combinations in a physical context. By selecting those that meet the community's interests and needs, it will be possible to get the best possible mix of uses.

QUESTIONNAIRES GAUGE COMMITTEE'S LIKES AND DISLIKES. As the alternative plans were reviewed, committee members were asked to react to individual planning elements on questionnaires forms. By collectively indicating what facilities are of interest to the community, the planners will have some idea of what directions to pursue. Survey findings will be discussed at the next meeting.

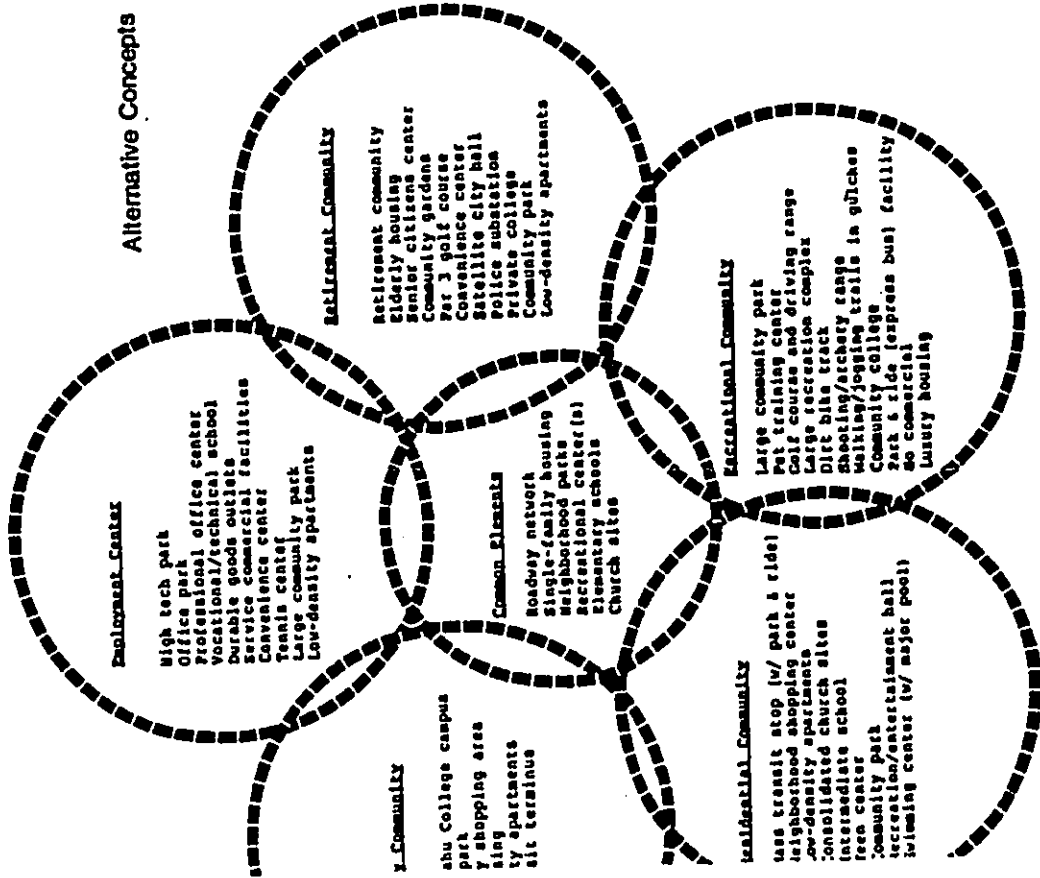
EVALUATION CRITERIA. Feedback through the questionnaires is one indicator of community interest, the first of three stages in the evaluation process. Additional studies will identify market areas and project economic performance.

Community Interest	What uses or facilities are of interest to the community? What uses are compatible with the existing community?
Market Demand	Will there be a market demand for the use or facility? What are the targeted market areas for the various uses and facilities (e.g., mauka area only, Mililani Town as a whole, the Central Oahu region)?
Economic Feasibility	In the use or facility economically feasible? What are the costs of installation, as well as long-term operation and management? How will the facility be financed (e.g., user fees, prorated into unit selling price, public cost-sharing)?

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Alternative Concepts



Comments

Question: Isn't this presentation premature?

Response: The planners wanted the committee members to see the alternatives in their rough form, instead of showing them a de facto plan and simply ask their approval. The committee members are going through the process at the same speed as the planners.

Comment: For years the Millitant neighborhood has been neglected. The interest of Millitant is not in locating a campus in the area--with no success.

Comment: A lot of things seem to be out of the planners' control, such as allocation of a police substation or siting of a 60 campus.

Response: We'll just have to try again. It would be better to have such community support were available before talking to relevant agencies and organizations. And this time, new facilities would be proposed as part of a comprehensive master plan for the area.

Comment: We seem to want more things than can be accommodated in the space available.

Members Present:

- Fred Bell, Jr., Disabled American Veterans
- Bill Bell, Millitant Presbyterian Church
- Steve Collins, Tabernacle of Solitude Church
- Rev. G. W. Eber, Millitant Baptist Church
- Michael Flores, Millitant Tennis Club
- John Gilliland, Christ Lutheran Church
- David Hill, Millitant membership
- Steve Jones, Church of Latter-Day Saints
- Jerry McGuire, Postscript Church of the Pacific
- Mark Smith, Millitant Garden Tours Club
- Leslie Lee, Millitant Orchid Club
- Sue Lee, Millitant Mill Community Center
- Charlotte Moore, Millitant John Club
- Clarence Moore, Millitant John Club
- Rev. Brian O'Connell, Mill. Missionary Church

- Paul Peters, Millitant Youth Association
- Slick Polster, Millitant Millitant No. 23
- Debra Williams, Millitant Millitant No. 23
- Thomas Tinsley, American Youth Soccer Association
- Dean Alton, City Council

- Members Absent:
- Walter Anderson, Pop Warner Football
- Wally Condon, Leonard Training Club of Hawaii
- Boris Ferrari, Millitant Garden Club
- William Farrell, Millitant-Hawaii Rotary Club
- Terry Kelly, St. John Sports Club
- John Kelly, Millitant Millitant No. 23
- Jerry Smith, Millitant S.C. Michigans' Assoc.

THE AGENDA FOR THE NEXT MEETING ON TUESDAY, DECEMBER 11, INCLUDES THE FOLLOWING ITEMS:

- Review of technical findings
- Summary of committee members' responses to the Alternative Plans Questionnaire
- Review of alternative plan evaluation
- Presentation of conceptual plan

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Planning Program

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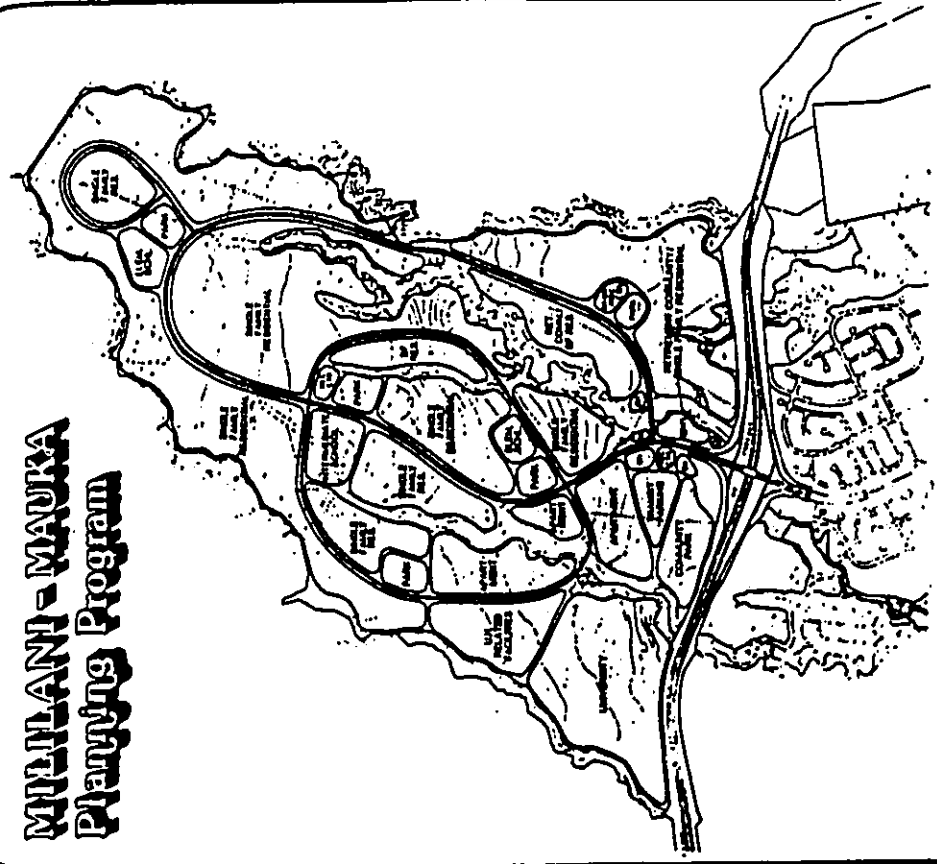


MILILANI - MAUKA Planning Program NEWSLETTER

December 1984

Number 4

MILILANI - MAUKA Planning Program



RECOMMENDED PLAN



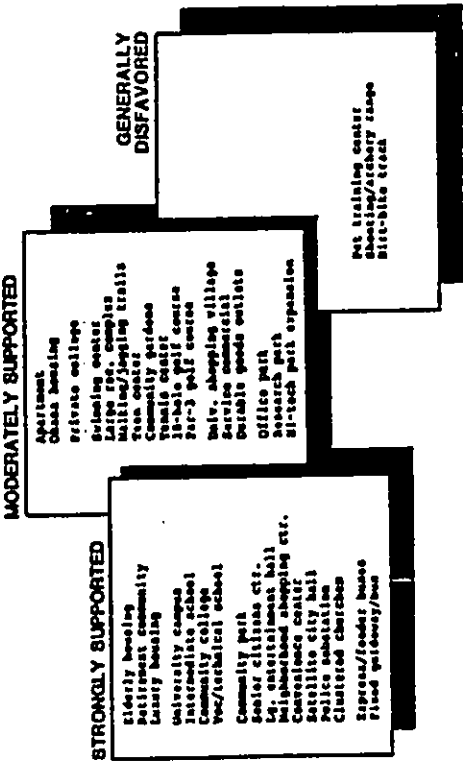
The fourth meeting of the Mililani-Maui Planning Advisory Committee was held on December 11 and focused on the first draft of the recommended plan.

