BENJAMIN J. CAYETANO
GOVERNOR
STATE OF HAWAII

KALI WATSON
CHAIRMAN
HAWAIIAN HOMES COMMISSION

JOBIE M. K. M. YAMAGUCHI
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

September 17,1997

Mr. Gary Gill, Director
State of Hawaii
Office of Environmental
Quality Control (OEQC)
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Dear Mr. Gill:

SUBJECT: Final Environmental Assessment for Anahola Wastewater Treatment Plant, Phase 1
Anahola, Island of Kauai

Enclosed are four (4) copies of the Final Environmental Assessment (Negative Declaration) for the proposed Anahola Wastewater Treatment Plant, Phase 1. Based on the analysis of the conditions and impacts presented in the Final Assessment, we have concluded that the proposed project will have no significant effect on the environment. Therefore, we are filing a Negative Declaration for the proposed project.

We request that this Negative Declaration be published in the next OEQC Bulletin. A complete OEQC Bulletin Publication form is enclosed as required.

Should you have any questions, please have your staff call Mr. Gerald Lee, Land Development Division, at 586-3815.

Aloha,

Kali Watson

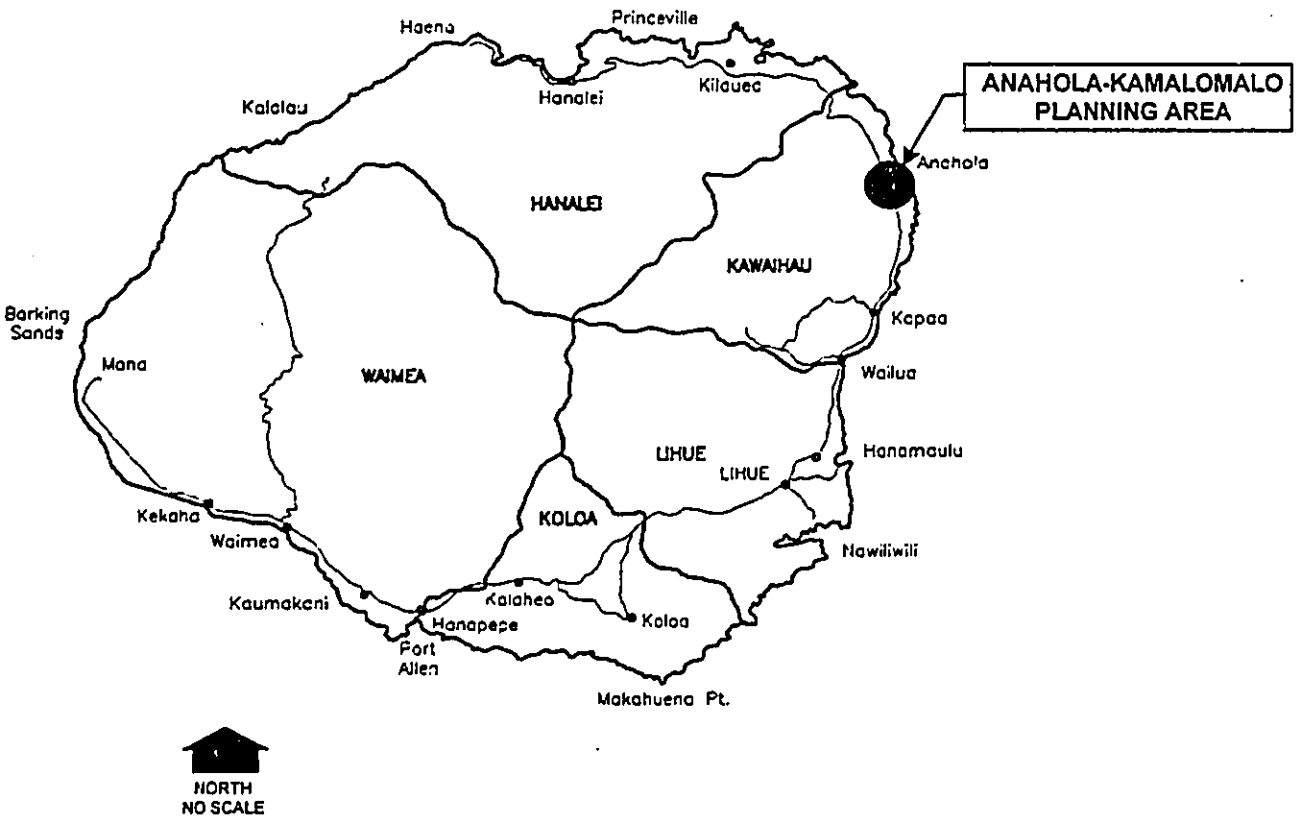
KALI WATSON, Chairman
Hawaiian Homes Commission

Enclosure:
c. Fukunaga & Associates, Inc.

161

1997-10-08-KA-FEA-

FINAL ENVIRONMENTAL ASSESSMENT FOR ANAHOLA WASTEWATER TREATMENT PLAN PHASE I



Prepared For:

DEPARTMENT OF HAWAIIAN HOME LANDS
State of Hawaii

By: **FUKUNAGA AND ASSOCIATES, INC.**

SEPTEMBER 1997

Chapter 343, Hawaii Revised Statues (HRS)

FINAL

ENVIRONMENTAL ASSESSMENT

FOR

ANAHOLA

WASTEWATER TREATMENT PLANT

PHASE I

TMK: 4-8-03:18 AND 4-7-04:7

ANAHOLA, KAUAI, HAWAII

PROPOSING AGENCY:

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

Responsible Official: Kali Watson Date: 9/17/97

Kali Watson, Chairman
Hawaiian Homes Commission

Prepared By:

Fukunaga and Associates, Inc.
1388 Kapiolani Blvd. Second Floor
Honolulu, Hawaii 96814

September 1997

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CHAPTER I

GENERAL INFORMATION

1.1 Project

The project to be accessed involves the Anahola Sewerage Plan and includes wastewater collection facilities and the proposed Anahola Wastewater Treatment Plant (WWTP). The system is intended to provide the Anahola area with adequate wastewater collection, treatment and disposal systems in support of DHHL plans to develop more residential homestead projects.

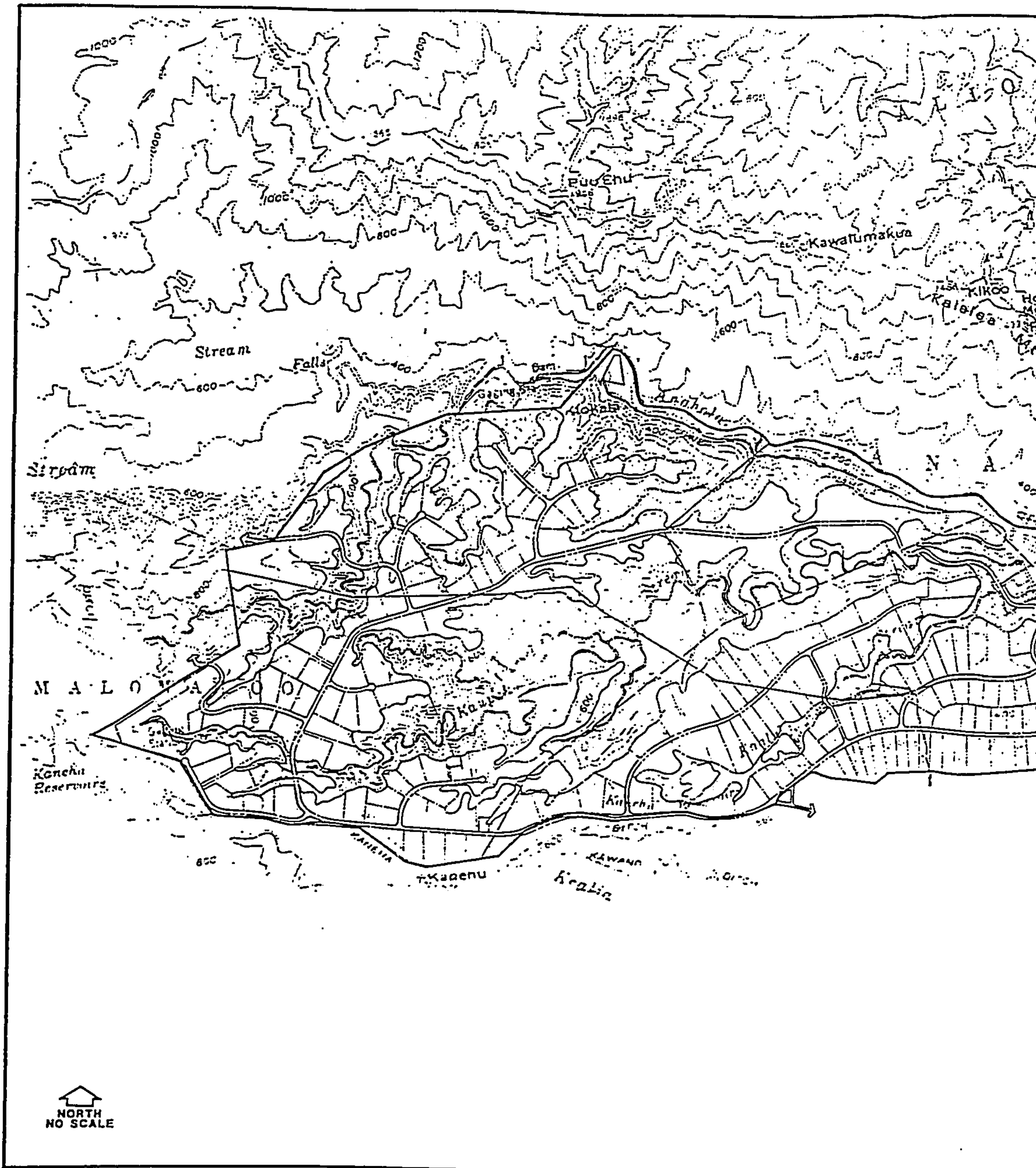
The location of the Anahola WWTP and the planned sewerage service area (SSA) are shown in **Figure-1**. The ultimate wastewater flow generated from the service area is estimated to be 1.5 MGD, including possible wastewaters that may be generated from denser development in the Kamalomaloo sub-area than master planned by the DHHL adopted Anahola-Kamalomaloo and Moloaa Development Plan (hereinafter referred to as the Anahola Development Plan).

Because a large part of the SSA is either difficult to serve or is not expected to be developed in near future (by 2010), sewerage services will be constructed in two phases. The Phase I service area is shown in **Figure-2**. Phase I of the Anahola WWTP will accommodate 0.4 MGD of wastewater flow. One (1) sewage lift station and associated force mains and gravity sewers are needed for the Phase I service area. The proposed location of the WWTP and layout of the conveyance system are shown in **Figure-3** .

1.2. Physical Information

1.2.1. Location

The project area is located on the northeast side of the Island of Kauai as shown in **Figure-4**. The major community center in this area is Anahola Town, a small Kauai rural community of about 1,181 people in 1990 (DBEDT, 1991). The project focuses on the proposed Anahola WWTP and its sewerage service area. According to the DHHL's



SEWERAGE SERVI

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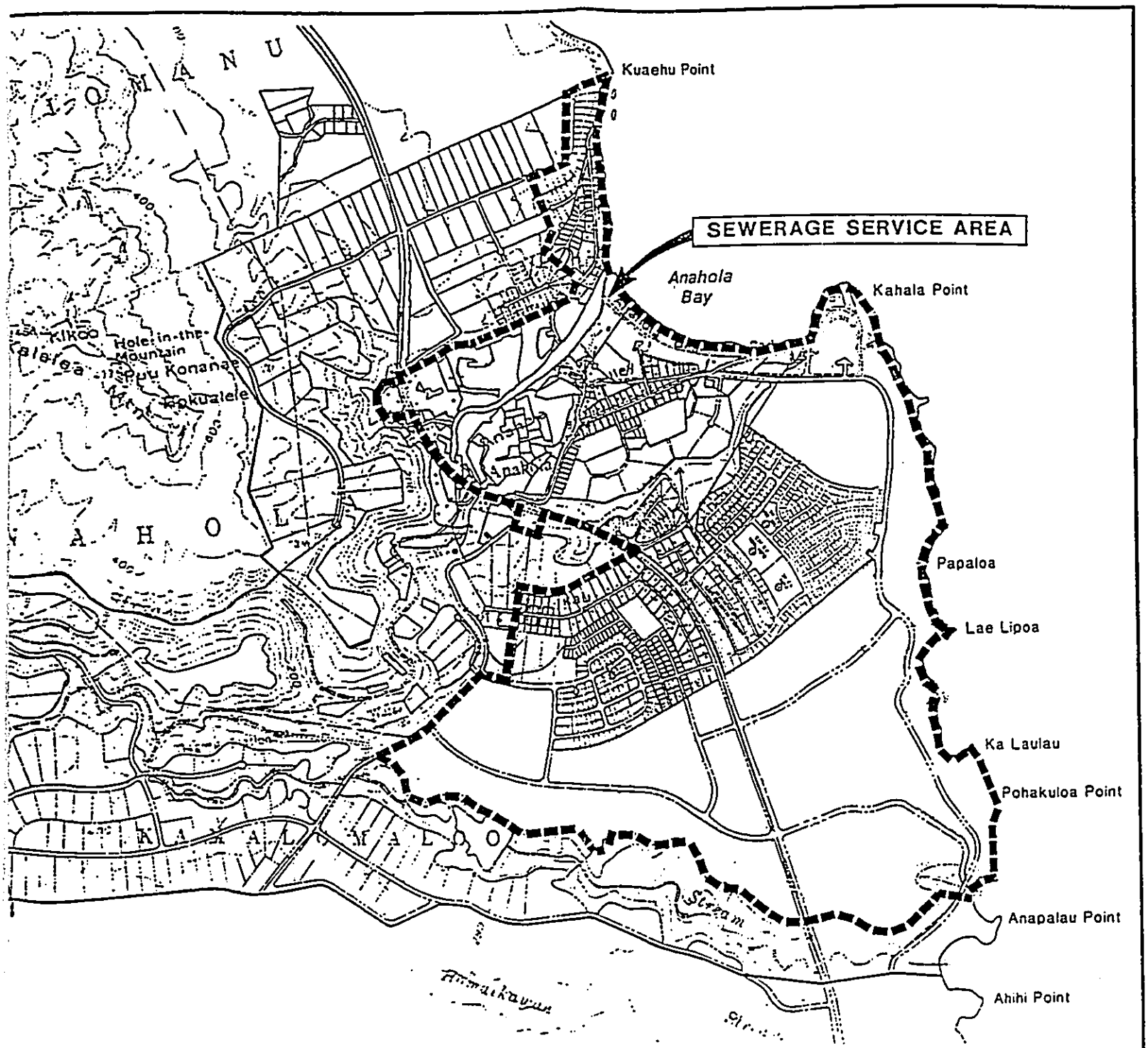
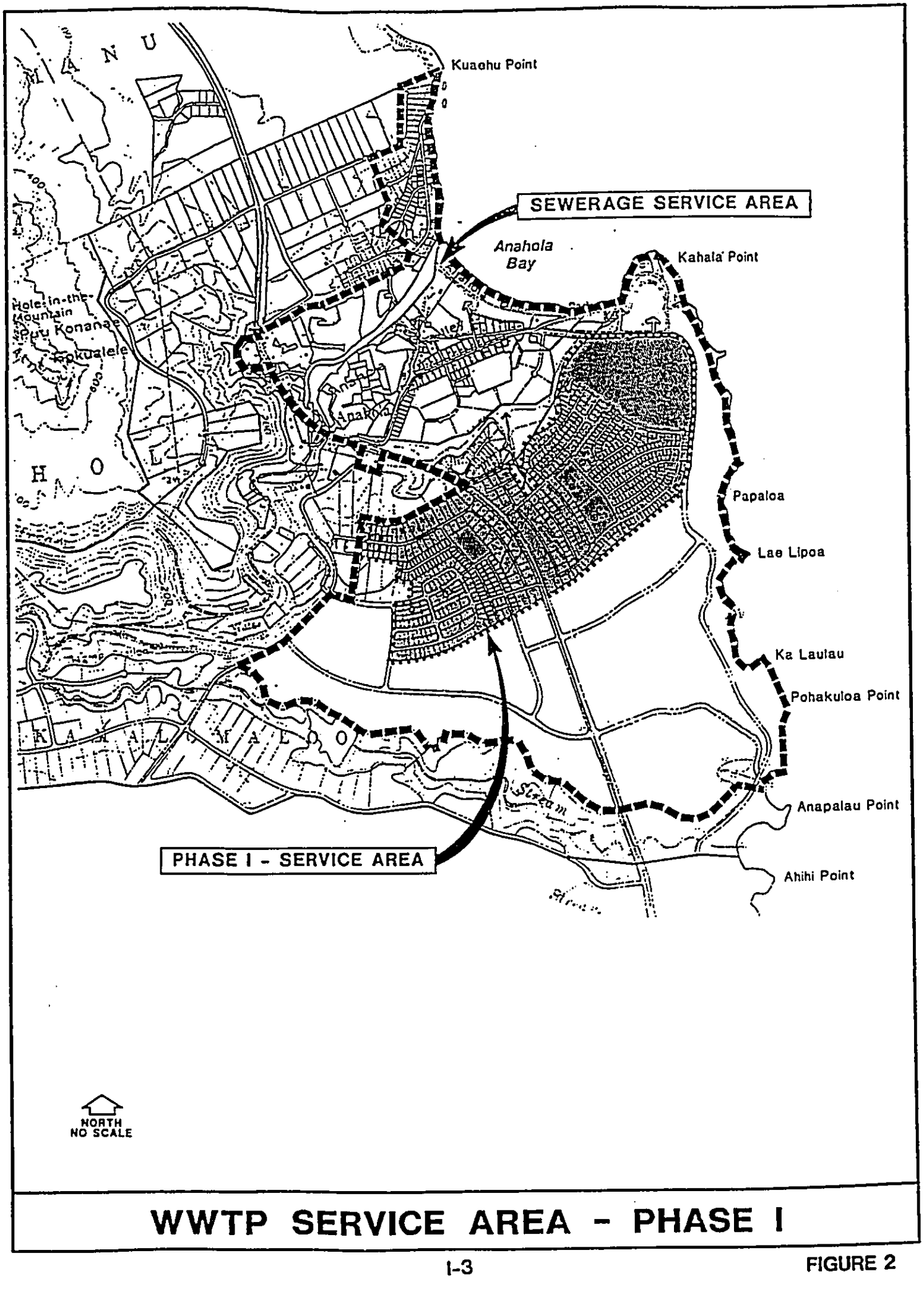