DGP STUDYING ALTERNATIVE REGIONAL GROWTH POLICIES. Bill Bartlett, Policy Planning Branch Chief of the Dept. of General Planning (DGP), reviewed the status of a request to amend the General Plan (GP) initiated by Mililani Town, Inc. and other major developers in Central Oahu. He explained that the City Council eventually will act on policy issues rather than the specifics of any single project. DGP's policy package will involve tradeoffs between major future growth in Ewa and further extensive growth in Central Oahu. Staff members are also looking into the implications of the latest population forecasts from DPED which adjust the year 2000 projection upward.

Public agencies and citizen groups have submitted comments about the potential impacts of the alternative policies. A report containing DGP's analysis and recommendations will be transmitted to the Planning Commission (PC) by February 1, 1985. The PC then has 30 days to hold a public hearing, and is required to send its recommendations to the City Council within 30 days following the close of the public hearing; however, the hearing itself may be open for an indefinite period with one or more meetings convened.

QUESTIONNAIRES COMPLETED BY 20 ADVISORY COMMITTEE MEMBERS at the November meeting were reviewed by Mark Watter. The questionnaire related to the five thematic planning concepts presented at that meeting. Although the survey was not based on a scientific sample, the advisory group represents all major types of community groups in Mililani.

The breakdown of planning items below was derived by weighting the survey scores. (For some items, different interpretations could have resulted by using other methodologies.)



MILILANI-MAUKA RECOMMENDED PLAN (FIRST DRAFT)

The "recommended plan" is a first attempt to put desirable elements onto a single plan. Because public decisions are being made at the policy level first, there is still ample time to modify the plan.

Roadway System. Two loops form the main thoroughfares; the major one would be designed to accommodate bus service.

Transit Parking. A 6-acre area (for approximately 100 cars) is provided for express-bus riders initially, with the potential for future development of a transit station.

Commercial. Five acres are provided for convenience shopping (comparable to Mililani Marketplace). Located just off the freeway, it would be convenient for commuters.

Church Sites. Five individual church sites are provided near the interchange. These sites have good accessibility and visibility, and are set away from major residential areas. Locations adjacent to commercial facilities allow for shared parking.

Recreation Centers. The recreation center closest to the freeway could be developed as a large entertainment hall-type facility. It is sited near the transit parking area for shared parking. Two other recreation centers are provided, one possibly as a senior center.

Community Park. This facility is located near the freeway because of its higher tolerance to potential noise impacts. The drier climate of the lower elevations will permit greater usage.

University. Approximately 75 acres have been allocated for a university campus. Because this site is somewhat separated by a gulch, it can be developed as the site occurs without leaving a large vacant parcel in the middle of the campus. The maximum space allowance thought to be required for a university has been provided. However, the site may also be appropriate for other institutions of higher education (community college, private college, vocational/technical school) and/or a private school.

A possible roadway connection with the proposed Oceanic High-Tech Park (through Waikahaia Gulch) is being explored.

University-Related Facilities. An adjacent area is planned for uses adjacent to the campus, although they may not be developed by university authorities directly.

Apartment. The low-density apartments in this area would likely have ties with the university campus.

Retirement/SE Residences. This fairly large section (approximately 130 acres) is another well-defined area. Detailed market characteristics of a retirement community are still unknown; however, areas not developed specifically for retirement housing are expected to be used for single-family residences.

Schools. Sites for 2 elementary schools and 1 intermediate school are provided. The intermediate school is sited fairly high up so the reserved parcel can be held open until DOE is ready to build or determines that it is not needed.

Neighborhood Parks. Five neighborhood parks are scattered throughout the community. In most cases they are located adjacent to a school or rec. center.

Single-Family Residences. Most of the remaining mauka area would be used for single-family home sites. This may include cluster-type dwellings, but houses exceeding two stories are not envisioned.

Some uses, such as professional offices and a satellite City Hall, were felt to be more appropriate in the planned Mililani Town Center and were not included on the plan for Mililani-Mauka.



KA MUPEPA WILL RUN A PLANNING QUESTIONNAIRE FOR THE MILILANI COMMUNITY AT LARGE. Similar to the one for committed members, respondents are asked to indicate whether they like, "don't like," or "don't care" about the alternative elements. In addition, they are asked to circle the five elements they feel are most important. This will give the planners better indication of fruitful directions for the planning process. Committee members are requested to inform members in their respective groups about the questionnaire in ka mupepa and to encourage them to respond.

If you would like the planners to talk to your organization, or if you know of other interested Mililani groups, please contact Mark or Glenn at 922-9763.

EXCERPTS OF DISCUSSIONS DURING PLAN PRESENTATION

Intermediate Schools: Some parents object to busing their children to Wheeler Intermediate School and will send their children to a private school instead... A Neighborhood Home Survey found a lot of support for Wheeler's safety and high-quality education cited.

Recreation Centers: Rec. centers seem to be serving larger numbers of households... Rather than duplicating the same facilities (e.g., small pools) in decentralized locations, larger, specialized centers may be better... Combined facilities might also reduce personnel requirements... Will MTA manage the rec. centers? Yes, if they're similar to existing ones; specialized facilities may require different mtg. practices, such as user charges.

Apartments: Apartment area seems large compared to the amount of support received in the survey... the proposed area is related to the university; a higher density would also enable a lower unit cost... Will the apartments be rentals or sold as condominiums? Probably a mix... Good views shouldn't be diminished by tall, poorly designed structures.

Members Present:

- Fred Bell, Jr., Blended American Veterans
- Bar. O. M. Eide, Mililani Baptist Church
- Denis Farrell, Mililani Garden Club
- William Fetter, Westside-Waiolua Bakery Club
- Michael Fetter, Mililani Tennis Club
- Joe Hillman, Club Interiors
- Harold Hise, Mililani Greek Club
- Donna Kimm, Mililani Neighbors
- Jerry McCallie, Pentecostal Church
- Sue Lee, Mililani Neighborhood Bd. No. 33
- Carlette Metzer, C. Old West Assembly Church
- Bar. Wayne, Mililani Town Association
- Dick Pfeiffer, Mililani Neighborhood Bd. No. 35
- Donna Tomlinson, American Youth Soccer Assoc.
- Thomas Tinsley, American Legion Post 155

Members Absent:

- Nancy Alencastro, Pop Warner Football
- Sharon Collins, Transcendental Church
- Terry Kelly, St. John Apostolic Catholic Church
- Estera Kallioniemi, Church of Latter-Day Saints
- Mark Kelly, Mililani Golden Years Club
- Loanne Lee, Mililani Otchika Club
- John Linn, Mililani Baptist Church
- Debra Walsh, Mililani-Waipio Rec. Adv. Council
- Andrey Simas, Mililani S.C. Merchants' Assoc.

Visitors:

- Donn Alton, City Council Staff
- Bill Bartlett, Dept. of General Planning

THE NEXT MEETING WILL BE HELD ON JANUARY 15, 1985, and will feature a review of the refined plan and a discussion of the future program.

MILILANI-MAUKA Planning Program

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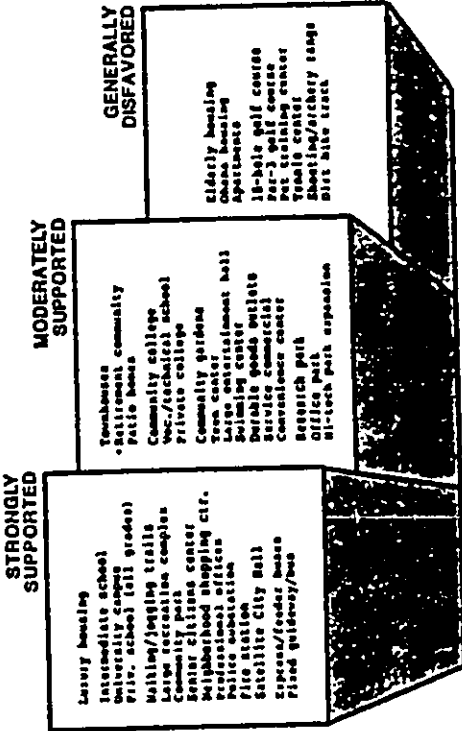
MILILANI - MAUKA Planning Program NEWSLETTER

January 1985

Number 5

The fifth meeting of the Mililani-Mauka Planning Advisory Committee was held on January 15 and focused on the results of a recent newspaper survey and a review of the refined land use plan.