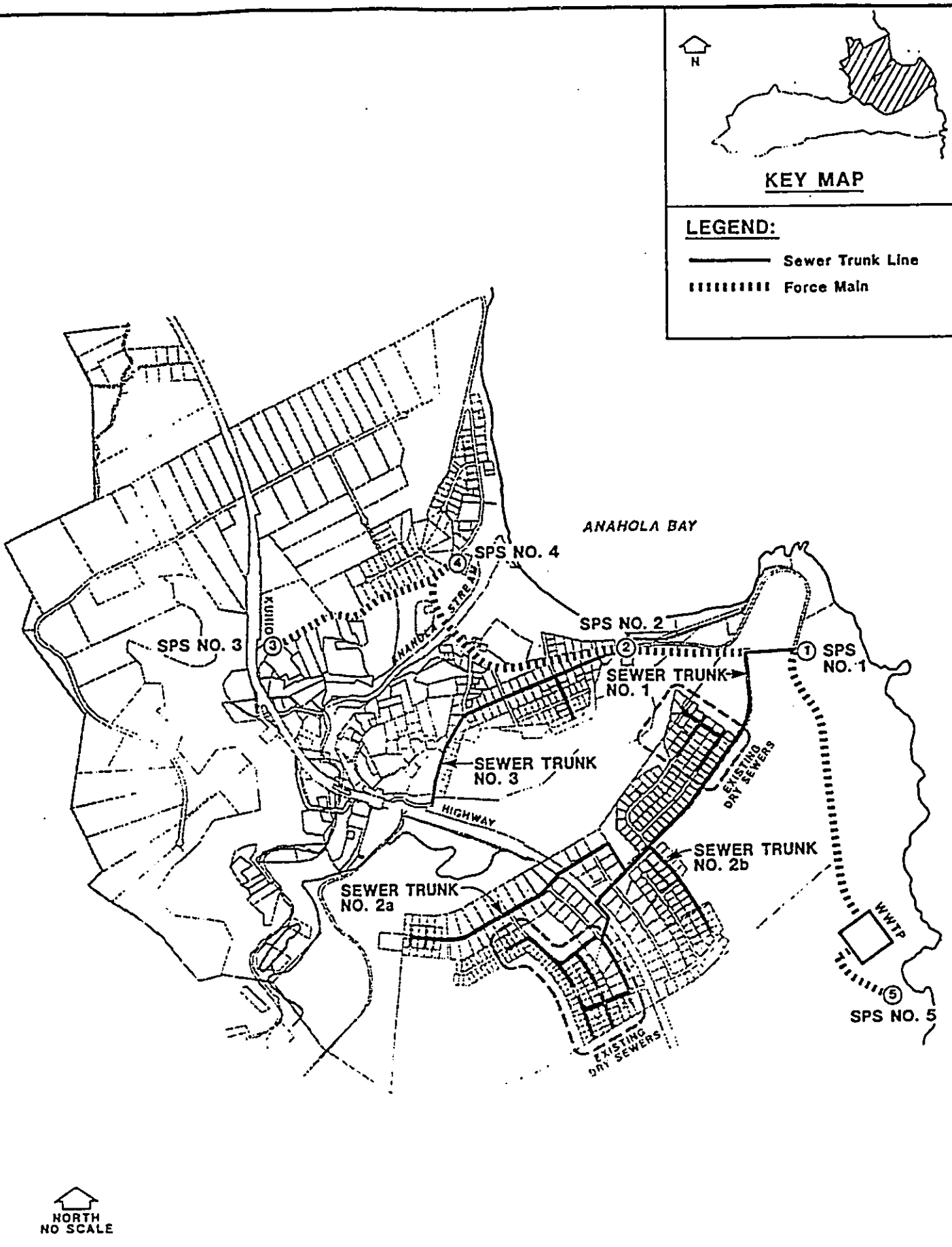
SERVICE AREA

FIGURE 1



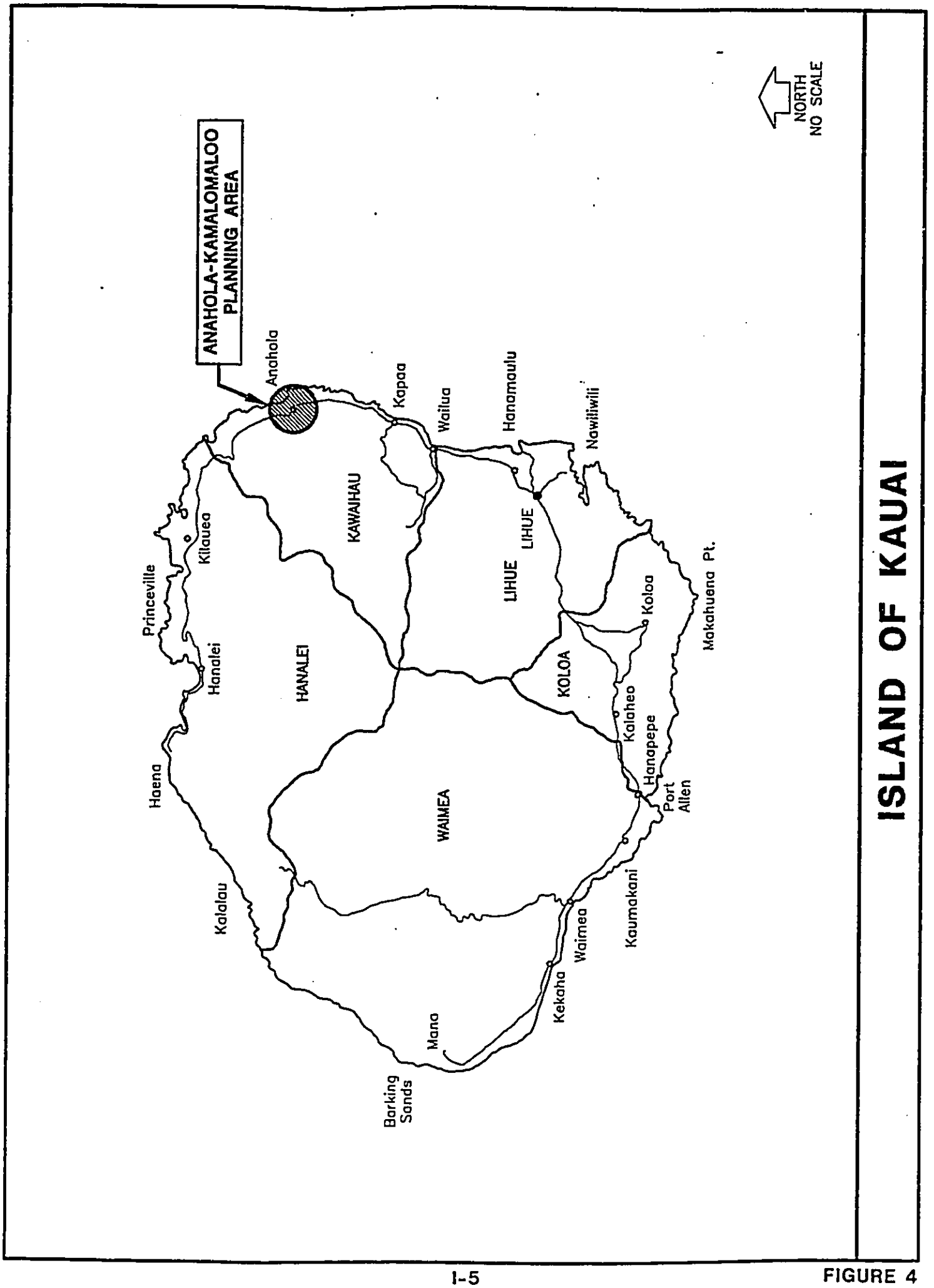
WWTP SERVICE AREA - PHASE I

FIGURE 2



LAYOUT OF SEWER TRUNK LINES & FORCE MAIN

FIGURE 3



ISLAND OF KAUAI

FIGURE 4

Anahola Development Plan, the area is expected to become a major Hawaiian homestead site with a projected population of more than 6,000 by the year 2007. But, according to the discussions with the DHHL personnel, denser residential development (with unit size not exceeding 6,000 ft^2) may well occur at the south part of the SSA where the Anahola Development Plan designates large agricultural residences. Based on the denser development, a much higher ultimate population is anticipated as will be discussed in the population sub-section of this chapter and Tables 1 and 2.

1.2.2. Climate

The climate in the study area is generally mild and conducive to residential and agricultural development. The temperatures near the shoreline range from an average high of 87° F to an average low of 60° F.

The prevailing wind in the area is the northeast trade winds. Although no specific observation has been made at the area, the wind pattern is expected to be similar to that in the Lihue area where northeast wind accounts for approximately 70% of winds from all directions around the year. The most frequent average wind speed is about 10 knots.

The area is considered to be relatively wet with the average annual rainfall at about 50 inches per year in the makai lands. Rainy months generally occur from December through March with average monthly rainfall of about 6 to 8 inches per month. The upper mauka lands in the study area are much wetter. Annual average rainfall in the mauka area approaches 100 inches. Lihue Sugar Plantation grows sugar cane in the mauka areas with only rainfall for irrigation. By comparison, the average annual rainfall in Hanapepe-Eleele area is about 28 inches per year, and about 90 inches per year at Princeville.

1.2.3. Geology

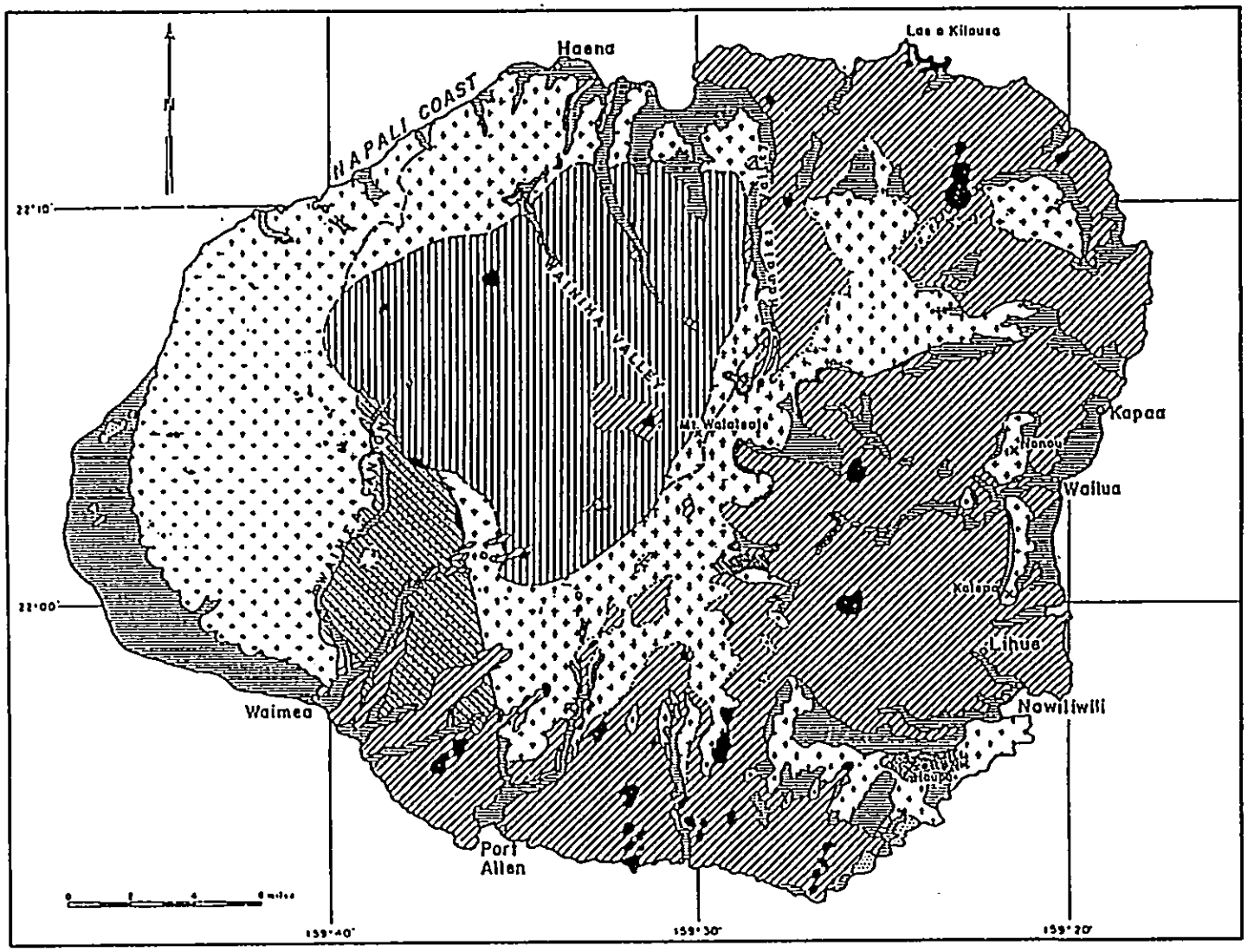
As indicated in The Geology and Ground-Water Resources of the Island of Kauai, Hawaii by MacDonald et al. (1960), the island is fundamentally a single broad volcanic dome built by a basaltic shield volcano resembling the present active volcanoes of Kilauea and Mauna Loa on the island of Hawaii. The 10 square mile Anahola Stream basin, which extends

from Anahola Bay to the ridge line of the Kealia Forest Reserve at elevation 2,800 feet, is almost entirely covered by Koloa Volcanic Series lava. The Kealia Mountains are outcrops of the earlier Waimea Canyon Volcanic Series. In addition, alluvial and lagoonal materials also exist in the Anahola Bay area. See **Figure-5**. The Koloa volcanic series lava was formed during the island's last stage of eruption, and is characterized as relatively dense lavas of moderate to low permeability. MacDonald et al. (1960) indicated that the thickness of the Koloa Series lava is in the order of hundreds of feet. According to the Development Plan report, outcrops of the older, more permeable Waimea Canyon Volcanic Series occur along the north and east boundaries of the basin. Because large areas are covered by the less permeable Koloa formation, a large percentage of rainfall ends up as runoff in streams rather than as ground water through percolation. Also, wells in the Koloa formation are less productive than those in Waimea lavas.

1.2.4. Soils

The United States Department of Agriculture Soil Conservation Service identified a wide range of soil types in the study area as indicated in **Figure-6**. the predominant soil types are the Lihue soil series (Lh) on the makai and lower mauka slopes and the Kapaa silty clay (Kk) and Pooku silty clay (Pn) on the upper mauka slopes. All of these soils are suitable for agricultural, pastoral, and urban uses. The valley and gulch areas are categorized as rough broken lands (rRR) and shoreline areas are categorized as rock outcrops (rRO), badlands (BL), and sandy beaches (Bs). According to the SCS survey, permeability of the soils ranges between 2.0 and 6.3 in/hr (or 4 and 12.6 ft/d, or 0.001411 and 0.004445 cm/sec). The soils are considered to provide moderately rapid drainage.

According to the Anahola Development Plan, soils in the lower Anahola valley are identified as having a high water table and poor drainage.



EXPLANATION

Recent — QUATERNARY

Alluvium beach and dune sand, lagoonal clays and marls.

Lithified calcareous dune sand.

Pleistocene — Koloa volcanic series

Breccia and conglomerate of Palikea formation.

Lavas of Koloa volcanic series.

Pliocene(?) — Waimea Canyon volcanic series — TERTIARY

Lavas of Makaweli formation.

Lavas of Olokele formation.

Lavas of Haupu formation.

Lavas of Napali formation.