61 COMPLETED QUESTIONNAIRE FORMS WERE RECEIVED, in response to a survey in the December 1984 issue of *Ia Nuipepa*. With the exception of a few items, this questionnaire duplicated an earlier one completed by members of the Advisory Committee. The newspaper survey revealed the relative preferences of respondents who constitute a subgroup of the Mililani community. It also provided another "snapshot" of community opinion which could be compared with the results of the first questionnaire reported in Newsletter No. 41. The two sets of responses were found compatible. Another significant factor was the close match between write-in suggestions on the questionnaire forms and the problems and opportunities that had been raised previously by Committee members.



NO SIGNIFICANT CHANGES IN 2ND VERSION OF LAND USE PLAN. Like the initial plan, major and minor circulation loops make up the primary transportation routes and single-family residences are the predominant land use. There is still potential for a retirement community although the level of demand for this type of housing has not been ascertained. Land use requirements have been more clearly defined for some of the proposed uses.

Category	Acres	Units
University	75	6800
University-related activities	25	
Commercial	5	
Transit/parking	5-6	
Community park with playing fields	15	

The plan is at a preliminary stage, and will continue to see changes as more information is obtained.

SPACE REQUIREMENTS FOR LITTLE KIDS, BIG KIDS, AND ADULTS.

Day Care. Day care centers are on the list of planning items that definitely will be included in the mauka development. Space for day care has not been allocated because of space-related concerns. This service would be provided by churches, and the possibility that MRA may expand its services. Appropriate locations and acreage for facilities and providing day care services continue to be investigated.

Playing fields. Representatives of athletic organizations informed the Advisory Committee that competition is not limited to the playing fields, but is characteristic of sports scheduling--a process complicated by the "neighborhood parks" designations which allow passive recreational use only and limit organized sports activities. The 15-acre community park is planned to address a large demand, however, the extent of the problem raises questions about the adequacy of park planning standards.

Walking/jogging trails. The proposal that trails be developed in the gulches remains an attractive alternative with substantial community support, but the concept must still be tested against economic and security concerns. Although a considerable amount of open space would remain intact, it is unlikely that the gulches would meet the City's park dedication requirements.

PLANNING ACTIVITIES HAVE PROCEEDED STEADILY OVER 5 MONTHS, and the outcome is a conceptual land use plan developed with the involvement of the Advisory Committee. Although the plan has been published in this newsletter, it has received limited public exposure to date. Beginning with a presentation at the Mililani Neighborhood Road meeting in March, broad-based community input will be sought. The original schedule of six meetings with the Advisory Committee has been extended with a meeting planned for March. Although this ad hoc committee was to disband at the end of the current planning phase, Maly Miyahira has requested that it remain together through the public planning and review process. New information brought up during the hearing process may require the Committee's assistance in evaluating plan revisions.

Members Present:

Fred Bell, Jr., Mililani American Veterans Club
 James Bell, Mililani Tennis Club
 James Malinowski, Christ Lutheran Church
 Terry Kelly, St. John Apostolic Catholic Church
 Harold Gray, Mililani Lions Club
 Shere Nishimi, Mililani Neighbors
 Keith Sale, Church of Latter-day Saints
 Keith Sale, Mililani Tennis Club
 Keith Sale, Mililani Tennis Club
 Keith Sale, Mililani Neighbors
 Charlotte Maki, C. O. Youth Association
 Paul Pater, Mililani Tennis Association
 Dick Pelletier, Mililani Tennis Association
 Bruce Smith, Mililani Neighbors Council

Thomas Truitt, American Youth Soccer Assoc.
 Thomas Truitt, American Legion Post 151
 Tom Whiting, Leonard Training Club of Hawaii

Members Absent:

Henry Kikoyan, Pop Warner Football Club
 Gary Chuang, Mililani Presbyterian Church
 Sharon Collins, Tabernacle of Holiness Church
 Rev. D. W. Field, Mililani Baptist Church
 Dennis Ferris, Mililani Garden Club
 William F. Hays, Mililani Garden Club
 John J. Hays, Mililani Garden Club
 Rev. Mark Oastha, Mil. Protestant Church
 Audrey Simon, Mililani S.C. Marchants' Assoc.

COMING UP. Committee members will be mailed details of the February meeting.

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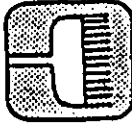
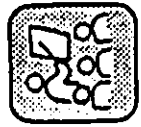
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MILILANI - MAUKA Planning Program NEWSLETTER

June 1985

Number 6

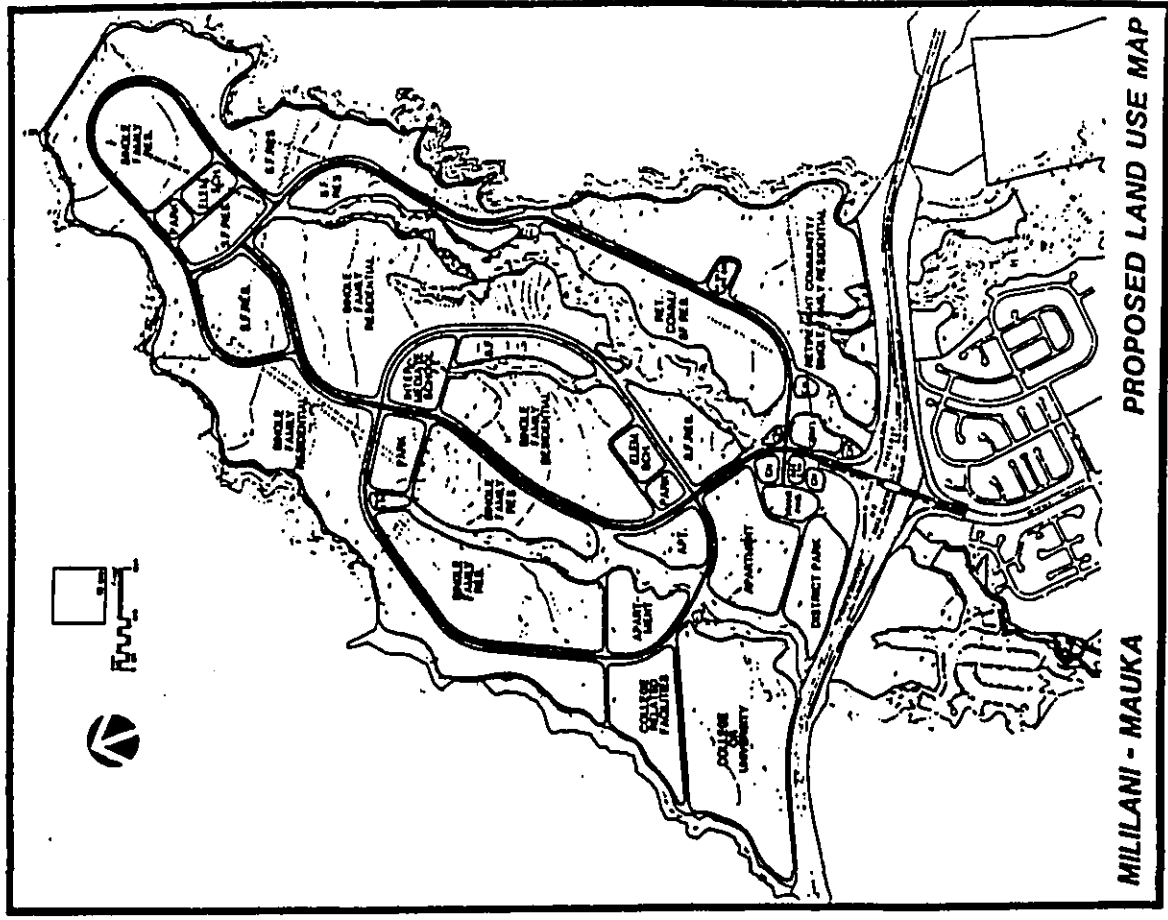


THE SIXTH MEETING of the Mililani-Mauka Planning Advisory Committee was held on June 12. The meeting was opened by Wally Miyahira who explained that it was called because of the need to submit the Mililani-Mauka plan to the City on a relatively short notice. This need was generated by an opportunity to include the plan in the County's 1985/86 Development Plan Review Process, an opportunity which could shorten the planning process by a whole year. He noted that the main purpose of the meeting was to keep the Advisory Committee informed of any changes which had taken place in the Mililani-Mauka plan since the last presentation, and to give the members an opportunity to comment on the changes before it was submitted to the City.

THE PLANNING PROCESS WAS THEN DISCUSSED by Ty Kusso in more detail including the contents of the Development Plan amendment package which was being prepared for the Department of General Planning (DGP). He also noted that meetings had been held with the City's Parks Department and the Department of Education (DOE) to get their input on the plan. These meetings resulted in some modifications to the plan which were then explained by Mark Mastert. The main changes concerned the distribution and size of parks.

CONCERN WAS RAISED ABOUT PARK MAINTENANCE when the plan was shown to the Department of Parks and Recreation staff members. Their ability, financially and in terms of manpower, to keep the parks well groomed has become a major issue. Parks in the existing portion of Mililani Town were drawn as examples to emphasize their point.

FEWER, LARGER PARKS WERE RECOMMENDED as an alternative. Consequently, two small neighborhood parks, one in the lower eastern portion and one in the retirement community, have been deleted from the plan. However, two other 4-acre parks have been retained adjacent to the two proposed elementary schools at the DOE's request. The community park, which was adjacent to H-2, has been expanded from 16 acres into a 20-acre district park that will include a gymnasium, tennis courts, athletic fields and other facilities. The park adjacent to the intermediate school has been expanded to 12 acres and will include athletic fields for sports such as soccer and baseball. The demand for park space is currently greater for these more actively oriented facilities. (See the December 1984, Number 4, Newsletter for park comparisons.)

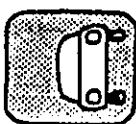




AFTER EXPLAINING THE PROPOSED PARK CHANGES, Mark Haster asked committee members if the revised plan still met their needs. The consensus was that having fewer, larger parks would serve community needs better than the previous plan. Larger parks were seen as less costly and easier to maintain. It was felt that larger parks would receive more diverse usage. Having centralized parks would also be more convenient for getting groups to and from league games.



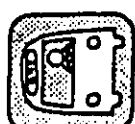
THE THREE RECREATION CENTERS NOW PLANNED would have distinct community functions. The one located closest to H-2 would serve as an entertainment facility when necessary and could be used for such things as luaus and wedding receptions, as well as other activities which tend to generate traffic and loud noise. It would be adequately removed from residential sectors and close to parking (the Park and Ride facility) so that it would not interfere with community life. The second recreation center would be situated within the planned retirement community and focus on the needs of senior citizens. The third recreation center would serve as an active, athletically oriented center. An idea which might be considered is a jogging trail in the eucalyptus filled gulch which lies makai of the site.



A SLIGHT CHANGE IN THE ROAD LAYOUT was also noted. In the mauka area there was a modification to the loop through the single-family residential housing to permit better circulation. Primary access will remain Menehula Parkway, with through traffic always being directed toward the main thoroughfare.



TWO OTHER TOPICS WERE TOUCHED UPON after the revised plan was presented. One of these was the conceptual plan for the retirement community. Wally Miyahira mentioned Hillhaven, a health care company operating out of Seattle, found that they could serve a need in Mililani Town and the Central Oahu region. The company felt the planned site for the retirement community was good, although the immediate need would only be for about 30 acres. Supporting health or nursing care facilities could be an integral part of the project. It was stressed, after concern had been raised, that such a facility would not be institutionally oriented. Rather it would simply consist of smaller, single story units specifically designed for use by retired people. Suggested was the inclusion of a par-3 golf course within or close to the retirement community.



THE SECOND BIT OF NEWS dealt with the Park and Ride facility for express buses. The City and County Department of Transportation Services, although interested in the concept, does not have the funds to construct such a facility. Mililani Town, Inc., hopes to find alternate sources of funding. It will be putting a package together to present to the City in the hopes of making Park and Ride a reality.

COMMENTS

QUESTION: Why did Mililani have to go through the procedure of submitting the General Plan amendment first, whereas Waikale was able to submit both its General Plan (GP) and Development Plan (DP) simultaneously?

RESPONSE: Mililani and Waikale are in similar positions; both submitted GP amendments at the same time last year. However, on Arafac's initiative the Waikale DP was submitted and the City Council chose to review and finally adopt it. The GP deals with planning population projections for Oahu, and because the ultimate expansion of Mililani Town will exceed current population projections for Central Oahu (by about 2.25%), the GP must either be amended or reinterpreted. The original City policy for dealing with DP proposals was to receive and decide on the GP amendment before the DP proposal was submitted. This was so that basic policy changes needed for a specific development could be made prior to the submission of the DP proposal. Mililani Town Inc., is now preparing a DP proposal for submission based on Waikale's precedent. The Chief Planning Officer will be initiating Mililani's Development Plan proposal by July 1.

QUESTION: What is the life of this committee and how will its involvement in Land Use Commission (LUC) hearings be handled?

RESPONSE: Committee meetings will continue to take place in order to keep the members involved with the project. This is a long-range committee. It is hoped that committee members will become actively involved in the LUC hearings, scheduled to take place late this year. The LUC is a quasi-judicial body and holds formal hearings quite different from City and County zoning and development meetings.

Members Present:

Fred Bell, Sr. Disabled American Veterans
 Mark Chiles, Mililani Presbyterian Church
 Rev. G. W. Eford, Mililani Baptist Church
 Vera Hillwell, Christ Lutheran Church
 Harry Kelley, St. John Apostolic Catholic Church
 Mark Kato, Mililani Golden Years Club
 Jerry McGee, Pentecostal Church
 Charlotte Mak, Pentecostal Church
 Paul Peters, Mililani Youth Baseball League
 Dick Peirce, Mililani Ten Association
 Debra Rolich, Mililani-Waikale Adv. Council
 Thomas Tinsley, American Legion Post #86
 Pam Whiting, Leeward Training Club

Members Absent:

Sharon Collins, Tabernacle of Holiness Church
 Doris Farrell, Mililani Garden Club
 William Farrell, Mililani-Waikale Rotary Club
 Michael Flores, Mililani-Waikale Rotary Club
 Shuro Kikura, Mililani Tennis Club
 Kotaro Koiura, Church of Latter Day Saints
 Luanna Lee, Mililani Orchid Club
 Clarence Washi, Mililani Judo Academy
 Rev. Norman Okazaki, Mil. Missionary Church
 Donna Tsunastau, American Youth Soccer Assn.

MILILANI - MAUKA Planning Program

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APPENDIX M

Air Quality Analysis.

Barry D. Root. December 1986.

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	Prepared by	
	Barry D. Root	
	Kaneohe, Hawaii	
	December 8, 1986	

SUMMARY

1. The proposed Mililani Town Developments covered by this air quality study include two projects: a 240 unit multi-family housing complex to be constructed within the present Mililani Town area in the near future and site preparation and construction of a residential community on a large parcel of land located just east of the Mililani Interchange on the H-2 Freeway. Construction of this Mililani Mauka project would not be completed until the year 2000.

2. Prevailing air quality in the project area is estimated to be good since nearby long term monitoring stations have consistently been recording airborne particulate and sulfur dioxide levels that are well within allowable State of Hawaii Air Quality Standards, but particulate and carbon monoxide emissions from nearby sugar cane or pineapple fires do present some potential to degrade air quality in the project area for short periods of time and vehicular emissions during peak period traffic conditions may be creating "hot spots" near congested intersections where carbon monoxide levels could exceed allowable air quality standards under especially unfavorable meteorological dispersion conditions.

3. Except for dust emissions during the construction phase of the development, no significant direct air quality impacts are expected. Adequate control measures exist to limit the scope of this impact, but special care will have to be exerted to insure that previously developed residential areas are not subjected to excessive levels of particulate pollution from construction activities.

4. Indirect air quality impacts are expected to result from new demands for electrical energy. This impact is most likely to occur in the vicinity of existing power plants such as the Kane Plant on the Waianae coast where increased levels of particulates and sulfur dioxide can be expected. Maximum use of solar energy designs in project development can at least partially mitigate the magnitude of this impact. New methods of generating electrical power such as wind or ocean thermal energy conversion may eventually also play a mitigative role in this regard.

5. Increased traffic generated by the proposed Mililani developments will increase emissions of carbon monoxide and nitrogen dioxide along routes leading to urban Honolulu. Detailed modeling carried out as a part of this study indicates that under worst case morning peak hour traffic and meteorological conditions estimated current and projected future carbon monoxide levels are expected to be in excess of allowable State of Hawaii Air Quality Standards at selected critical receptor sites along these routes.

6. For the most part, the modeling shows that carbon monoxide standards would not be met at these potential "hot spots" whether traffic from the proposed developments is included in the computations or not. The air pollution problems identified in this study are primarily the result of regional traffic congestion and will require mitigative measures beyond those that can be provided by a single project developer. It is possible, however, that the developer could be required to provide Park and Ride facilities within the Mililani Mauka project or to incorporate other traffic reduction strategies into project plans as part of an overall transportation management plan for the region.

1. PROJECT DESCRIPTION

Millilani Town, Inc. plans to complete a 240 unit multi-family housing complex within the currently developed Millilani Town area in the near future and to create a Millilani Mauka residential complex by the year 2000. The Millilani Mauka project will involve site preparation and construction of 6,600 dwelling units, a commercial center, schools, churches, parks, and other amenities on a 1,200 acre site located east of the H-2 Freeway (Figure 1). The Millilani Mauka area is currently being used for pineapple cultivation.

Roadway access to the 240 unit multi-family housing project will be via Kamehameha Highway, from which commuters will have a choice among a variety of routes to Iolani Oahu or the urban Honolulu area. By 1990 these choices will include routes via Kamehameha Highway and Meheula Parkway to the Millilani Interchange on the H-2 Freeway; via Kamehameha Highway and Ka Uka Boulevard to the new Waipio Interchange on the H-2 Freeway; or via Kamehameha Highway directly to the H-1 Freeway.