Vents of Koloa and Waimea Canyon volcanic series

Buried fault scarp

Geology by H.T. Stearns, G.A. Macdonald, U.S. Geol. Surv. and D.C. Cox, 1934-54

VOLCANIC SERIES MAP

FIGURE 5

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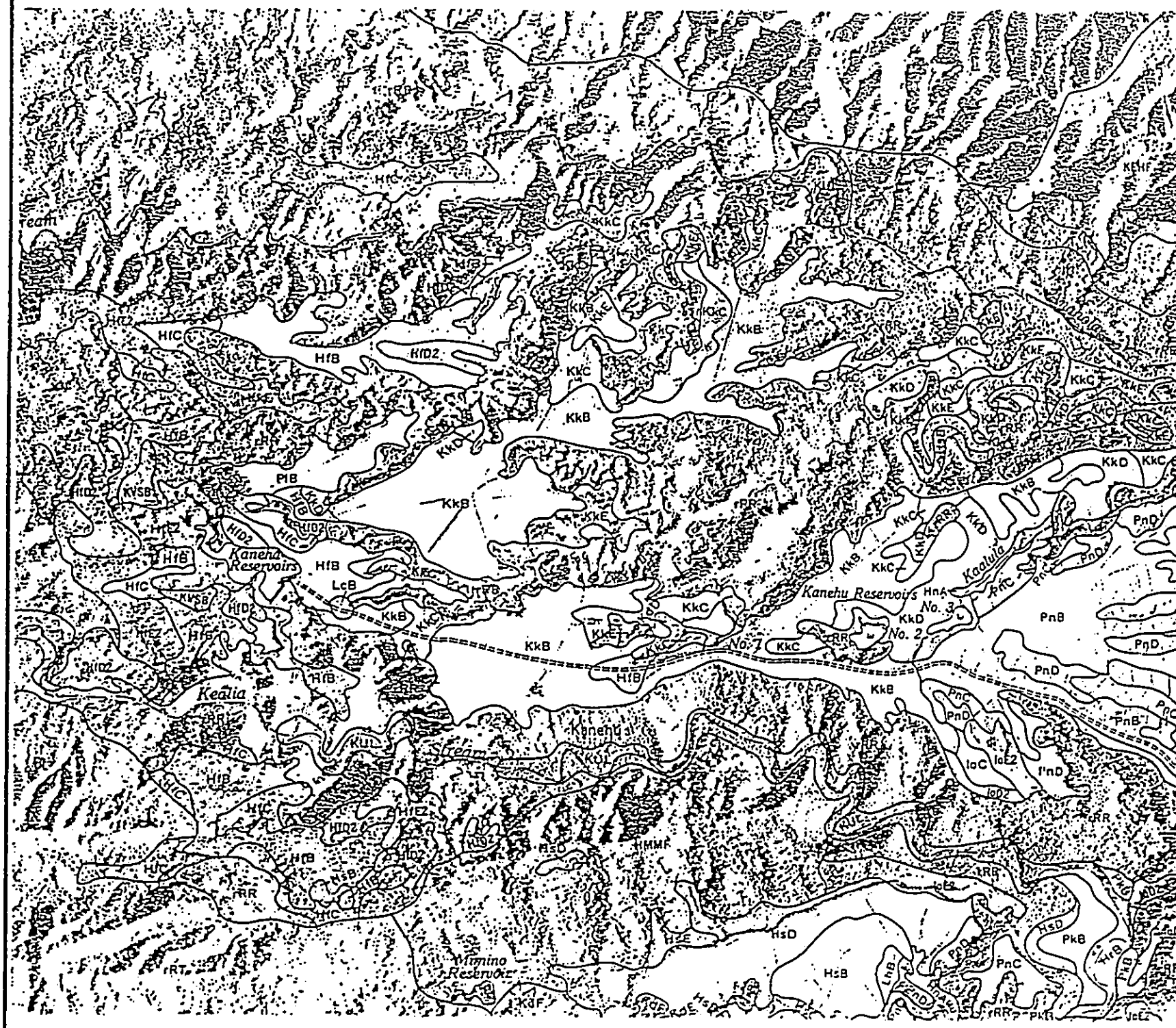

SOURCE: Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii, U.S. Dept. of Agriculture, Soil Conservation Servi

USDA/SCS SOIL

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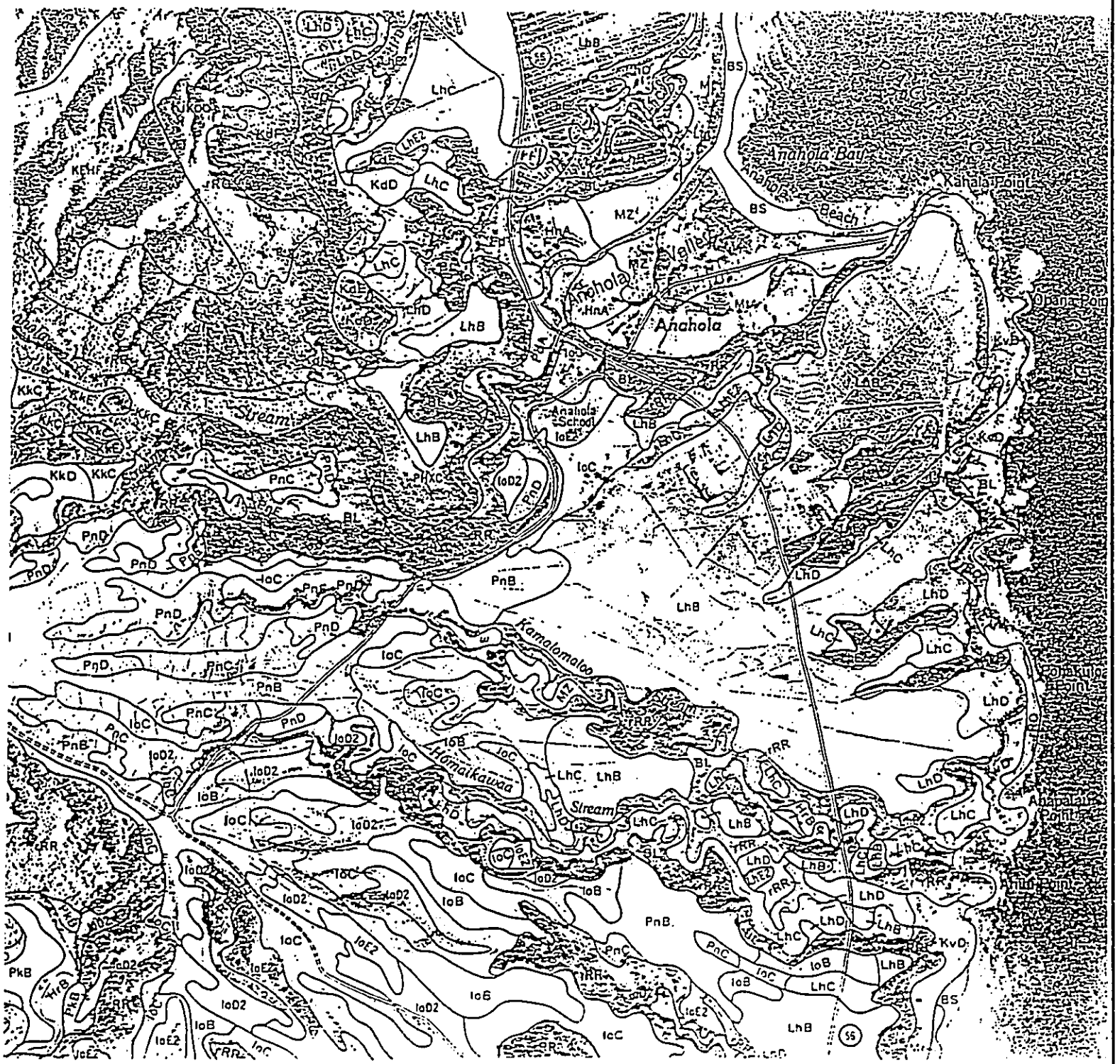

servation Service, August 1972.

SOIL MAP

FIGURE 6

1.2.5. Topography

The Anahola-Kamalomaloo properties extend from sea level at the shoreline up to the 160 foot± elevation at Kuhio Highway and then up to the 800 foot± elevation at the mauka boundary abutting the Kealia Forest Reserve. At Anahola-Kamalomaloo, the existing homestead area terrain generally slopes from 0 to 10 percent. Slopes greater than 20 percent occur in gulches and along mountain slopes. The proposed Anahola WWTP is at about 100 foot± elevation, with an average ground slopes of 10 percent.

1.2.6. Hydrology and Floodplain

(1). Streams

There are three major streams in the area. Anahola Stream flows into Anahola Bay. Kaupaku Stream flows into Anahola Stream and drains a large portion of the mauka property. Kamalomaloo Stream drains portions of the Kamalomaloo property and empties into a bay located between Anapalau Point and Ahihi Point. Runoff from the higher areas drain into gulches that feed these major streams, and into a system of ditches and reservoirs that irrigate the Lihue Plantation fields. Low lying areas in Anahola Town near the shoreline and along the river are subject to flooding. See Flood Insurance Rate Map shown in **Figure-7**.

(2). Groundwater

According to the Kauai Water Use and Development Plan, the types of groundwater in the Anahola study area include fresh basal, perched and brackish basal water. See **Figure-8**. The existing nearest sources of potable water are two County wells and one DHHL well located above Kuhio Highway. **See Figure-9**. The groundwater table is approximately 12 to 14 feet above sea level at these well locations.

To protect the underground sources of drinking water, the State Department of Health (DOH) promulgated Public Health Regulations entitled "Underground injection Control (UIC) Rules", known as Chapter 23, Title 11 of the Hawaii Administrative Rules. The DOH

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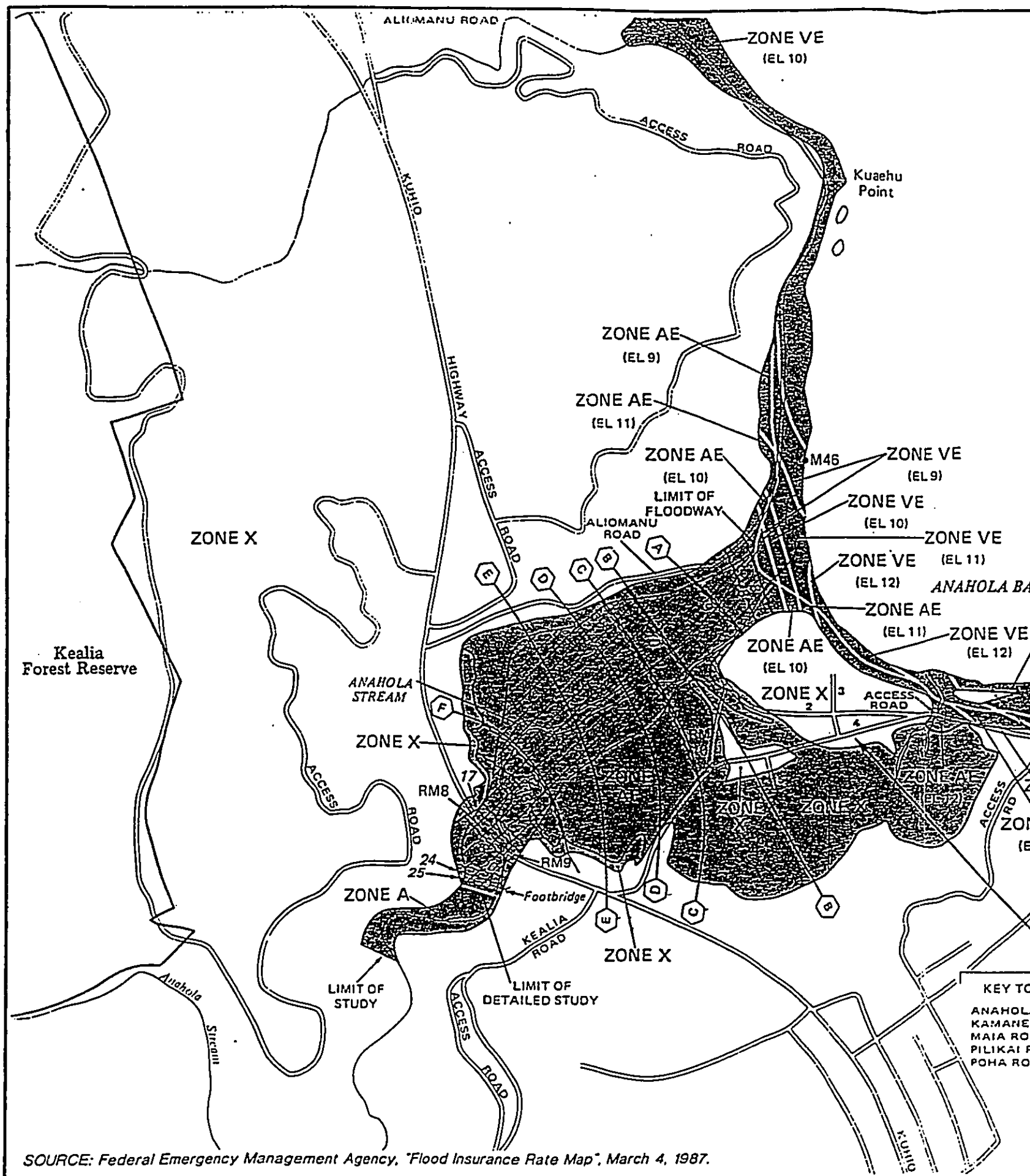
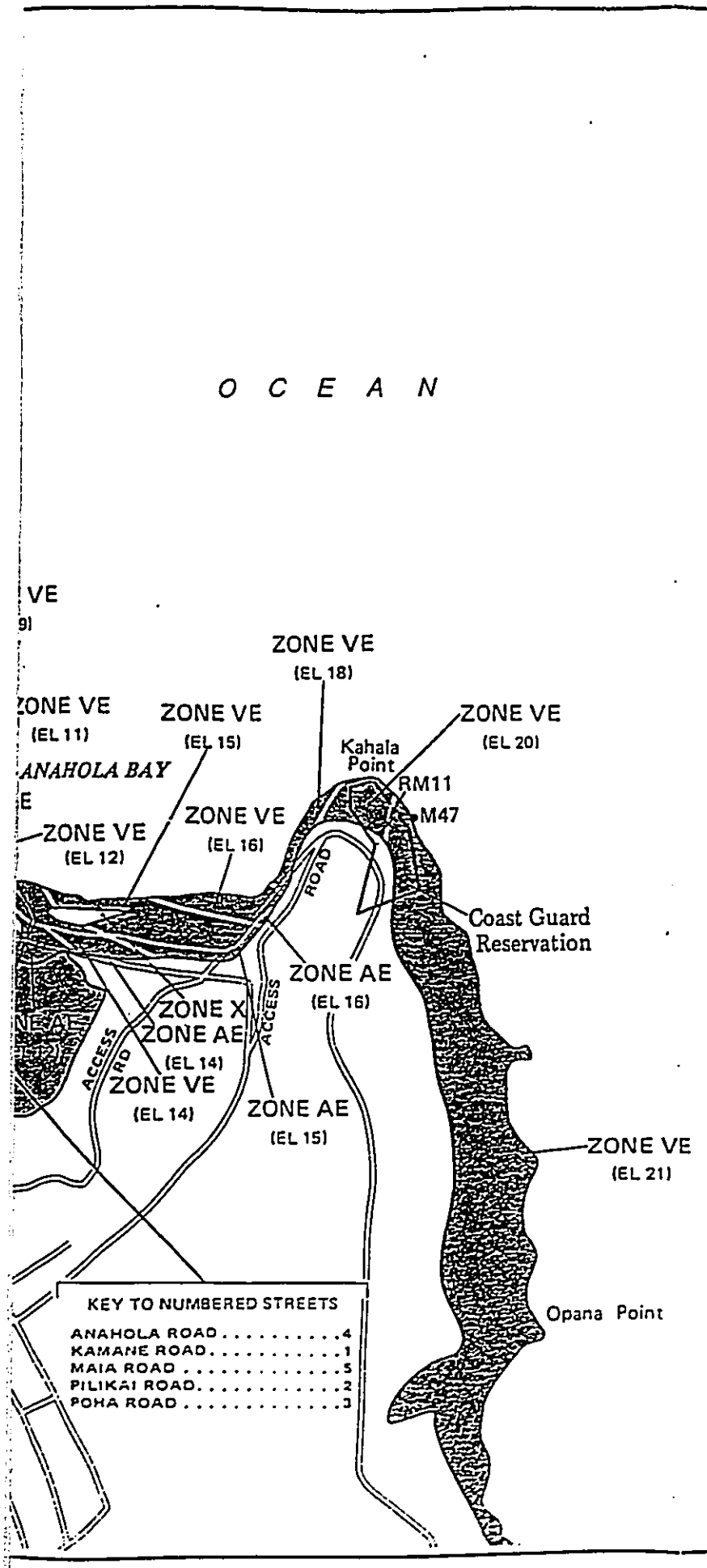


SOURCE: Federal Emergency Management Agency, "Flood Insurance Rate Map", March 4, 1987.