Highway access to the proposed Millilani Mauka project would be via an extension to the Meheula Parkway, a major arterial through the existing Millilani Town. The Meheula Parkway provides direct access to the H-2 Freeway at the Millilani Interchange as shown in Figure 2.

The purpose of this study is to describe existing ambient air quality in the project area and to estimate the magnitude of any increase in air pollutant concentrations resulting from actions related to the proposed projects.

2. AIR QUALITY STANDARDS

State of Hawaii and National Ambient Air Quality Standards (AQS) have been established for six classes of pollutants as shown in Table 1. An AQS is a pollutant concentration level not to be exceeded over a specified sampling period which varies for each pollutant depending upon the type of exposure necessary to cause adverse effects. Each of the regulated pollutants has the potential to cause some form of adverse health effect or to produce environmental degradation when present in sufficiently high concentration.

National AQS have been divided into primary and secondary levels. Primary AQS are designed to prevent adverse health impacts while secondary AQS refer to welfare impacts such as decreased visibility, diminished comfort levels, damage to vegetation, animals or property, or a reduction in the overall aesthetic quality of the atmosphere. State of Hawaii AQS have been set at a single level which is in most cases significantly more stringent than the lowest comparable national limit. In particular, the State of Hawaii one hour standard for carbon monoxide is four times more stringent than the national standard.

National AQS are based on 40 CFR, Part 50, while State of Hawaii AQS are set in Chapter 11-59, Hawaii Administrative Rules. This chapter was recently amended (March 25, 1986) to make Hawaii AQS for particulates and sulfur dioxide essentially the same as the most stringent national limits.

3. PRESENT AIR QUALITY

A summary of air pollutant measurements from State of Hawaii long term monitoring stations located nearest to the project is presented in Table 2. Data from several different sampling stations are included in the tabulation.

The sampling station for particulates and sulfur dioxide is located in Pearl City, about five miles southeast of the project area. The monitoring of sulfur dioxide in Pearl City was discontinued in 1984 and 1985 measurements are from the Barbers Point station located about 11 miles southeast of the project.

Until September 1979, and after June 1983, carbon monoxide monitoring was conducted at the Department of Health building at Punchbowl and Beretania Streets in urban Honolulu. This site is about 15 miles southeast of the project. During 1981 carbon monoxide was measured at Fort Dehuay in Waikiki (17 miles southeast of the project), and in 1982 carbon monoxide was monitored at Leahi Hospital in Kaimuki, about 18 miles southeast of the project.

Ozone levels were also measured at the Department of Health building in urban Honolulu until December 1980, when the monitor was relocated to Sand Island (about 13 miles southeast of the project site). During 1981 nitrogen dioxide was also monitored at the Sand Island location, but all nitrogen dioxide monitoring has since been discontinued. Lead measurements are from Liliha Street in Kalihi, about 14 miles southeast of the project site.

From the data presented in Table 2 it appears that State of Hawaii ambient air quality standards for particulates, sulfur dioxide, nitrogen dioxide, and lead are currently being met at nearest monitoring stations to the project area.

On the other hand, carbon monoxide and ozone readings from urban Honolulu indicate that allowable State of Hawaii standards for these vehicle-related air pollutants are being violated at a rate of about once or twice a year. Ozone is an indicator of the formation of photochemical pollutants in the air, a condition which tends to develop if the air mass over the islands has been fairly stable with little wind flow for a period stretching over several days.

Concentrations of carbon monoxide are more directly related to vehicular emissions and tend to be highest during periods of rush hour traffic. Carbon monoxide would thus be the pollutant most likely to cause difficulty in meeting allowable State of Hawaii AQ5 as a result of new residential development on Oahu.

There are power plants and other potential sources of industrial pollutants along the central portion of the leeward coast in the vicinity of the project site, but the generally low readings of particulates and sulfur dioxide at the Pearl City monitoring station just to the south of the project indicate that these sources are not likely to cause any air pollution problems at Milliani Town. Likewise sugar cane and pineapple cultivation in the project area could generate some particulates and carbon monoxide when fields are burned at harvest (about once every two years for sugar cane fields and once every three years for pineapple fields). The consistently low readings of particulates at Pearl City indicate that this source is not likely to present any significant air pollution problems either, but the impact of field burning depends greatly on their proximity of the field to the residential area in question.

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

4. DIRECT AIR QUALITY IMPACT OF PROJECT CONSTRUCTION

During the site preparation and construction phases of this project it is inevitable that a certain amount of fugitive dust will be generated. Field measurements of such emissions from apartment and shopping center construction projects has yielded an estimated emission rate of 1.2 tons of dust per acre of construction per month of activity. This figure assumes medium level activity in a semi-arid climate with a moderate soil silt content. Actual emissions of fugitive dust from this project can be expected to vary daily depending upon the amount of activity and the moisture content of exposed soil in work areas.

One major generator of fugitive dust is heavy construction equipment moving over unpaved roadways. This problem can be substantially mitigated by completing and paving roadways and parking areas as early in the development process as possible. Because of the relatively long construction period for the Milliani Mauka project, some construction will eventually be taking place in close proximity to existing residential areas. Dust control will have to be an item of special concern in all instances where residential areas are downsized from construction sites.

Heavy equipment at construction sites will also emit some air pollutants in the form of engine exhausts. The largest equipment is usually diesel-powered. Carbon monoxide emissions from large diesel engines are generally about equal to those from a single automobile, but nitrogen dioxide emissions from this type of engine can be quite high. Fortunately, nitrogen dioxide emissions from other sources in the area should be relatively low and the overall impact of pollutant emissions from construction equipment should be minor compared to levels generated on major roadways nearby.

5. AIR QUALITY IMPACT OF INCREASED ENERGY UTILIZATION

Estimating about 1,500 square feet average size for the 6,600 dwelling units at Milliani Mauka and about 1000 square feet as the average for the 240 multi-family units in Milliani Town yields about 10 million square feet of residential development. Energy consumption rates at the power plant for single family residential units with all-electric kitchens and water heaters are about 55,000 BTU per square foot; for similarly equipped apartments the rate is 45,000 BTU per square foot. The total floor space devoted to commercial and industrial use on the acreage set aside for those purposes is uncertain at this time, but for air conditioned offices the energy use rate is 350,000 BTU per square foot and for retail establishments the rate is 450,000 BTU per square foot.

For residential use alone this project could require more than 500 billion BTU of energy per year at the power plant, or about 90,000 barrels of oil if the demand were to be met totally by burning fuel oil. Energy use for commercial and industrial purposes could conceivably double this amount.

The major impact of burning fuel oil to meet this new energy demand will be increased levels of sulfur dioxide and particulates in the vicinity of existing power plants, primarily the Kabe Power Plant on the Waianae coast.

New energy requirements could be reduced substantially by the installation of solar water heating on all units at the time of construction. It is also possible that the new demand could be met by means other than burning fuel oil. Generation of electrical energy by wind power and by using ocean thermal energy conversion are two such possibilities.

6. INDIRECT AIR QUALITY IMPACT OF INCREASED TRAFFIC

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

Motor vehicles, especially those with gasoline-powered engines, are prodigious emitters of carbon monoxide. Motor vehicles also emit some nitrogen dioxide and those burning fuel which contains lead as an additive contribute some lead particles to the atmosphere as well. The major control measure designed to limit lead emissions is a Federal law requiring the use of unleaded fuel in most new automobiles. As older cars are removed from the vehicle fleet lead emissions should continue to fall. In fact, effective January 1, 1986, the Federal Environmental Protection Agency has revised the allowable lead content in gasoline to 0.1 gram per gallon. At the beginning of 1985 the standard was 1.1 grams per gallon. The EPA is also advocating a total ban on lead in gasoline to take effect as early as 1988.

Federal control regulations also call for increased efficiency in removing carbon monoxide and nitrogen dioxide from vehicle exhausts. By the year 2000 carbon monoxide emissions from the Oahu vehicle fleet then operating are mandated to be little more than half the amounts now emitted.

7. CARBON MONOXIDE DIFFUSION MODELING

In order to evaluate the future air quality impact of projected increases in traffic associated with the proposed Millilani Developments in view of the previously described government-mandated decreasing emission rates per vehicle it was necessary to carry out a detailed carbon monoxide modeling study. The study was designed to yield carbon monoxide concentration values which could be compared directly to allowable State and National Ambient Air Quality Standards.

Three critical receptor sites were selected for analysis. Site 1, on the west side of Kamehameha Highway near the intersection with Wopio Uka Street, was selected primarily to evaluate the impact of the proposed 240 unit multi-family project in Millilani Town on projected Kamehameha Highway carbon monoxide levels.

Site 2, on the west side of the H-2 Freeway near the Millilani Interchange was selected for analysis because it would be expected to reflect the impact of increased traffic generated by the Millilani Mauka project on carbon monoxide levels near this primary H-2 access point.

Site 3, on the south side of the H-1 Freeway between Pearl City and Aloha Stadium was selected in order to evaluate the long term cumulative impact of project-related traffic along the main traffic route between Millilani and urban Honolulu.