FLOOD ZONE



LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

- ZONE A — No base flood elevations determined.
- ZONE AE — Base flood elevations determined.
- ZONE AH — Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.
- ZONE AO — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE A99 — To be protected from 100-year flood by Federal flood protection system under construction; no base elevations determined.
- ZONE V — Coastal flood with velocity hazard (wave action); no base flood elevations determined.
- ZONE VE — Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

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

OTHER AREAS

- ZONE X — Areas determined to be outside 500-year flood plain.
- ZONE D — Areas in which flood hazards are undetermined.

- Flood Boundary
- Floodway Boundary
- Zone D Boundary
- Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.
- 513 — Base Flood Elevation Line; Elevation in Feet*
- D — D — Cross Section Line
- (EL 987) — Base Flood Elevation in Feet Where Uniform Within Zone*
- $RM7_X$ — Elevation Reference Mark

*Referenced to the National Geodetic Vertical Datum of 1929

APPROXIMATE SCALE IN FEET

1000 0 1000

ZONE MAP

FIGURE 7

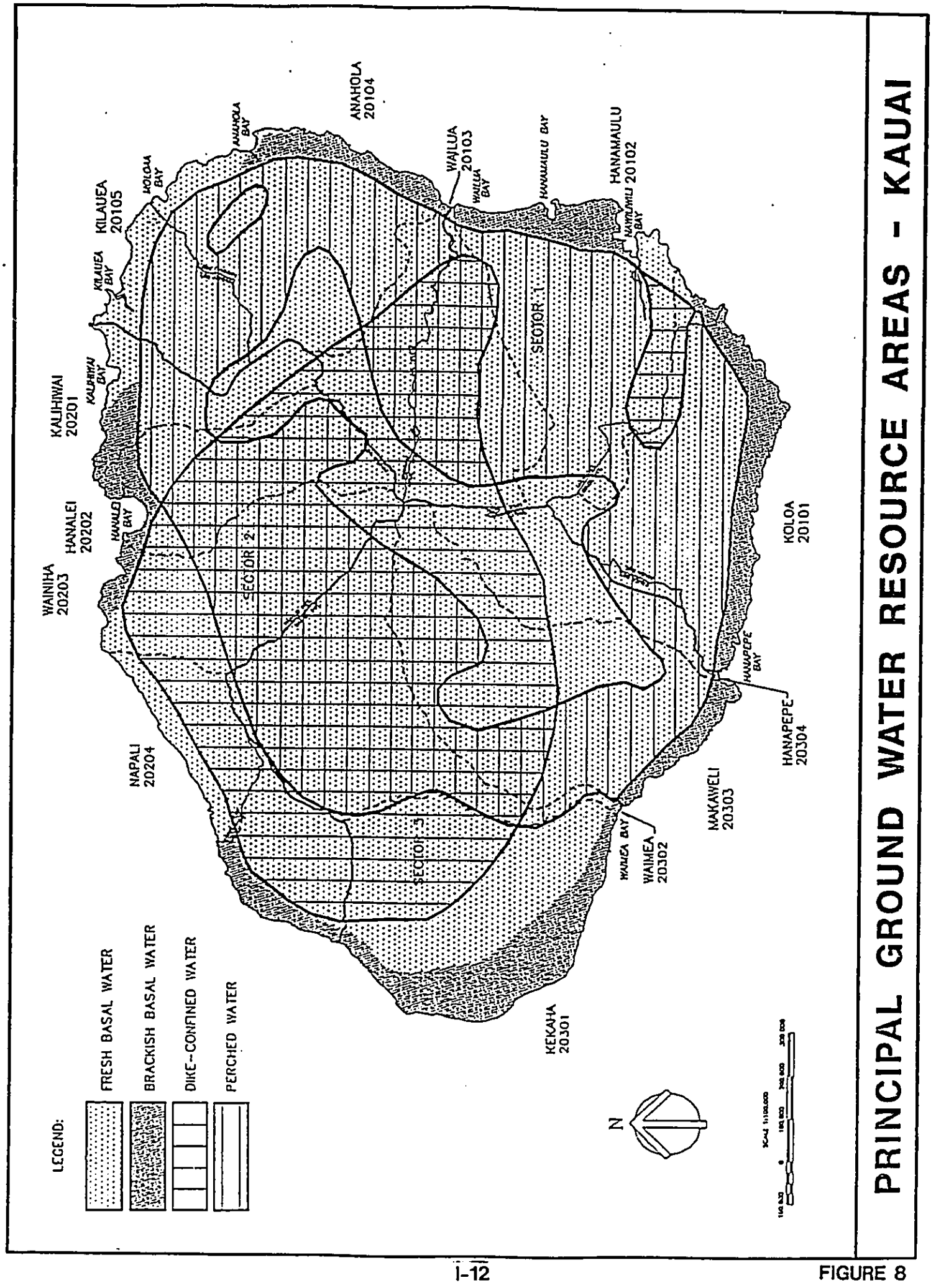


FIGURE 8

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WATER RESOU

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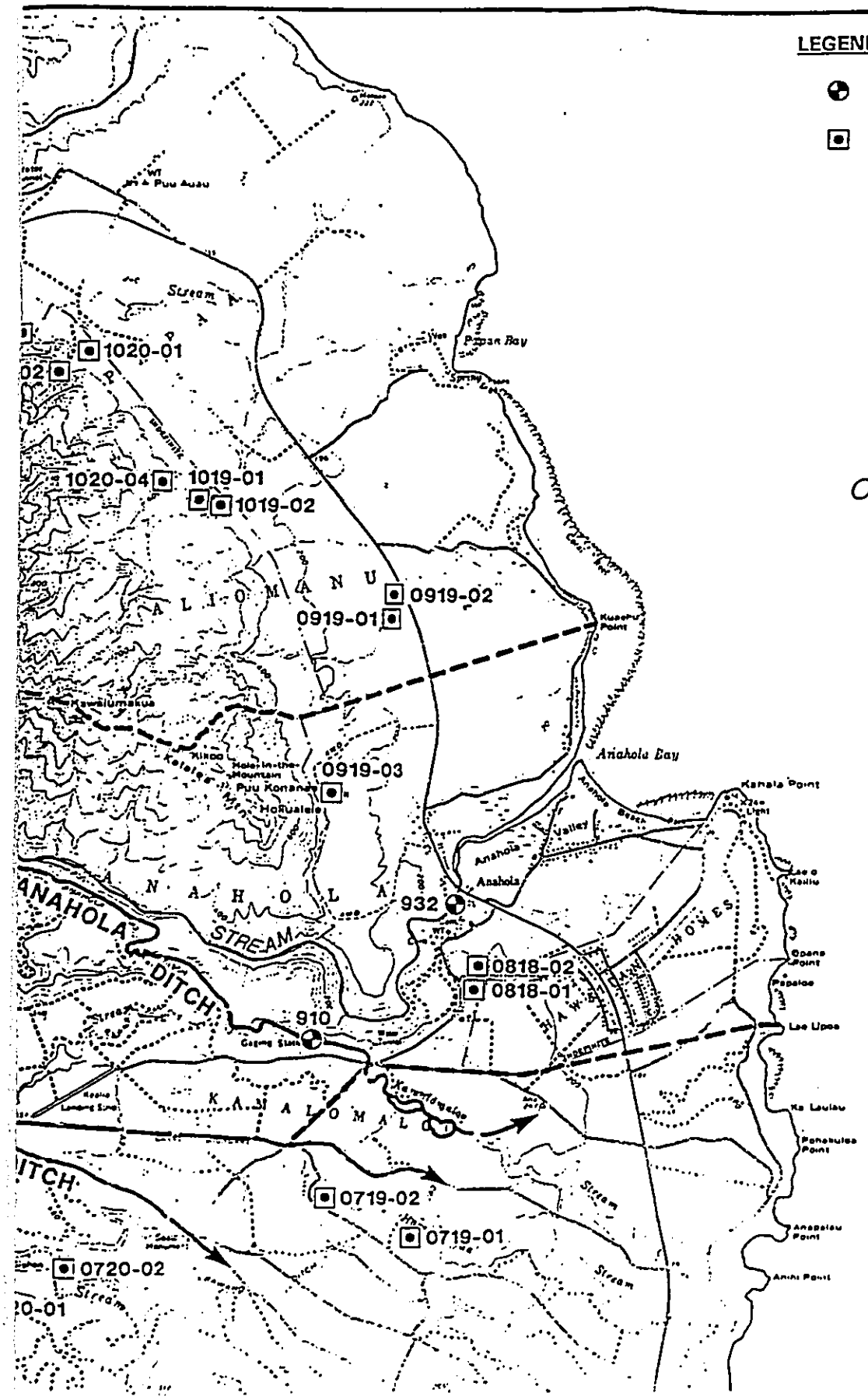


regulations have established a "no pass" line to restrict the subsurface disposal of fluids which might contaminate underground sources of drinking water. No injection well will be permitted mauka of this line. Any injection well makai of the "no pass" line must obtain a DOH permit to construct, operate, and close. The "no pass" line for the Anahola area is shown in **Figure-10**. Also, Chapter 62, Title 11 of the Hawaii Administrative Rules, specifies that no cesspools can be utilized within a 1,000 foot radius of all existing and projected drinking water sources.

(3). Coastal Water

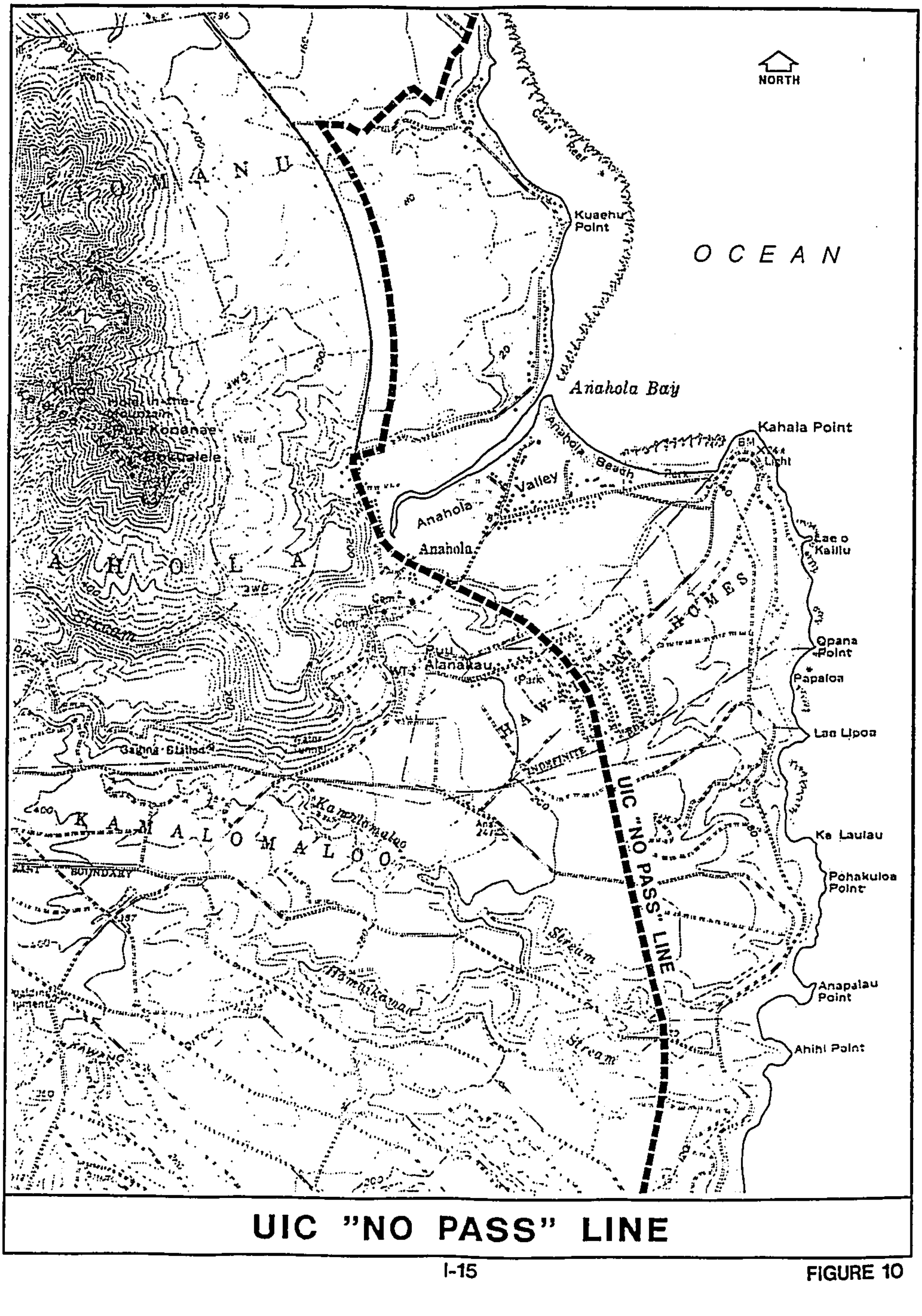
The Anahola Stream and Kamalomaloo Stream discharge into Anahola Bay. According to Chapter 54, Title 11 of the Hawaii Administrative Rules, the off-shore waters of Anahola Bay and Ahihi Point are classified as "Class A". The intent of these regulations is to protect off-shore waters from degradation. Within Class A embayments, no new treated sewage effluent discharges will be allowed. Outside the Class A embayment, off-shore outfall disposal is possible, but a NPDES permit from DOH must be obtained. Ocean outfall disposal of treated effluent is not viable because of the high planning, design, and construction costs for developing offshore outfall disposal facilities.

(4). Special Management Area

The County of Kauai has established Special Management Area (SMA) ordinances to protect natural resources within the coastal areas of Kauai. Any development or activity which impacts the SMA must apply for a permit. The SMA extends from the shoreline inland to a demarcation line established by the County, and is shown on **Figure-11**. The Anahola WWTP and Phase I sewerage service area are not within the SMA zone, and thus do not require a SMA permit.

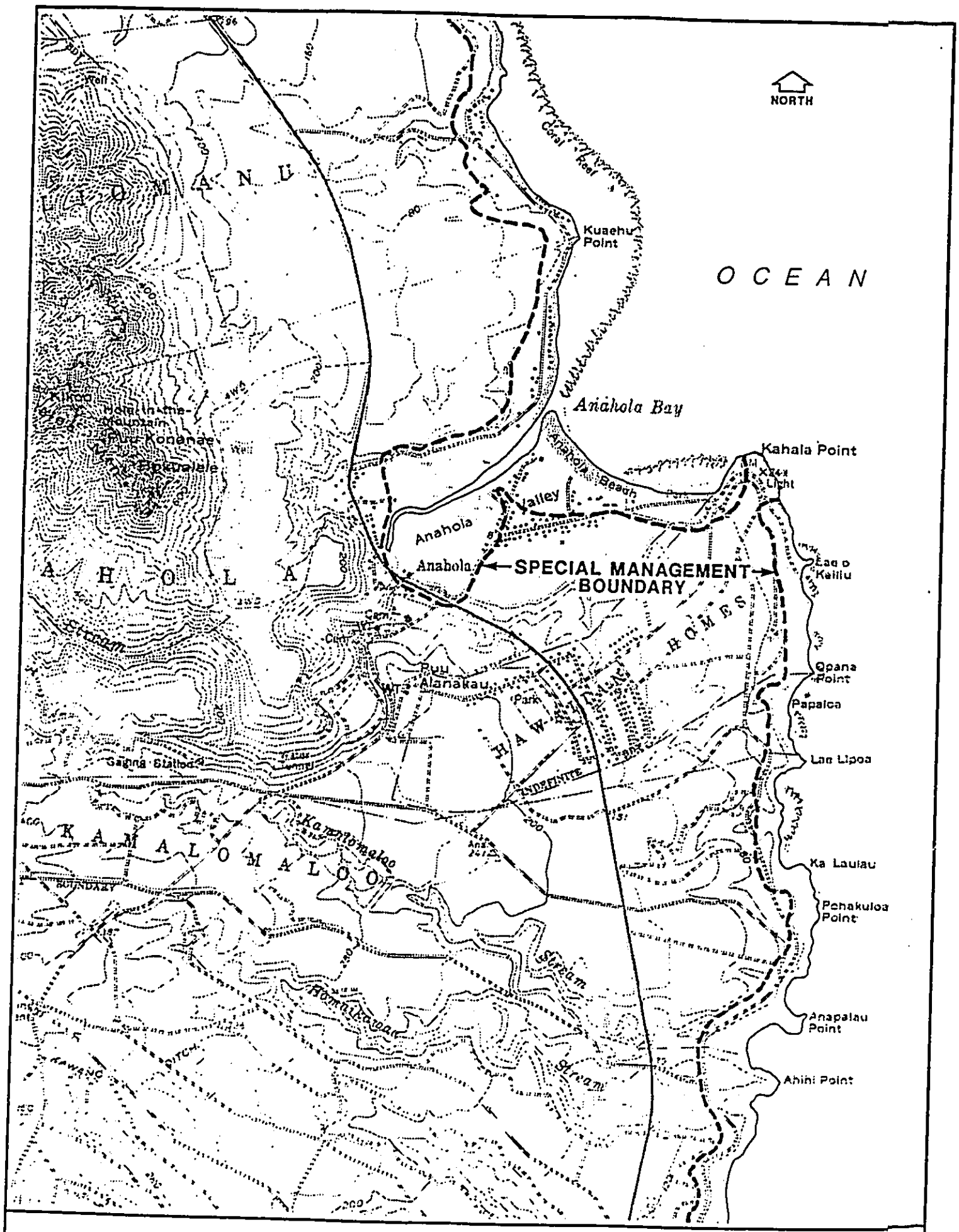
1.2.7. Biology

There are no endangered plants or animals within or near the project area, according to available information and the DHHL Anahola Development Plan.



UIC "NO PASS" LINE

FIGURE 10



SPECIAL MANAGEMENT AREA

FIGURE 11

1.2.8. Historical and Archaeological Sites

Based on the Anahola Development Plan, the following historical/archaeological sites are shown in **Figure-12**:

(1). Anahola Dune Burials (State Site No. 30-03-116) are located on an 8.61 acre parcel identified by TMK No. 4-8-07:01. Specific locations were not indicated.

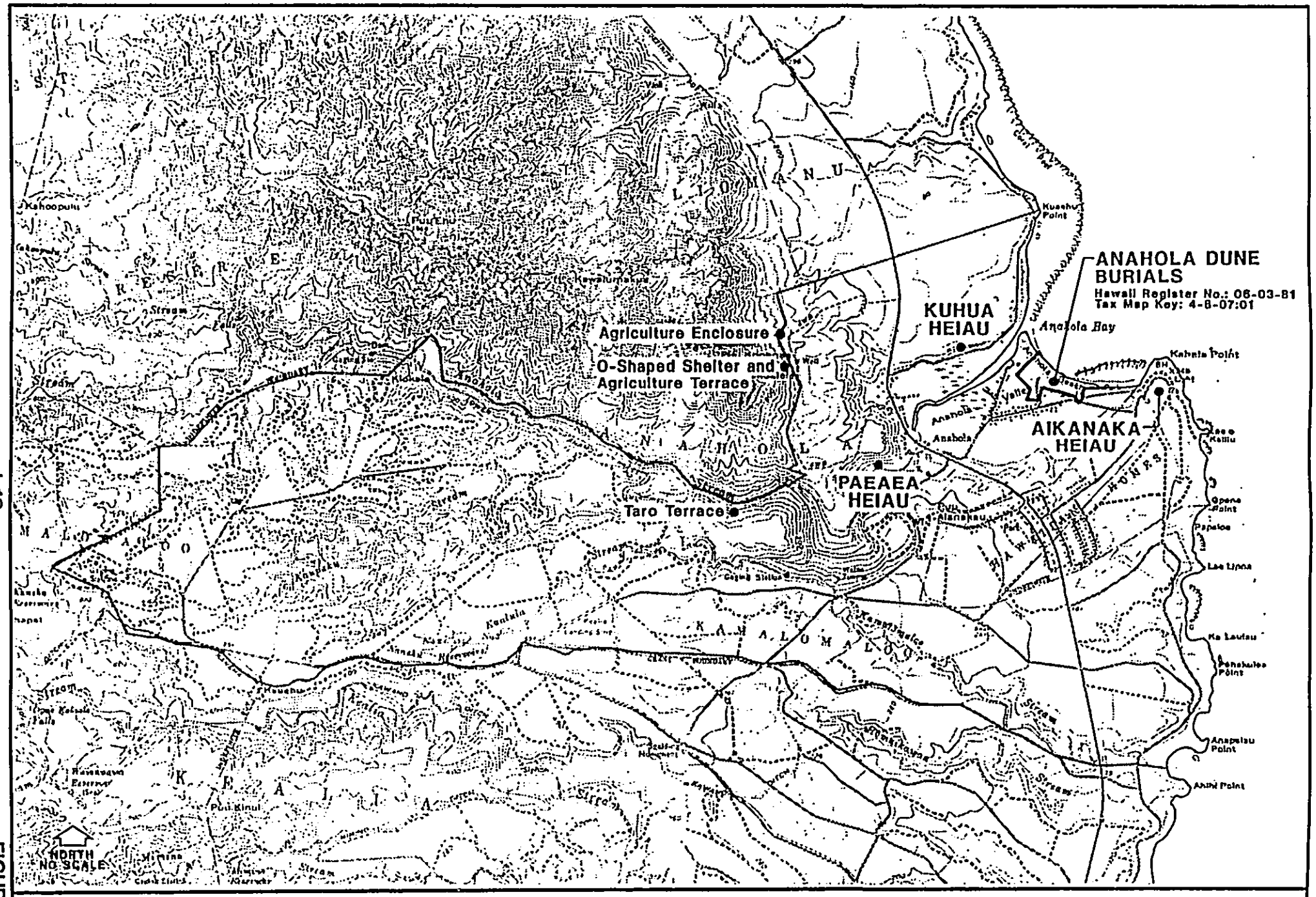
(2). Aikanaka Heiau (State Site No. 30:04:0113) was identified in 1907 to have stood on the bluff at the south side of Anahola Bay. It was described as "A small heiau, about *40 feet in size, that has been destroyed.*" A 1931 *investigation in the cane field* identified a large rock that may have marked the spot of the heiau. However, A DHHL reconnaissance in 1985 failed to find the large rock. It was suspected that the rock had been moved as part of the agricultural activities.

(3). Paeaea Heiau (State Site No. 30:04:0114) was identified in 1907 as a small round heiau with walls about 8 feet high, but not thick and whose class was not known. The heiau was located in 1931 at the back of Anahola Bay inland of the government road on the north side of the valley. Since then, the site has not been relocated nor inspected.

(4). Kuhua Heiau (State Site No. 30:04:0115) was located on northern bluff of Anahola Valley between the government road and the sea bluff. It has been concluded that the heiau was destroyed by land clearing for pineapple fields.

(5). Taro Terraces (State Site No. 30:04:0117) were identified by the DHHL as "...of usual description and marked by taro lines in Anahola Valley. Though the slopes are too steep for cultivation, taro is still grown on the flatland near the mouth of the valley."

The location of the proposed Anahola WWTP will not be on nor adjacent to those identified historical sites. Therefore, no impact to the historical sites is anticipated.



I-18

FIGURE 12

HISTORIC/ARCHAEOLOGICAL SITES

1.2.9. Land Use

Land use policies and designations are governed by State and County laws and regulations. The State Land Use Commission establishes and designates "general planned" for Agriculture, Conservation, Rural, or Urban uses. The State Land Use designations for the Anahola area are shown in **Figure-13**. More detailed land use zonings for the State designated land areas are governed by the County's Planning Department, through adoption of a "County General Plan", promulgation of a "Land Use Ordinance", and development of County Zoning Maps which specify the land uses as follows:

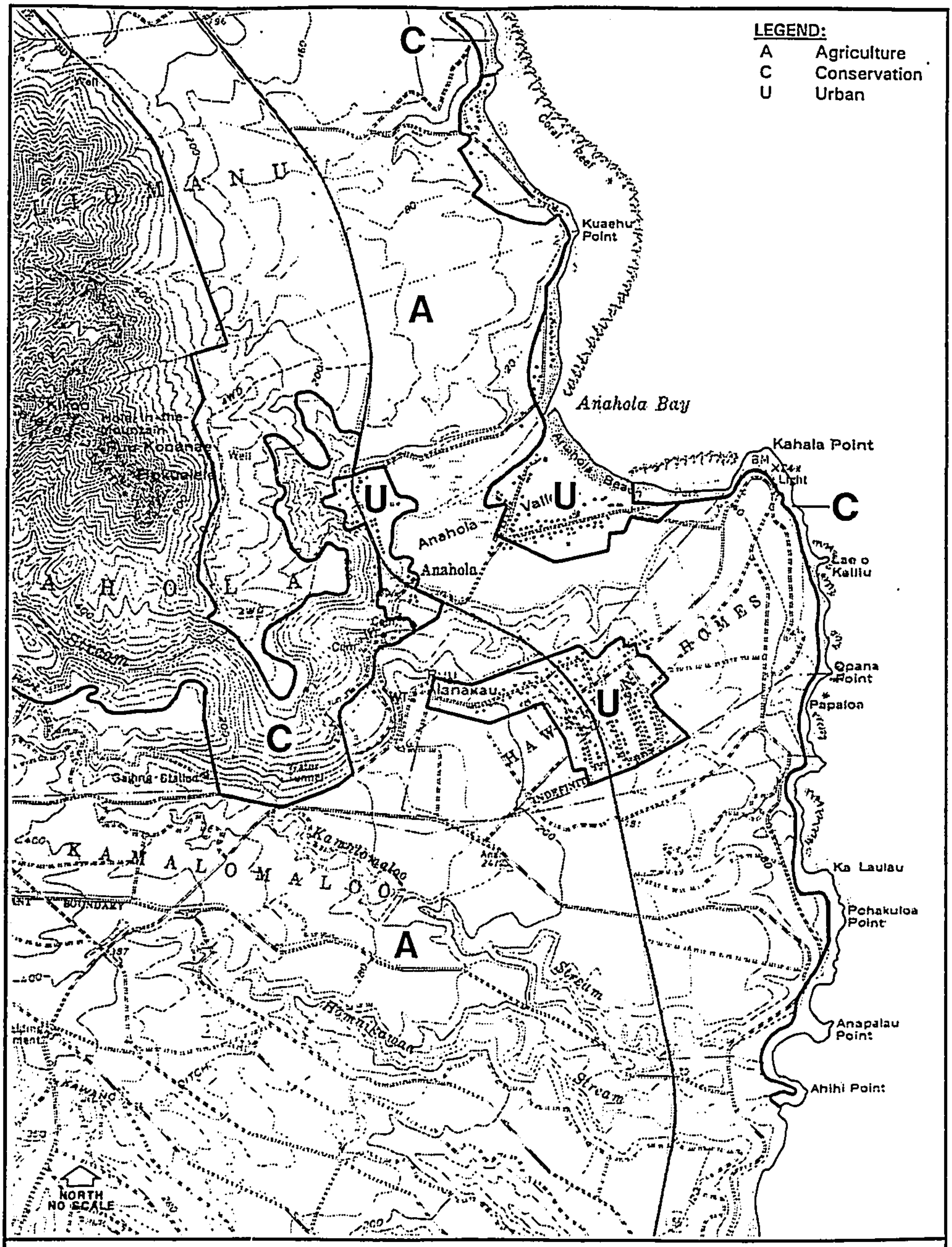
A	Agriculture
O	Open
PF	Public Facilities
R	Resort
RR	Rural Residential
UR	Urban Residential
UMU	Urban Mixed Use

The County General Plan for the Anahola area is shown in **Figure-14**. The County Zoning Map for the Anahola area is shown in **Figure-15**.

Existing residential areas are shown in **Figure-16** and include (1) the DHHL Anahola Village residential lots within the lower Anahola valley adjacent to Anahola Bay; (2) the shoreline residences along the shoreline north of Anahola Bay to Aliomanu; and (3) the DHHL homestead residential lots on the hills overlooking Anahola Village area.

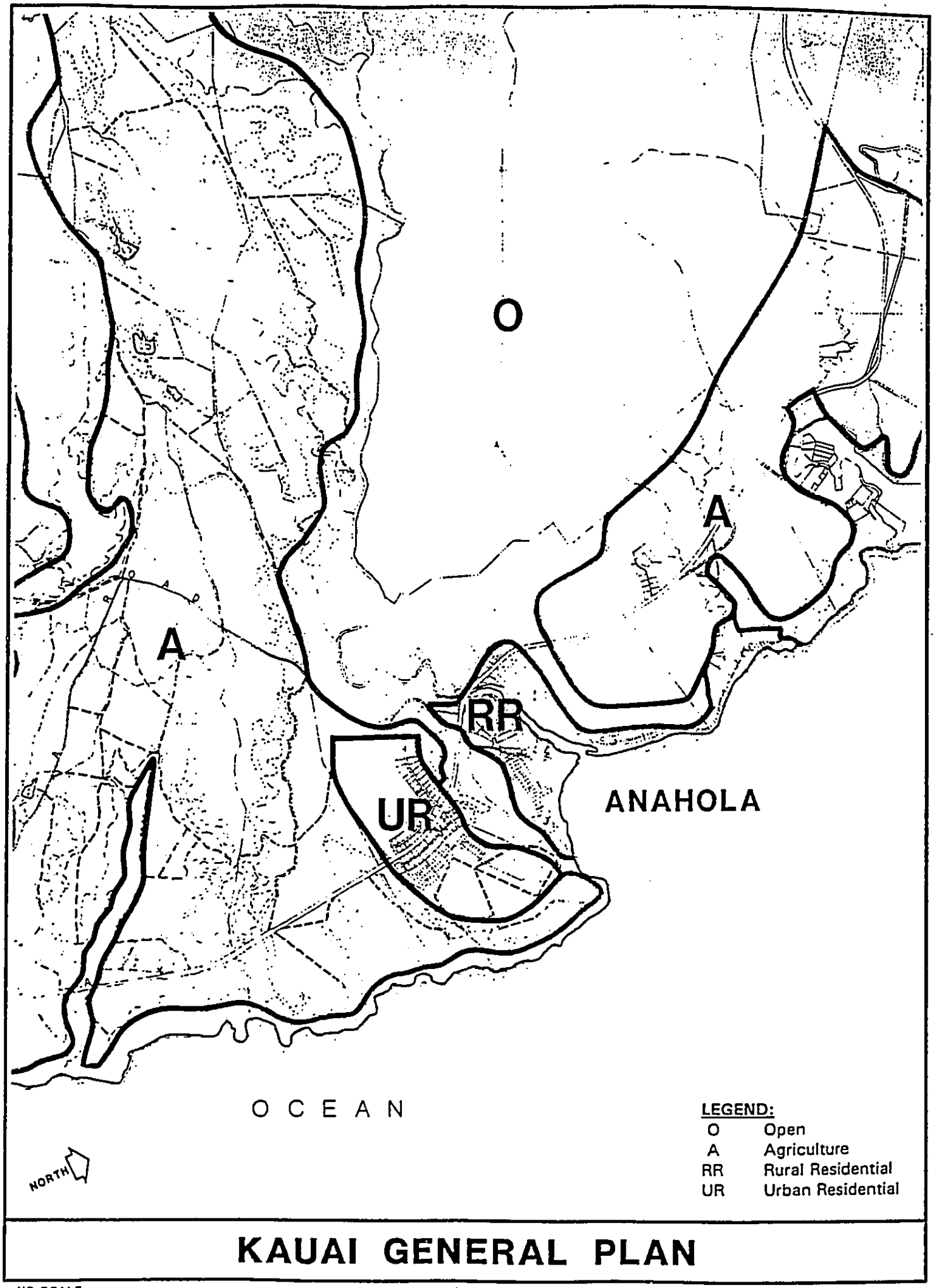
Existing commercial facilities include a food market and a hamburger stand located on private land along Kuhio Highway north of the Anahola Stream bridge.

Public service facilities include Anahola preschool, a post office, various churches and cemeteries, Anahola Homestead Park, and Anahola Beach Park.