The general locations of all three receptor sites are shown in Figure 3. Expected worst case morning peak hour carbon monoxide concentrations at these receptor sites were computed for those years for which traffic studies had been completed. For site 1, current and 1990 traffic forecasts came from the May 12, 1986, Traffic Impact Report for the Proposed Maiala Estates Subdivision by Austin, Tautami & Associates, Inc. Assumptions for the 1990 traffic scenario included widening of Kamehameha Highway to 4 lanes, divided, with left and right turn lanes, and construction of the Waipio Interchange on the H-2 Freeway and the Palwa Interchange on the H-1 Freeway.

Current and forecast traffic volumes for the year 2000 at site 2 were extracted from the Traffic Impact Study: Millilani Town Master Plan, May, 1984, and the Loop Ramp Study, Millilani-Maui, January, 1985, by Parsons, Brinkerhoff, Quade & Douglas, Inc. Assumptions for the year 2000 traffic scenario include a change from the present Millilani Interchange configuration to a double loop system shown in Figure 4, along with widening of the H-2 Freeway in the southbound direction. These changes were deemed necessary in order to accommodate the projected traffic volumes expected from the proposed Millilani Maui Project.

Traffic volumes in the vicinity of site 3 for the year 2005 were based on figures for the high growth scenario in the May, 1985, Draft Report, Central and Leeward Oahu Transportation Study by Parsons, Brinkerhoff, Quade & Douglas, Inc.

Computations were made for traffic conditions with and without the proposed Millilani Developments using traffic volume predictions for the projects. To maximize the potential site 1 near-term impact of traffic from the proposed 240 unit multi-family housing project Millilani Town, all projected traffic from this project was assigned to Kamehameha Highway.

Based on 1986 vehicle registration figures for Oahu the existing peak hour vehicle mix in the study area is estimated to be 91.9% light duty gasoline-powered vehicles, 4.2% light duty gasoline-powered trucks and vans less than 6000 lbs, 0.8% light duty gasoline-powered trucks between 6000 and 8500 lbs, 0.5% heavy duty gasoline-powered vehicles, 0.5% diesel-powered automobiles, 0.1% diesel-powered light duty trucks, 1% diesel-powered trucks and buses, and 1% motorcycles. The same vehicle mix was assumed for all emission rate calculations.

At site 1, where a signal light controls traffic flow, average vehicle speeds were assumed to be 1 mph upstream from red signal lights and 15 mph downstream from signals or turns. At site 2 near the H-2 Freeway average vehicle speeds were assumed to be 35 mph for vehicles on the Freeway, 15 mph on the off-ramp and 5 mph on the on-ramp. At site 3 near the H-1 Freeway, vehicles in the peak direction were assigned a speed of 7 mph since this speed would be the minimum required to move the projected volume of morning peak hour traffic through the area. Traffic in the off-peak direction was assumed to move at 35 mph. A cold winter morning temperature of 55 degrees F was assumed with 20.6 percent of vehicles equipped with catalytic converters and 20.6 percent of vehicles without catalytic converters operating in the 'cold start' mode, and 27.3% of all vehicles operating in a hot start mode. The EPA computer model MOBILE 3 was run using the above parameters to produce vehicular carbon monoxide emission estimates for each of the sites and years studied.

The EPA computer model HWAY 2 was used to calculate carbon monoxide concentrations at each of the selected critical receptor sites for each scenario studied. Stability category 5 was used for determining diffusion coefficients. This stability category represents the most stable (least favorable) atmospheric condition recommended for use as an input to HWAY 2 diffusion modeling calculations and would be likely to occur only on a cold, clear, nearly calm winter morning in a relatively rural area. For site 3, along the urbanized leeward traffic corridor, stability category 4, a somewhat less stable diffusion coefficient was used to represent the worst case that would be likely to occur in this area.

To simulate worst case wind conditions a uniform wind speed of one meter per second was assumed with the worst case wind direction for site 1 from the southeast, for site 2 from the east, and for site 3 from the northeast. For each receptor site concentrations were computed at a height of 1.5 meters to simulate levels that would exist within the normal human breathing zone. Background contributions of carbon monoxide from sources or distant roadways not directly considered in the analysis were assumed to be 5% of computed values at sites 1 and 2 and zero at site 3. A background concentration was not included for site 3 to show the impact of H-1 carbon monoxide contributions alone. In fact, morning peak hour background concentrations at congested intersections along this corridor probably exceed those levels generated by the somewhat more freely flowing traffic along the H-1 Freeway.

Results of the carbon monoxide study are presented in Table 3. At sites 1 and 2, and most likely at site 3 as well, present concentrations under the worst case conditions studied here are estimated to be considerably in excess of the allowable State of Hawaii one hour carbon monoxide standard.

At site 1 worst case projections for the year 1990 indicate that without the additional traffic from the planned 240 unit multi-family Milliani project future levels of carbon monoxide at that location might decrease somewhat, but with the addition of the traffic from this project they might increase a small amount instead. The projected change is less than one milligram per cubic meter either way, and in either case the 1990 projected concentration is still well above the allowable State of Hawaii one hour standard.

At site 2, near the H-2 Freeway at the Milliani Interchange, the projected worst case carbon monoxide concentration for the year 2000 is within the one hour State Standard if the intersection is kept in its current configuration, but if the Milliani Mauka project is completed and the intersection is modified to the double loop configuration planned (with an additional lane of traffic on H-2), then the projected worst case peak hour concentration is just over the State of Hawaii limit. For this site concentrations were computed at the edge of the freeway right-of-way. It is likely that much higher values occur within the right-of-way, especially in the vicinity of left turn lanes, but the complex geometry of the roadways within the interchange preclude use of the HEMATZ model which is, in any case, not recommended for use within freeway right-of-way areas.

At site 3, along the crowded H-1 Freeway corridor between Pearl City and Aloha Stadium, projected worst case carbon monoxide levels for the year 2005 are above the State of Hawaii limit with or without traffic from the proposed Milliani developments. The values shown in Table 3 are for a distance of 10 meters from the edge of the roadway. For the case with traffic from the Milliani developments included, projected concentrations are above the State of Hawaii standard out to a distance of 40 meters from the Freeway. When Milliani Mauka traffic is removed from the roadway, State of Hawaii standards are exceeded only out to a distance of 20 meters from the roadway. In reality, however, little can be inferred from this computation since it is virtually certain that the H-1 Freeway will operate at capacity for more than one hour during the morning with or without traffic from the proposed Milliani developments. Without the project the morning rush hours might at best decrease in duration by a few minutes, but this will have no impact on peak hour carbon monoxide levels.

None of the computed worst case peak hour carbon monoxide concentrations are even half as high as the National one hour carbon monoxide standard and it is reasonable to conclude that this standard can be easily met by the proposed projects.

Eight hour carbon monoxide levels are estimated by multiplying the peak hour values by a "meteorological persistence factor" of 0.6 which is recommended in EPA modeling guidelines to account for the fact that average one hour traffic volumes over an eight hour period are lower than at peak hour and meteorological dispersion conditions are more variable (and hence more favorable) over an eight hour period than they are for a one hour period. Multiplying projected peak hour carbon monoxide levels by this factor yields the values that are shown in Table 4.

For all three receptor sites, projected eight hour carbon monoxide concentrations under worst case conditions are above the allowable State of Hawaii standard with or without the increase in traffic expected from the Milliani developments. At site 1 a similar result occurs with respect to the National eight hour standard as well. In all cases, however, the increase in eight hour carbon monoxide attributable to traffic from the Milliani developments is less than one milligram per cubic meter.

It is also important to note that the worst case conditions studied here have a relatively low probability of occurrence. The wind directions at each of the locations studied are relatively common, but the wind usually blows from these directions at much higher speeds than one meter per second. With windspeeds of two meters per second, for example, computed carbon monoxide concentrations would be half the values shown in Table 3. Furthermore, the light wind speeds needed to produce the worst case values shown here would be most likely to occur in conjunction with highly variable wind directions, rather than the steady condition assumed here. The meteorological conditions used in this analysis do have a small probability of occurring, but to put the computations into perspective, this probability is on the order 0.3 to 1.0 percent (somewhere between one and four mornings a year). Nonetheless, both State of Hawaii and National Ambient Air Quality Standards are values not to be exceeded more than once per year. Comparisons between the values computed in this study and allowable air quality standards are thus considered to be valid.