STATE LAND USE MAP

FIGURE 13



KAUAI GENERAL PLAN

NO SCALE

FIGURE 14

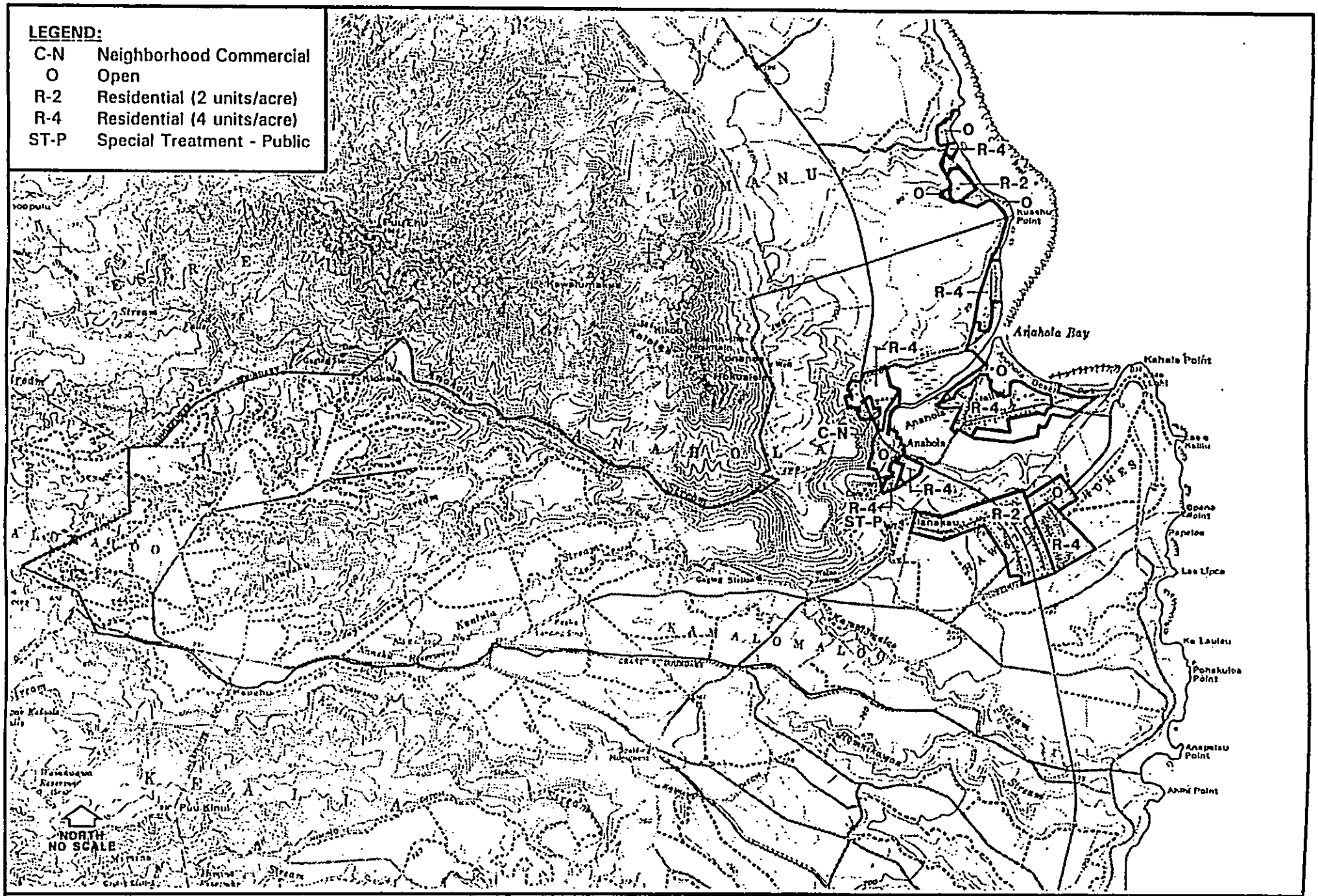


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FIGURE 15

COUNTY ZONING DISTRICTS

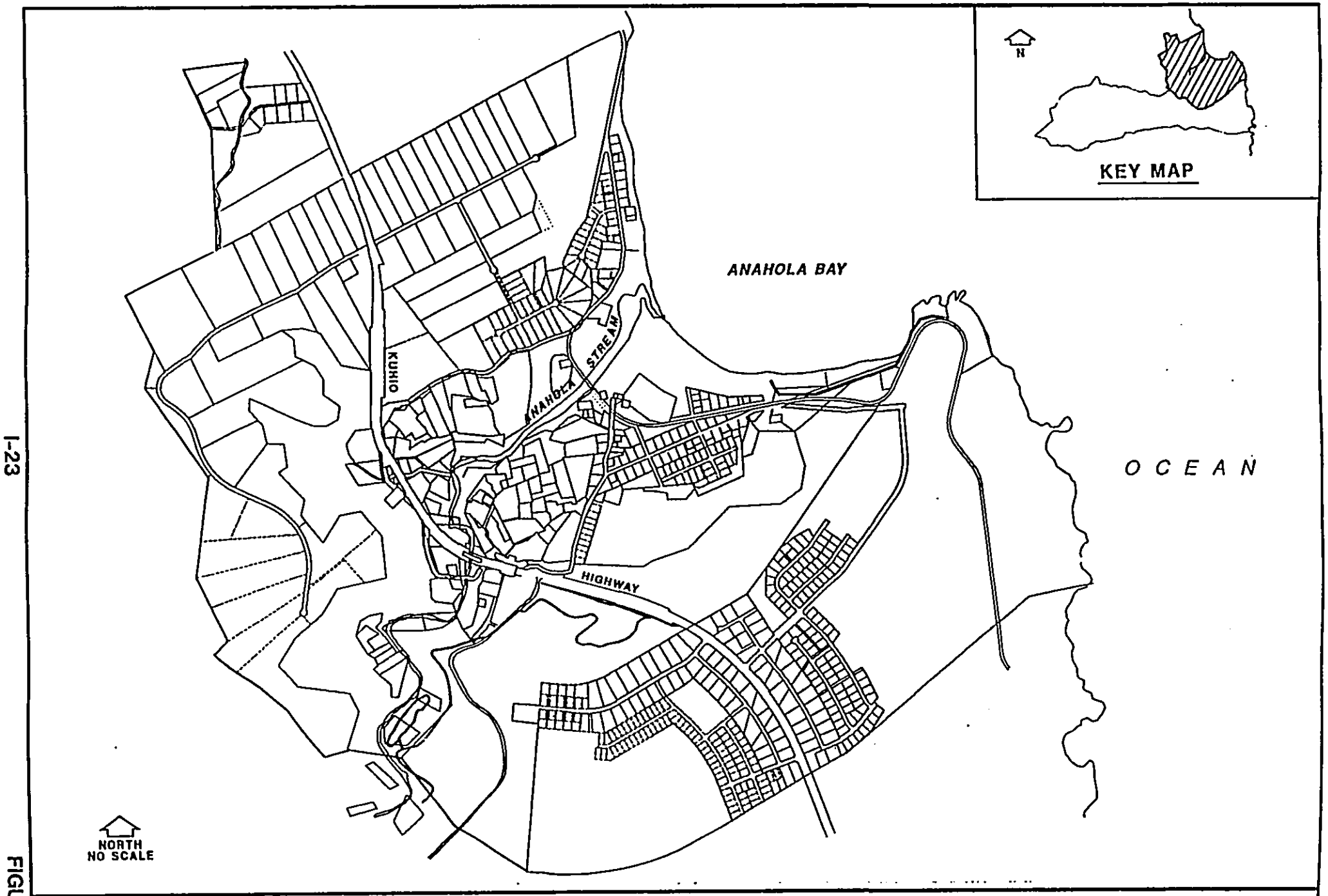

FIGURE 16

EXISTING RESIDENTIAL AREAS

The large peripheral area around the Anahola homestead lands is used primarily for agriculture. Areas uphill of the Anahola homestead subdivision are leased to Lihue Plantation Company for sugarcane cultivation. The lands on the northern part of the study area have been subdivided into agricultural homestead lots for DHHL award and is identified as the Anahola Farm Lot subdivision.

1.3. Socio-economic Characteristics

1.3.1. Population and its Projections

Anahola town and the peripheral Kamalomaloo area are included within Census Track 402.01. Total population for the track was 2,178 in 1990 (DBEDT, 1992).

Population projections for the County of Kauai are available. However, some of the data are not directly applicable to the Anahola-Kamalomaloo communities, and are presented in paragraphs 1 and 2 below for background information only. There are several population projections specific to the Anahola-Kamalomaloo study area, and these are discussed in paragraph 3 below. Review of the population projections indicates the difficulty and variability in projecting populations for specific areas.

(1). 1990 Bureau of Census Population Counts

According to the Census Bureau's reports, the County of Kauai had a population of 51,177 persons in 1990. Within census track 402.01 that includes the Anahola-Kamalomaloo planning area, the 1990 census data indicate a population of 2,178 and 656 households. The average number of residents per household within the track was approximately 3.3 persons. For the Anahola Census Designated Place, the population size in 1990 was 1,181.

In the Anahola Development Plan, an average of 4.12 persons per family was estimated for the planning area. By comparison, the County's Sewer Design Standards specifies that the densities of residential occupancy shall be assumed to be 4 persons per household. For planning purposes, the County's Sewer Division Standards will be used.

(2). Population Projection, Series M-K

The State Department of Business, Economic Development and Tourism (DBEDT) Population and Economic Projections for the State of Hawaii to 2010 (Series M-K) dated November 1988 provides population projection data for the State of Hawaii. According to the State DBEDT, the projections are based on objective analysis of past and current trends, and represent the most likely future given the known economic and demographic factors at the time the report was prepared. The resident population projections for the state total and County of Kauai are summarized below and indicated a 56% increase in population from the year 1990 to 2010.

YEAR	STATE TOTAL	KAUAI	
1970	771,600	29,800	
1975	886,200	33,400	
1980	968,900	39,400	
1985	1,051,500	45,400	
1990	1,137,200	54,100	(51,177 -1990 Census count)
1995	1,225,200	61,100	
2000	1,285,100	68,200	
2005	1,350,800	75,500	
2010	1,435,500	84,600	

(3). Population Projection for the Anahola-Kamalomaloo Planning Area

The most recent population projection study in the area was prepared for the DHHL by Akinaka & Associates in a Water Master Plan prepared for Anahola-Kamalomaloo, Kauai, dated December 1991 and revised May 1992. Although the title of the report includes the Kamalomaloo sub-area, the study area was actually confined to the existing County and DHHL water system service limits or "core area" shown in **Figure-17**. The Water Master Plan Report projected a population of 4,824 residents within the water service limits.

A population projection was made in the 1987 Anahola Development Plan report.

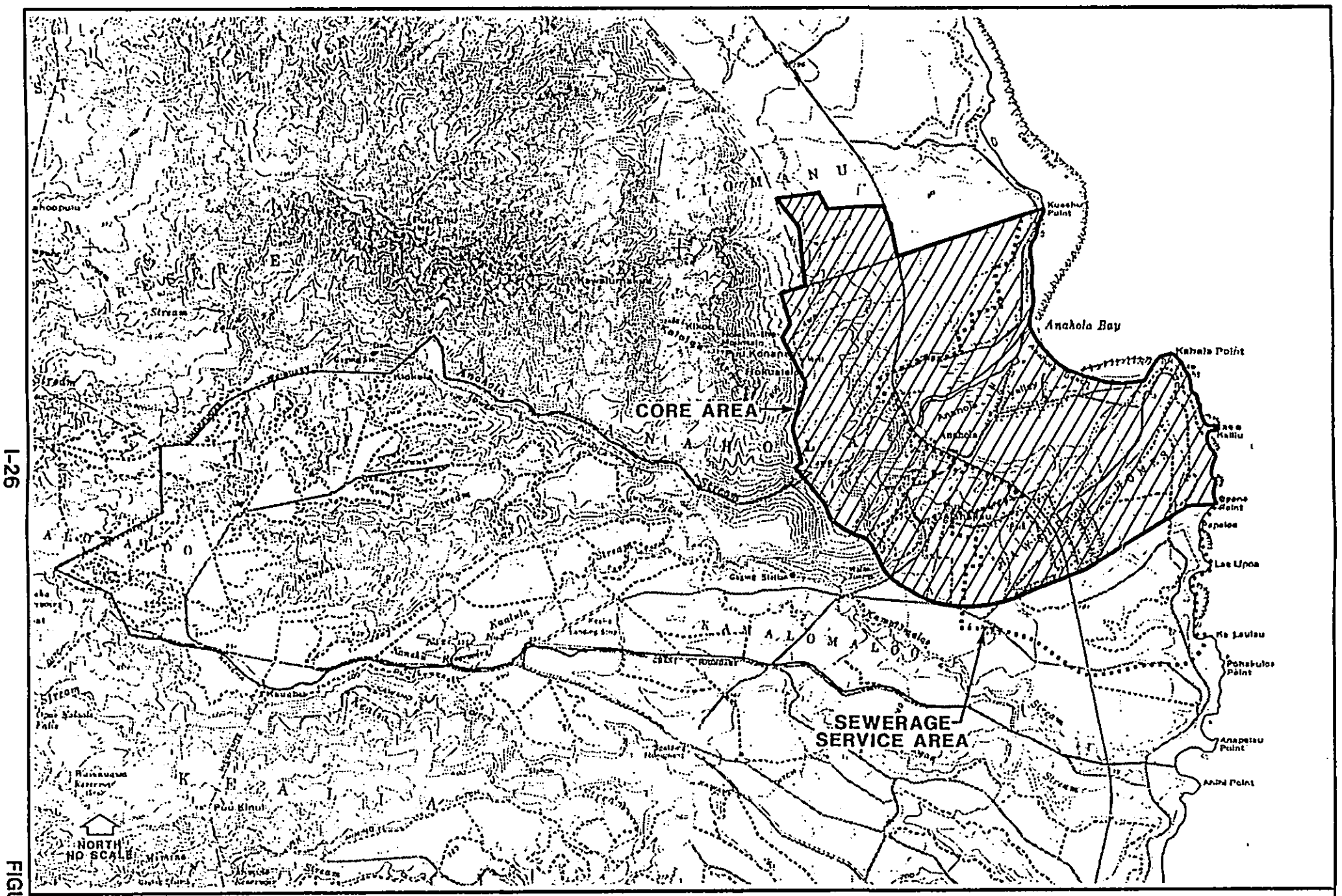

FIGURE 17

CORE AREA

According to the report, the town of Anahola had 915 residents in 1980. The development plan envisioned a community of about 6,500 residents, including the small Moloaa area by the year 2007. Most of these community members would live on new homestead residential lots located near the existing Anahola homestead areas, while others would live and work on farms adjacent to the residential core and extending from the shoreline up to the mauka forest reserve area.

(4). Population Projection for Sizing the Anahola WWTP Expansion

As part of the scope of work for the design of Anahola Wastewater Treatment Plant, new population projections were developed for sewerage system master planning purposes.

The population within the Anahola Census Designation Place (**Figure-18**) was 915 in 1980, and 1,181 in 1990. Based on available project scheduling information, and assuming that the demand for affordable housing remains strong, a plausible population projection scenario was developed incorporating DHHL proposed subdivision plans, and the results are summarized in **Table-1**. The full build out population is estimated to be 13,156 people. The corresponding average daily domestic wastewater flow is approximately 1.32 MGD. Wastewaters will also be generated from schools, commercial areas, parks, industrial areas etc. Allowances for these additional flows are tabulated in **Table-2**, and the total projected wastewater flow at full build out is estimated to be approximately 1.5 MGD.

As previously discussed, not all the population in the Anahola-Kamalomaloo area will be sewered by the municipal sewer collection and centralized treatment system. For this planning study, only those within the SSA will be sewered. The differentiation was presented in **Table-2**. The population counts of individual subdivisions and their corresponding sewage generation are also presented in **Table-2**. It should be noted that the 1999-2010 population indicated in **Table-1** (4396) represents the core area population and is 436 fewer than that calculated in **Table-2** (4,832). The difference is because the 1991 population indicated in **Table-1** is based on the Census data which is smaller than the population calculated on the basis of maximum land use and densities. The data in **Table-2** are based on maximum allowable land development densities, according to the

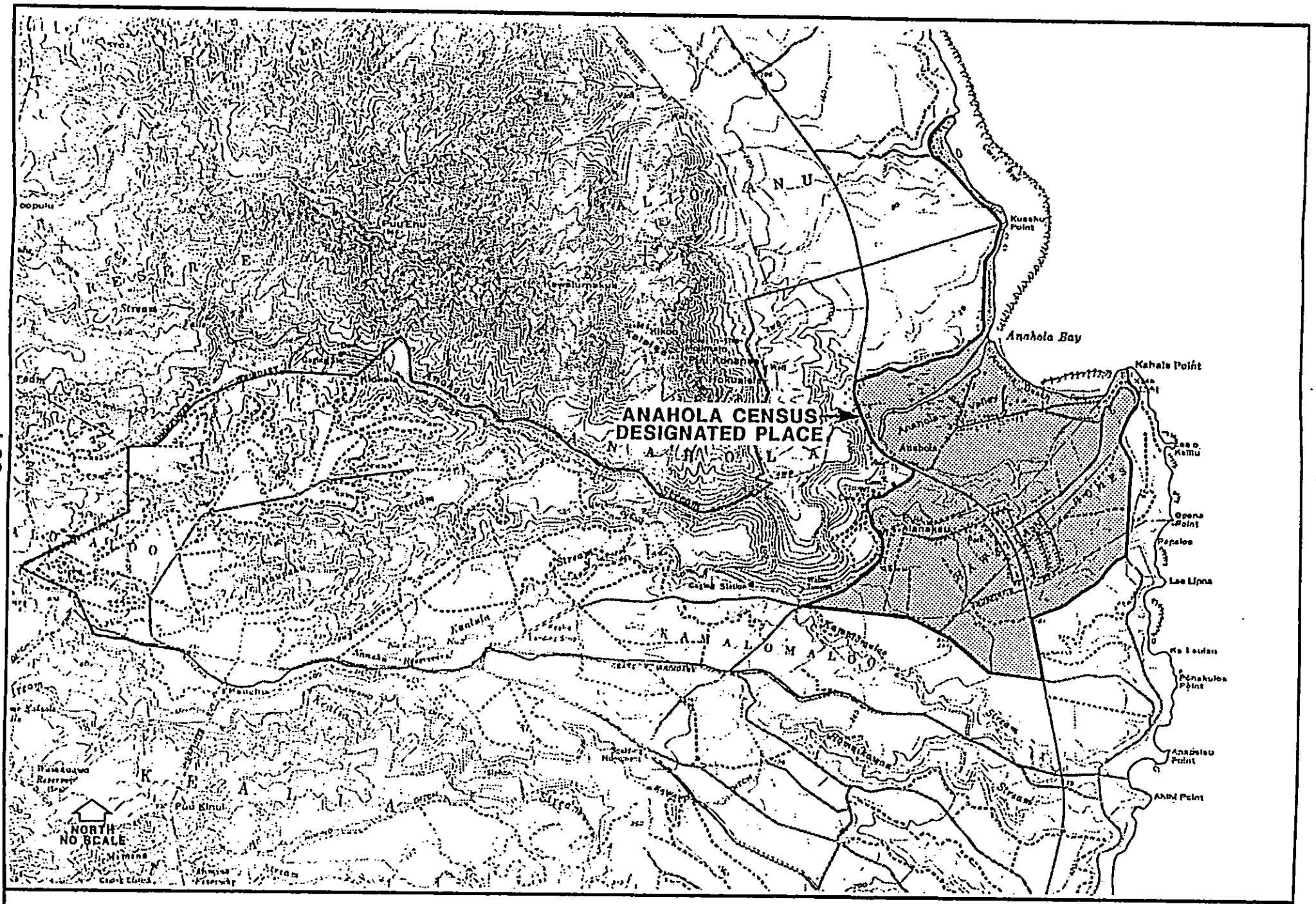

FIGURE 18

ANAHOLA CENSUS DESIGNATED PLACE

TABLE-1

ESTIMATED POPULATION PROJECTION*

UNITS\YEAR	1991	1992	1993	1994	1995	1996	1997	1998	1999-2010	LONG RANGE TO FULL BUILD UP (beyond 2010)
Core Area										
ESTIMATE EXISTING	1200									
Res. Lots Unit 4		280								
Bayview Subd. Ag. Subd. Unit 1-A2			160							
Village Lots Res. Lots Unit 4R				356	-----					
Mauka Lots 16&20 Hudley Rd Lots Ag. Subd. Unit 1-A1						380	-----			
Makai Lots 16&20 Ag. Lots 28&29 Mauka Lot 26 Aquaculture Lot 9 Ag. Lot 14								1592	428	
Peripheral Area										
From Devel. Plan**										1220
Allowance for expansion										7540
CUMULATIVE POPULATION	1200	1480	1640	1996		2376		3969	4396	13156
ESTIMATED SEWAGE FLOW (MGD)***	0.12	0.15	0.16	0.20		0.24		0.40	0.44	1.32

*: It is assumed that occupation of units is 4 persons per unit; the number of units is from "Water Master Plan" by Akinaka & Assoc., Inc.