B. MITIGATIVE MEASURES

A. SHORT TERM

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

B. LONG TERM

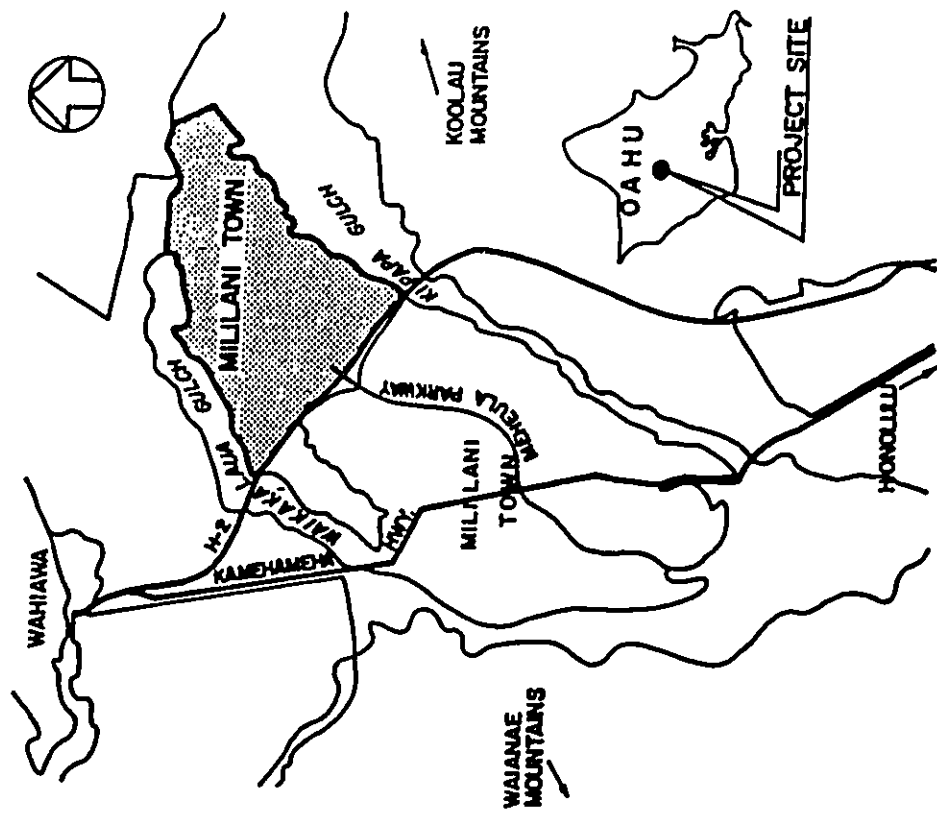
Once completed, the proposed Millilani developments are expected to have little direct impact on the air quality of the surrounding region. Indirect long term impacts in the form of increased air pollutant emissions from power plants serving new residences in the project area can be mitigated somewhat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

Other indirect long term air quality impacts are expected in those areas where traffic congestion can potentially be worsened by the addition of vehicles traveling to and from the proposed developments. Project planners can do very little to reduce the emission levels of individual vehicles, but traffic studies for the developments planned describe several proposed or planned roadway improvements that could significantly increase highway traffic capacity and facilitate entry and exit from the proposed development with a minimum of increased traffic congestion. The key to viable access and acceptable air quality impact regarding the Millilani Mauka project will be redesign of the Millilani Interchange on the E-2 Freeway to accommodate traffic from the Koolau side of the freeway.

Carbon monoxide modeling conducted as a part of this study indicates that under worst case morning peak hour traffic and meteorological conditions future carbon monoxide concentrations are likely to exceed the State of Hawaii one hour air quality standard at selected critical hot spots downstream from the project area when traffic associated with the proposed developments is added to existing volumes. For the eight hour worst case scenario, both State and National standards could be exceeded. For the most part, however, these are regional traffic problems which will require mitigative measures well beyond those that a single project developer can be expected to provide. In the case of the Millilani Mauka project, the developer might be required to provide "park and ride" facilities for carpooling or mass transit systems as a part of an overall regional transportation control strategy.

Because the stringent national vehicular emissions reduction program now being pursued is entirely the product of ever changing government regulations, it is always possible that economic conditions could lead to an early abandonment of this program. If that were to occur, then the projected pollutant levels presented in this study could be too optimistic. On the other hand, this analysis did not consider the possibility that technological innovation may lead to new vehicular propulsion systems that produce few or none of the currently regulated atmospheric pollutants.

For the benefit of future residents of Millilani Mauka, it is also noted that tall, dense vegetation can provide some screening of residential areas from larger airborne particulates generated along roadways and near construction areas. It is thus recommended that wherever possible such vegetation be included in landscaping plans with plantings to occur as early in the development process as practicable.



LOCATION MAP
FIGURE 1

REFERENCES

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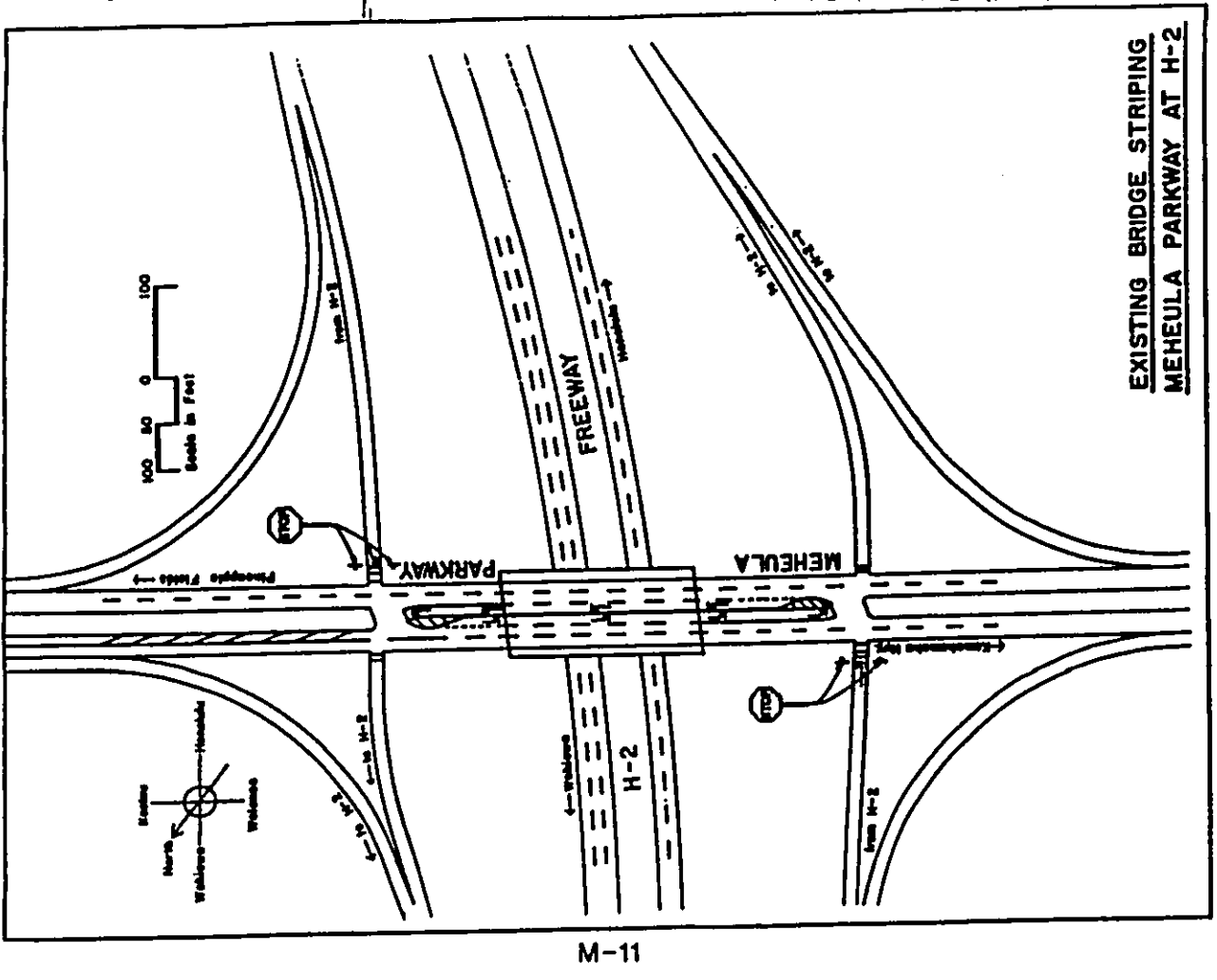
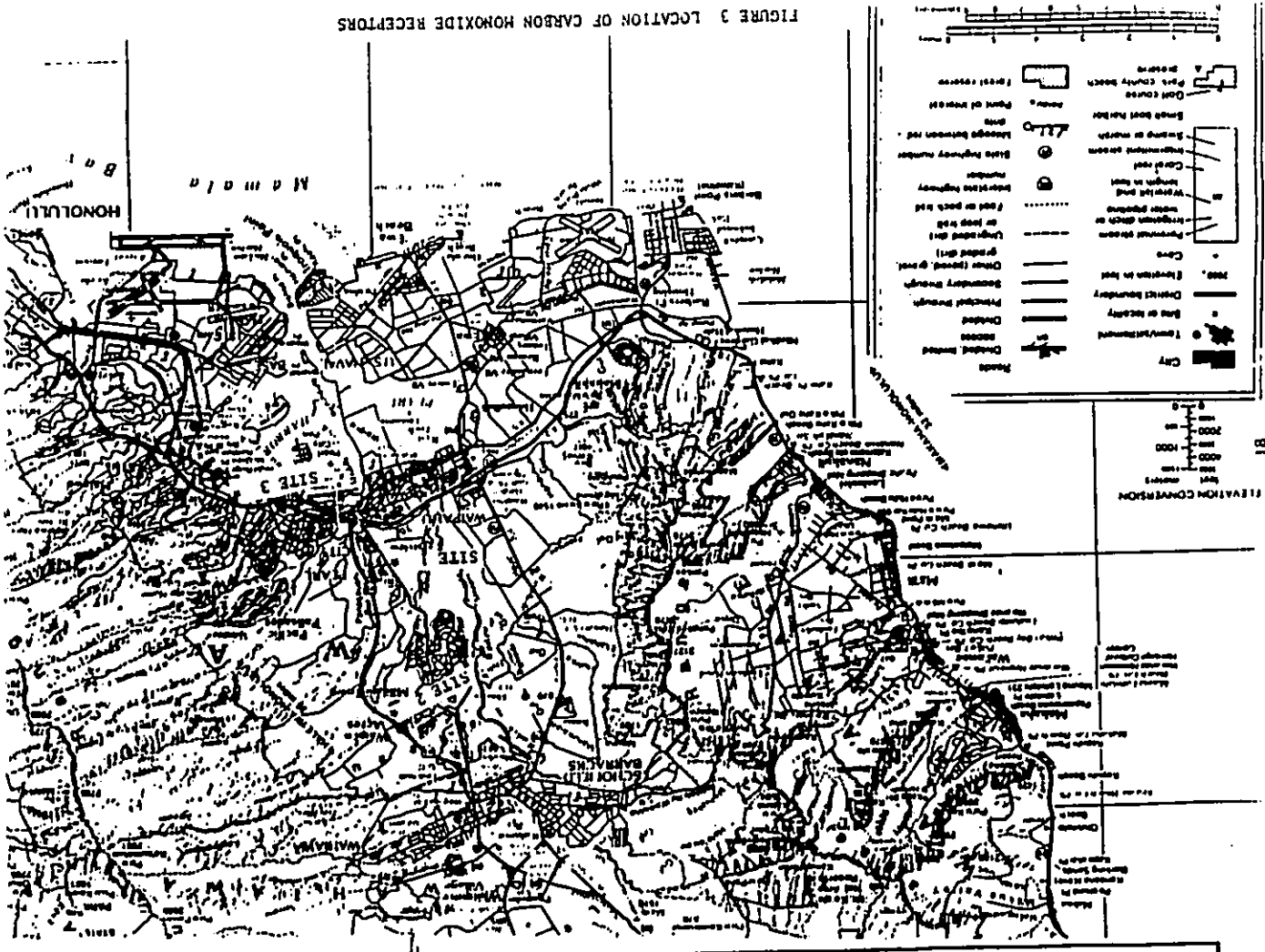


FIGURE 2
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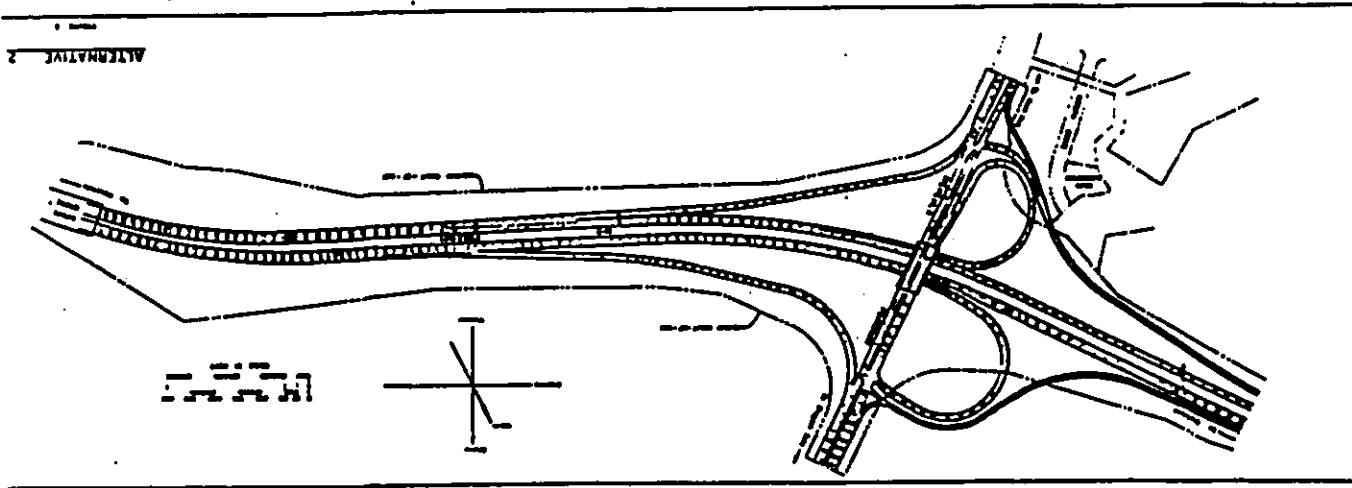


TABLE 1

SUMMARY OF HAWAII AND NATIONAL AMBIENT AIR QUALITY STANDARDS
(Micrograms per Cubic Meter)

POLLUTANT	SAMPLING PERIOD	AMBIENT AIR QUALITY STANDARDS	
		NATIONAL	HAWAII
Particulates	Annual Geometric Mean	75	60
	Maximum 24-Hour Average	260	150
Sulfur Dioxide	Annual Arithmetic Mean	80	80
	Maximum 24-Hour Average	365	365
	Maximum 3-Hour Average	1300	1300
Nitrogen Dioxide	Annual Arithmetic Mean	100	70
Ozone	Maximum 1-Hour Average	240	100
Carbon Monoxide	Maximum 8-Hour Average	10	5
	Maximum 1-Hour Average	40	10
Lead	Calendar Quarter	1.5	1.5

Notes: 1. Carbon monoxide standards are in milligrams per cubic meter.
2. National standards based on 40 CFR Part 50; Hawaii standards based on Title 11, Administrative Rules, Chapter 59.

TABLE 2

SUMMARY OF AIR POLLUTANT MEASUREMENTS AT NEAREST MONITORING STATIONS

POLLUTANT	1979	1980	1981	1982	1983	1984	1985
PARTICULATE MATTER							
No. of Samples	58	60	59	53	55	56	47
Range of Values	20-48	22-53	19-71	19-54	17-57	16-45	16-62
Average Value	33	36	34	31	30	28	35
No. of Times State AQS Exceeded	0	0	0	0	0	0	0
SULFUR DIOXIDE							
No. of Samples	56	52	56	43	49	42	50
Range of Values	<5-63	<5-15	<5-45	<5-10	<5-45	<5-45	<5-25
Average Value	10	5	5	5	5	5	5
No. of Times State AQS Exceeded	0	0	0	0	0	0	0
CARBON MONOXIDE							
No. of Samples	207	286	311	311	173	318	342
Range of Values	0-17.3	1.2-13.8	0-4.6	0-8.6	0-8.6	0-10.9	0-10.4
Average Value	2.9	6.1	1.2	2.3	2.4	2.4	1.5
No. of Times State AQS Exceeded	10	13	0	0	0	1	1
OXIDANT (OZONE)							
No. of Samples	338	296	314	335	349	296	341
Range of Values	10-80	10-84	10-104	0-151	0-123	0-104	8-198
Average Value	39	48	37	32	46	44	43
No. of Times State AQS Exceeded	0	0	1	2	2	1	3
OTHERS:							
NITROGEN DIOXIDE							
No. of Samples	46						
Range of Values	6-77						
Average Value	25						
No. of Times State AQS Exceeded	0						
LEAD							
No. of Samples	52						
Range of Values	.5-.8						
Average Value	0.6						
No. of Times State AQS Exceeded	0						

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

SOURCE: State of Hawaii Department of Health

TABLE 3

RESULTS OF PEAK HOUR CARBON MONOXIDE ANALYSIS (milligrams per cubic meter)

SITE	YEAR	1986	1990
SITE 1 (Waipio Uka / Kaeohamaha Highway Intersection)			
Without 240 unit Millilani Project	1986	18.3	17.7
With Millilani Project			18.7
SITE 2 (H-2 Freeway at Millilani Interchange)			
Without Millilani Mauka Project	1986	12.8	8.7
With Millilani Mauka Project			10.1
SITE 3 (H-1 Freeway between Pearl City and Aloha Stadium)			
Without Millilani Mauka Project	2005		12.7
With Millilani Mauka Project			14.5

STATE OF HAWAII AQS: 10
NATIONAL AQS: 40

Notes: See Figure 3 for location of receptor sites. See text, Section 7, for models and assumptions used for producing these estimates.

TABLE 4

RESULTS OF EIGHT HOUR CARBON MONOXIDE ANALYSIS
(milligrams per cubic meter)

SITE 1 (Waipio Uka / Kamehameha Highway Intersection)	YEAR	1986	1990
Without 240 unit Millilani Project		11.0	10.6
With Millilani Project			11.2
SITE 2 (H-2 Freeway at Millilani Interchange)	YEAR	1986	2000
Without Millilani Mauka Project		7.7	5.2
With Millilani Mauka Project			6.1
SITE 3 (H-1 Freeway between Pearl City and Aloha Stadium)	YEAR	2005	
Without Millilani Mauka Project		7.6	
With Millilani Mauka Project		8.7	

STATE OF HAWAII AQ5: 5
NATIONAL AQ5: 10

Notes: See Figure 3 for location of receptor sites.
These estimates produced by multiplying peak hour estimates by a "persistence factor" of 0.6.