**: The number of units is different from the DHHL's Development Plan by Belt Collins & Assoc., considering possible future expansion in the peripheral area. See Table III-2.

***: The average per capita wastewater contribution is assumed to be 100 gal/day.

TABLE III-2
PROJECTED WASTEWATER FLOWS

Development Area	Unit (#)	Area (AC)	Full Development Population	Population to be served	WW Flow (gpd)
A. Core Area					
1. County Single Family	318		318 x 4 = 1272	1272	127,200
2. County Single Family	36		36 x 4 = 144	144	14,400
3. Res. Lots, Unit 4	70		70 x 4 = 280	280	28,000
4. Village Lots	46		46 x 4 = 184	184	18,400
5. Res. Lots, Unit 4R(?)	43		43 x 4 = 172	172	17,200
6. DHHL Ag. Res.	51		51 x 4 = 204	----	0
7. Ag. Lands	----	185	----	----	0
8. Ag. subd. Unit 1-A	3		3 x 4 = 12	----	0
9. Bayview Subd.	31		31 x 4 = 124	124	12,400
10. Ag. subd. Unit 1-A2	10		10 x 4 = 40	----	0
11. Mauka Lots, 16&20 ‡	63		63 x 4 = 252	252	25,200
12. Hudley Rd. Lots	30		30 x 4 = 120	120	12,000
13. Ag Subd. Unit 1-A1	2		2 x 4 = 8	----	0
14. Makai Lots, 16&20	398		398 x 4 = 1592	1592	159,200
15. Commercial Lot, 17	----	1	----	----	6,000
16. Res Mgmt (Canoe, etc.), 18	----	13	----	----	1,000
17. Res Mgmt (Camp, etc.), 19	----	71.1	----	----	5,000
18. Park Lot, 21	----	5	----	----	5,000
19. School (820 students), 22	----	6	----	----	20,500
20. Ag. Lots, 28&29	12	45.9	12 x 4 = 48	48	4,800
21. Mauka Lot, 26	82		82 x 4 = 328	328	32,800
22. Aquaculture Lot, 9	3		3 x 4 = 12	12	1,200
23. Commercial Lot, 3	----	1	----	----	6,000
24. Commercial Lot, 30	----	1	----	----	6,000
25. Ag. Lot, 14	10		10 x 4 = 40	40	4,000
Subtotal			4832	4568	506,300
B. Peripheral Area					
26. Parcel 56, possible SF	1170	162.2	1170 x 4 = 4680	4680	468,000
27. Parcel 65, possible SF	570	79.2	570 x 4 = 2280	2280	228,000
28. Reserve Comm. Devel., 57★	----	6.9	----	----	41,400
29. Reserve possible SF Dev. 58	60	17.3	60 x 4 = 240	240	24,000
30. Elderly Residential, 59	25	2.5	25 x 4 = 100	100	10,000
31. Public Service, 61★	----	2.3	----	----	13,800
32. Reserve possible SF Dev. 62	159	45.7	159 x 4 = 636	636	63,600
33. Commercial, 63	----	11.3	----	----	67,800
34. Limited Industrial, 64	----	13.4	----	----	53,600
35. Res. Mgmt, 23,25,60& 67♣	----	145.5	----	----	20,000
36. Community Cemetery	----	8.3	----	----	0
37. 3-ac Farm Lots, 36 & 48	97	401.4	97 x 4 = 388	----	0
38. 2-ac Farm Lots, 52 & 53	3	7.7	3 x 4 = 12	----	0
39. Pasture Resource Mgmt, 66	1	30.7	1 x 4 = 4	----	0
40. 4-ac Farm Lots, 37,39,43,46	99	508.3	99 x 4 = 396	----	0
41. Pasture, 34,35, 38	6	143.5	6 x 4 = 24	----	0
42. Youth Camp (120 users), 41	30	11.1	----	----	0
Total			13,592	12,504	1,496,500 gpd

‡: Parcel numbers correspond to those in the Development Plan.

★: Flow based on 6,000 gallons per acre per day (general commercial use).

♣: For these four Resource Management parcels, it is assumed that recreational uses such as parks will be established. For a unit wastewater generation rate of 10 gal per capita per day and 500 users on each parcel, a total of 20,000 gpd is derived.

County Zoning Code, on the land use and zoning map areas shown on **Figure-19**. Allowances for the possibility of denser development in the peripheral Kamalomaloo sub-area have also been made because of the uncertainties in planning, land use changes, and other unpredictable variables. In the sub-area, lot size for residential development is assumed to be 6,000 ft^2. Other assumptions made are summarized in the notes for **Table-2**. According to **Table-2**, the projected average daily wastewater flow under full development conditions is approximately 1.5 MGD, which represents a situation in which worst cases co-occur everywhere in the planning area and is hence a very conservative estimate.

1.3.2. Economic and Social Profile of the Project Area

The Anahola-Kamalomaloo communities could be characterized as primarily rural residential communities. The predominant land owner in the area is DHHL. Most of the surrounding area is zoned for agriculture, and is used for growing sugar cane by Lihue Sugar Plantation. Most of the urban zoned lands have been developed into residential subdivisions. Commercial development is limited. It is expected that, after the completion of the homestead development, many of the residents will continue to commute to Lihue, Kapaa, and other areas for employment.

1.4. Anticipated Sewage Flow

1.4.1. Infiltration and Inflow

Part of the flows in the sewerage system are comprised of dry weather infiltration and wet weather inflow. Since most of the urban developments will be above the 10-foot elevation, the groundwater table in most parts of the Anahola area will be below the sewers except for the low-land area in the flood zone. Therefore, dry weather infiltration should be minimal.

In the absence of actual measured data, the Kauai County Standards suggest the following allowances for wet weather infiltration and inflow:

2,750 gpad for sewers laid below normal ground water
1,250 gpad for sewers laid above normal ground water

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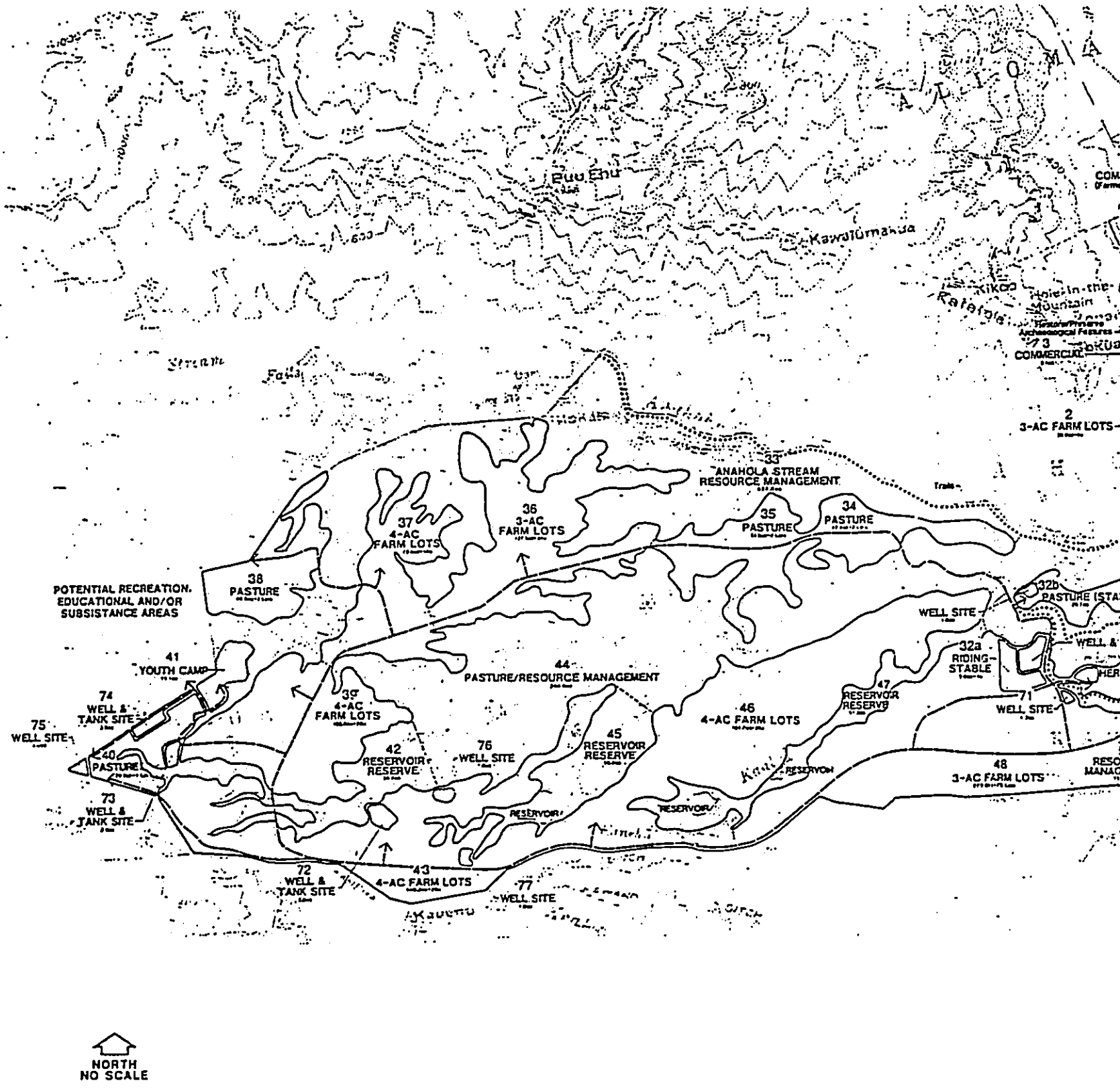

Reference: DHHL "Anahola-Kamalomalo and Moloaa Development", 1987.

DEVELOPMENT PLAN PA

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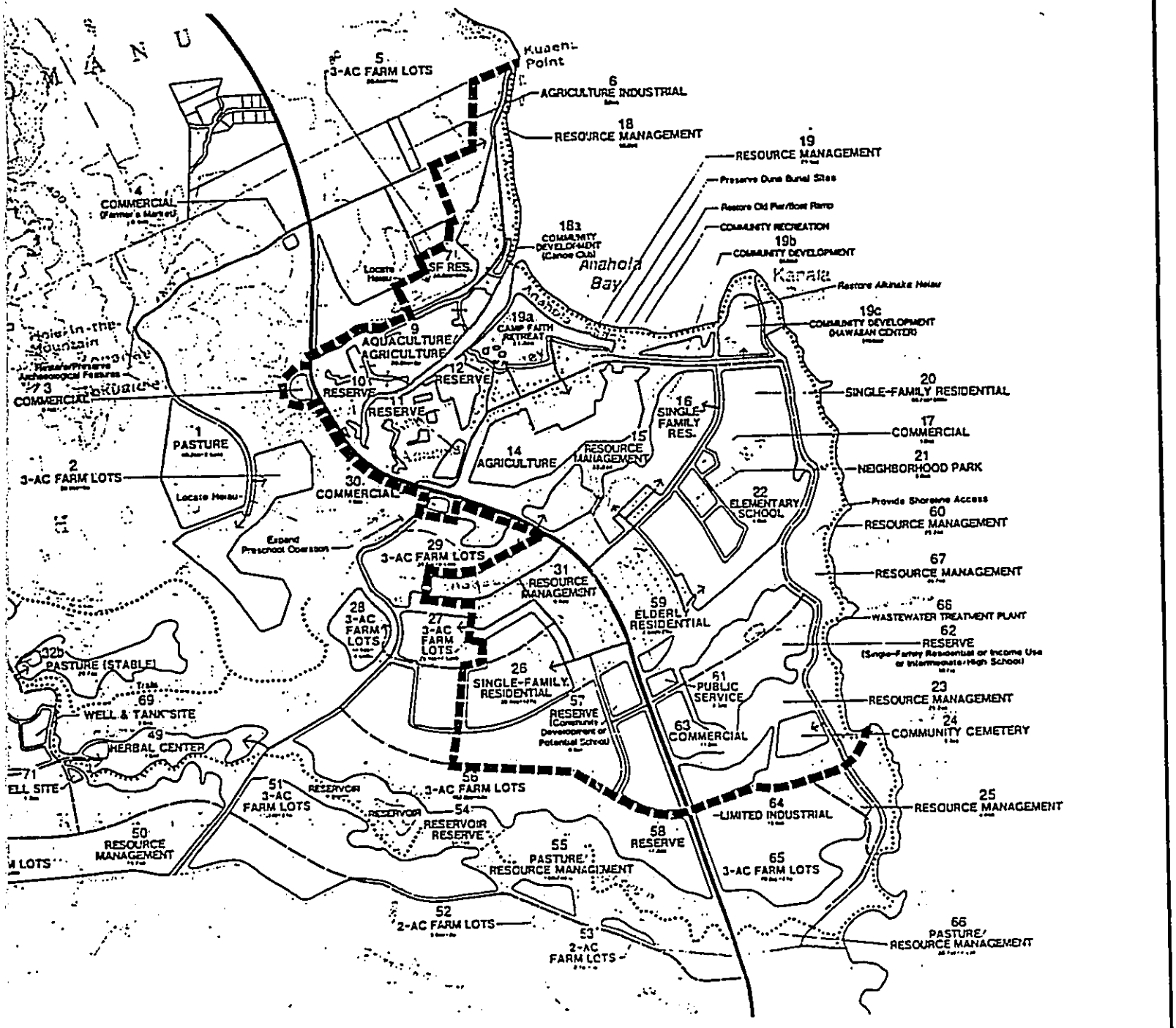


AN PARCEL NUMBERS

FIGURE 19

Based on the population projection scenario in **Table-2**, approximately an average of 1.5 MGD of wastewater flow will be generated from the SSA, without considering infiltration and inflow (I/I). According to the information on depths of groundwater table, most of the SSA area has low water table. So the sewer lines will be laid above the water table. By measuring on the U.S.G.S. 7½ minutes quadrangle map, the area of the SSA is approximately 1,230 acres, and the area of Phase I of the SSA is approximately 320 acres. Assume all the sewer will be laid above the water table, then the I/I contribution to the flow will be:

1,250 (gad) x 1,230 (ac.) = 1,537,500 (gpd)
1,250 (gad) x 320 (ac.) = 400,000 (gpd)

respectively.

1.4.2. Flow Factors

For determining the design flows and flow factors for sewer capacities and treatment plant sizing, the County of Kauai Sewer Design Standards is used, and the applicable standards are summarized below.

(1). Design Average Daily Flow

The Average Daily Wastewater Flows for this study are based on estimated population multiplied by an average daily flow allowance of 100 gallons per capita per day. Additional allowances are made for the following land uses:

Commercial
Resources/Parks
Schools etc.

A tabulation of flow estimate was presented in **Table-2.**

(2). Maximum Daily Flow

The Design Maximum Daily Wastewater Flow is obtained by multiplying the Average Daily Wastewater Flow by a flow factor. The flow factor suggested by the Kauai County Standards is known as the Babbit Factor. Values of the Babbit Factor are calculated with the following formula and are graphically presented in the Kauai County Standards.

$$M = \frac{5}{P^{0.2}} \qquad \text{(where P = Population in thousands)}$$

(3). Design Peak Flow

The Design Peak Flow is the sum of the Design Maximum Daily Flow plus wet weather infiltration and inflow. This flow is normally used to size the pipes, pump stations, and hydraulic components of the wastewater treatment system.

1.4.3. Design Flows

(1). Full Development

Average Daily Flow, Q_{ave} = 1.5 mgd

Maximum Daily Flow, $Q_{max} = Q_{ave} \times MF$ = 4.35 mgd, (MF = 2.9)

Infiltration:

Above GWT: 1,250 (gad) x 1,230 (ac.) =1,537,500 gpd

Below GWT: 2,750 (gad) x 0 (ac.)= 0 gpd

Peak Flow, $Q_{pk} = Q_{max}$ + infiltration = 4.35 + 1.53 = 5.88 mgd

(2). Proposed Phase I

The initial phase of construction was planned and proposed to accommodate the existing population and developments designed and under construction to the year 2010. Based on the projections in Table III-2, the anticipated population at that time is expected to be 7,444 people. However, it should be pointed out that because of the financial constraints and the

difficulty in serving the low land areas, Phase I of the project will include only those subdivisions from Kalalea Road to the core area boundary above the highway, and subdivisions from along the Kukuihale Road to the core area boundary below the highway. The difficult-to-serve low land areas and those subdivisions on the north bank of Anahola Stream and those in the peripheral Kamalomaloo area will be served later as Phase II of the project. Phase I will include 794 residential units and one elementary school, as well as a park beside the school. See **Figure-2.** The wastewater flow generated by the area covered by Phase I is estimated to be 0.38 MGD. The proposed Phase I design flows are estimated accordingly:

Average Daily Flow, Q_{ave} = 0.4 mgd

Maximum Daily Flow, $Q_{max} = Q_{ave} \times MF$ = 1.6 mgd, (MF = 3.9)

Infiltration:

Above GWT: 1,250 (gad) x320 (ac.) = 400,000 gpd
Below GWT: 2,750 (gad) x 0 (ac.) = 0 gpd

Peak Flow, $Q_{pk} = Q_{max}$ + infiltration =1.6 + 0.4 = 2.0 mgd

1.5. Wastewater Characteristics

Based upon experiences at other wastewater treatment plants on Kauai, influent flows are expected to have a diurnal pattern with two peaks, one occurring from about 7 to 10 a.m. and another from about 5 to 10 p.m..

The average strength of the wastewater is expected to vary, depending on land use, flow quantity, infiltration and many other factors. In the absence of actual measured data specific to the service area, the following values are proposed for design purposes. Comparison of data from other wastewater treatment plants on Kauai indicates that the BOD value is reasonable and that the suspended solids value is conservative.

BOD_5 : 0.17 lb/cap/d or about 210 mg/l

SS : 0.20 lb/cap/d or about 240 mg/l

These values will be used for the design of the proposed WWTP.

1.6. General Description of Public Facilities and Services

1.6.1. Water Supply

There are two water supply systems in the study area. One is the County of Kauai Department of Water system, the other is the DHHL water system. As of July 1989, the approximate number of water connections in the Anahola core area for both systems totaled 344. The DHHL water system serves the Anahola Farm Lot Subdivision. All other domestic users, both homestead and non-homestead, are supplied by the County's water system. The existing estimated average water demand from the County system as of 1988, was 161,332 gpd, with 318 service connections. The existing approximate demand from the DHHL system as of 1989, was 50,660 gpd, with 26 service connections. The total estimated everyday demand from both systems is approximately 0.212 mgd.

Both existing water systems are deemed to be inadequate for the existing conditions and need significant improvements to meet the anticipated projected demands of the future developments. A water master plan has recently adopted by the DHHL to accommodate the existing and the future water needs.

1.6.2. Sanitary Sewage System

Presently, there is no municipal sewerage system in the study area. All the existing residential and commercial lots are served by cesspools. There are some problems with their use. In the low-lying river areas problems are due to (1) high water table; (2) adobe soil which are poorly drained; and (3) flooding. In some upland areas, the soil is somewhat plastic and cesspools need to be at least 30 feet deep to reach the porous substrata. Conversion of individual cesspool use to a centralized wastewater treatment system is one of the goals of DHHL's goals.

Some of the recently developed DHHL subdivisions have been provided with dry sewers for future connection to a sewerage system.

1.6.3. Drainage System

Storm water runoff generated from urbanized areas within the planning area generally flow overland and is intercepted by various swales, ditches and catch basins. The storm runoff is then conveyed via pipes, culverts, and ditches, and discharged into existing streams and rivers. The Anahola Development Plan indicated that the area is relatively well drained. A map of streams and drainage copied from the report is presented in **Figure-20**.

1.6.4. Electricity

Electrical power for the Anahola area is supplied by Kauai Electric, a Division of Citizens Utilities Company. The main transmission lines are located along Kuhio Highway and power is distributed to residences from overhead electrical powerline.

1.6.5. Solid Waste Disposal System

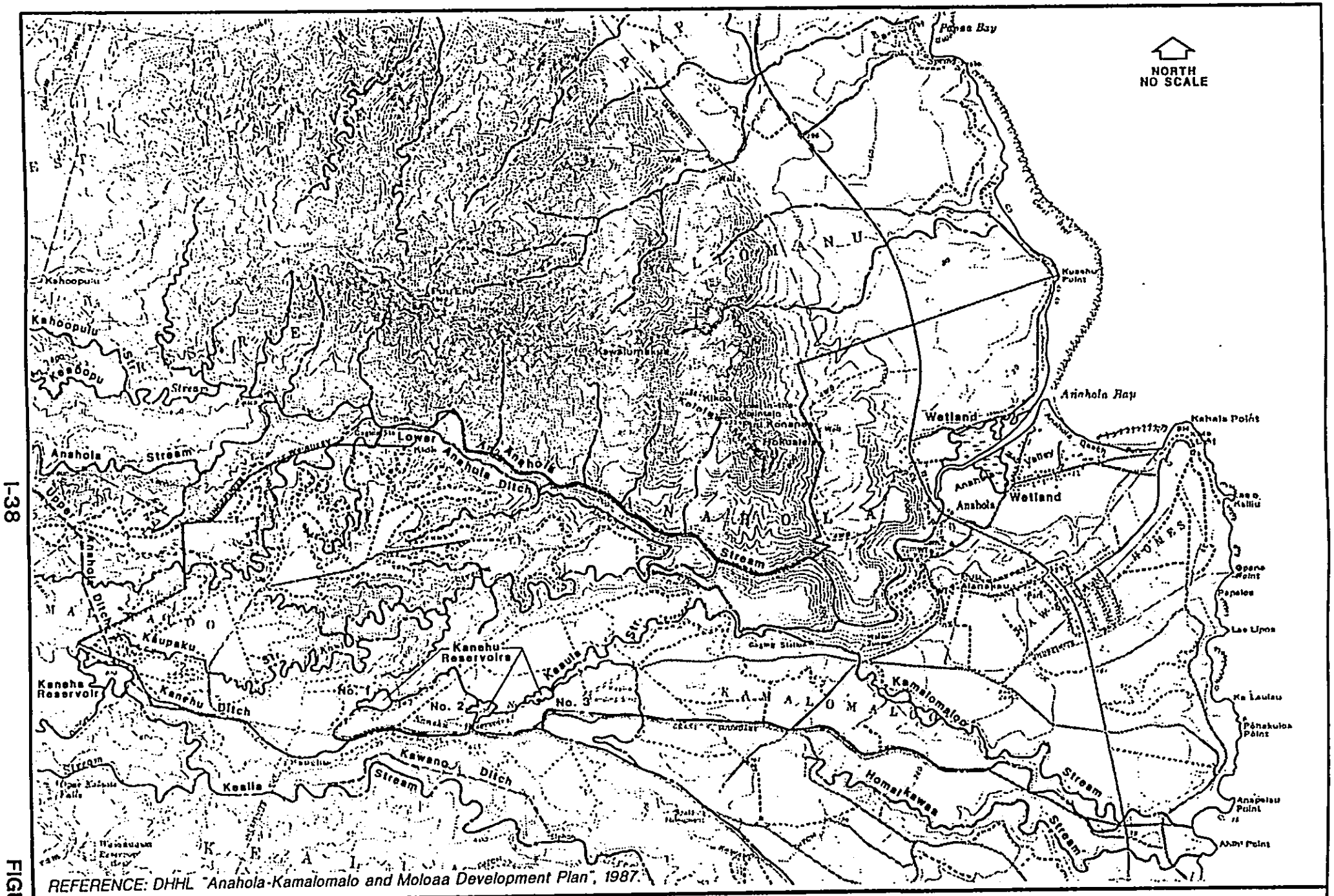
Solid wastes generated from residential areas are collected by the County of Kauai Department of Public Works and disposed of at the County's Kapaa Sanitary Landfill.

1.6.6. Road System

The main road serving the Anahola-Kamalomaloo area is the State owned Kuhio Highway. Branch roads serving the urbanized areas belong to the County of Kauai. The DHHL policy at present has been to construct roadways to County standards and to convey them to the County for maintenance purposes.

1.7. Regulatory Requirements

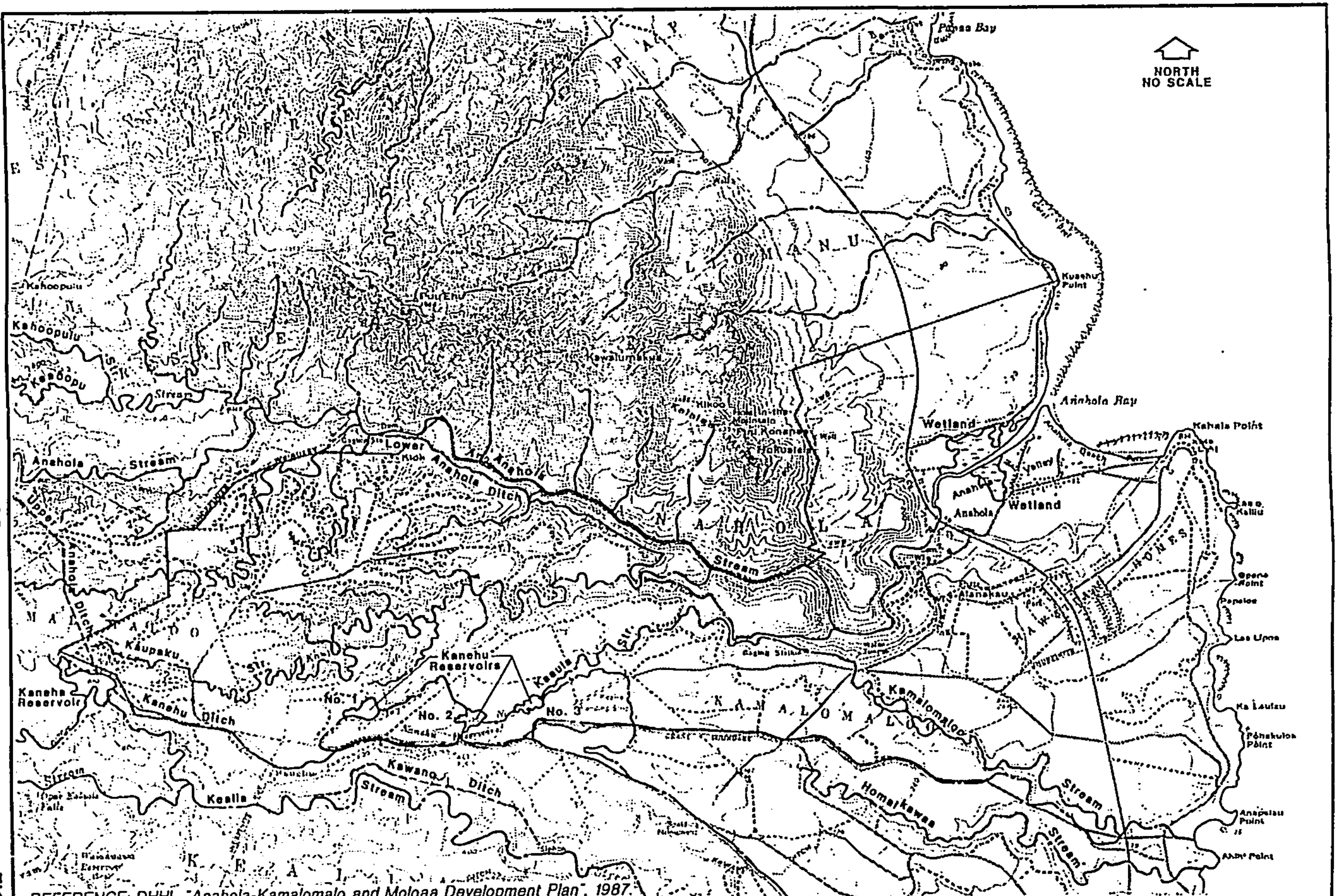
1.7.1. The Clean Water Act



REFERENCE: DHHL "Anahola-Kamalomalo and Moloaa Development Plan", 1987.

HYDROLOGY - STREAMS AND DRAINAGE

FIGURE 20



REFERENCE: DHHL "Anahola-Kamalomalo and Moloaa Development Plan", 1987.

HYDROLOGY - STREAMS AND DRAINAGE

FIGURE 20

The Federal Water Pollution Control Act, amended as the Clean Water Act PL 92-500, applies to discharges into open water and serves as a basis for Hawaii's wastewater regulations.

1.7.2. Hawaii Administrative Rules - Public Health Regulations

(1). Chapter 62 - Wastewater Systems

Chapter 62 applies to all public and private wastewater treatment facilities. The regulation specifies effluent quality standards, approval requirements, and minimum design criteria for wastewater treatment and disposal facilities. The regulation does not require a discharge permit nor a permit to operate. The regulation also does not specify sampling frequencies and reporting requirements.

Minimum effluent quality requirements based on Chapter 62 are summarized in **Table-3**.

TABLE-3 Effluent Requirements

Items	Monthly Average	Grab Sample
BOD_5	30 mg/l	60 mg/l
SS	30 mg/l	60 mg/l
Total Coliforms	23/100ml	240/100ml
Cl Residual		0.1 mg/l

(2). Chapter 55 - Water Pollution Control

Chapter 55 regulates the National Pollutant Discharge Elimination System (NPDES) permit and applies to effluent discharge into State waters. Direct discharge of Anahola WWTP effluent into a receiving body of water is not a preferred alternative.

(3). Chapter 54 - Water Quality Standards

Chapter 54 applies to classification of State waters and establishes minimum receiving water quality criteria. These regulations would probably not be applicable to the Anahola WWTP since effluent disposal directly into a receiving body of water is not a preferred alternative.

(4). Chapter 23 - Underground Injection Control (UIC)

The Underground Injection Control (UIC) program regulates injection wells for the protection of fresh groundwater resources. This regulation imposes permitting requirements for injection wells and establishes a UIC line along the coastal plains above which injection wells are not allowed.

Chapter 23 gives the following definition:

> "injection well" means a well into which subsurface disposal of fluid or fluids occurs or is intended to occur by means of injection.
>
> "well" means a bored, drilled or driven shaft, or a dug hole, whose depth is greater than its widest surface dimension.

Shallow pits or trenches which are not regulated by Chapter 23 will also be considered for the Anahola WWTP effluent disposal.

CHAPTER II

PROPOSED ACTION

2.1. PROPOSED ACTION

2.1.1. Existing Sewage Treatment System

There is no centralized sewage collection and treatment system in the planning area. Cesspools are the most common on-site individual treatment facilities, while septic tanks are utilized by some residents. Most of the cesspools do not function well: those in the lowland area usually malfunction due to the low permeability of the soils and high level of groundwater table; those in the highland areas above Kuhio Highway have troubles because of the relatively low permeability of the soils.

Current State DOH regulations do not allow the construction of new cesspools. Individual treatment systems such as septic tanks may be allowed outside of the CWDAs.

In some recently developed subdivisions, dry sewers have been laid for future connection to a centralized sewage collection and treatment system. **See Figure-21**. Future DHHL subdivisions in the Anahola area will be provided with sewer connections to the centralized sewerage system as deemed appropriate, unless deemed impractical because of the terrain and large lot sizes (more than one acre).

2.1.2. Proposed Action

The Anahola-Kamalomaloo planning area is included in the census track 402.01. See **Figure-22**. The 1990 census showed that census track 402.01 had a population of 2,178 persons and 656 households. The DHHL is implementing a master plan for the Anahola-Kamalomaloo area that will significantly increase the population and availability of housing for native Hawaiians. Accordingly, the Anahola area could be viewed as a "developing" region where much more growth can be anticipated in the years ahead. The topography of the area is diverse, and the sewerage service area is divided into two major service areas by the Anahola River. Construction of sewage service infrastructure to serve the

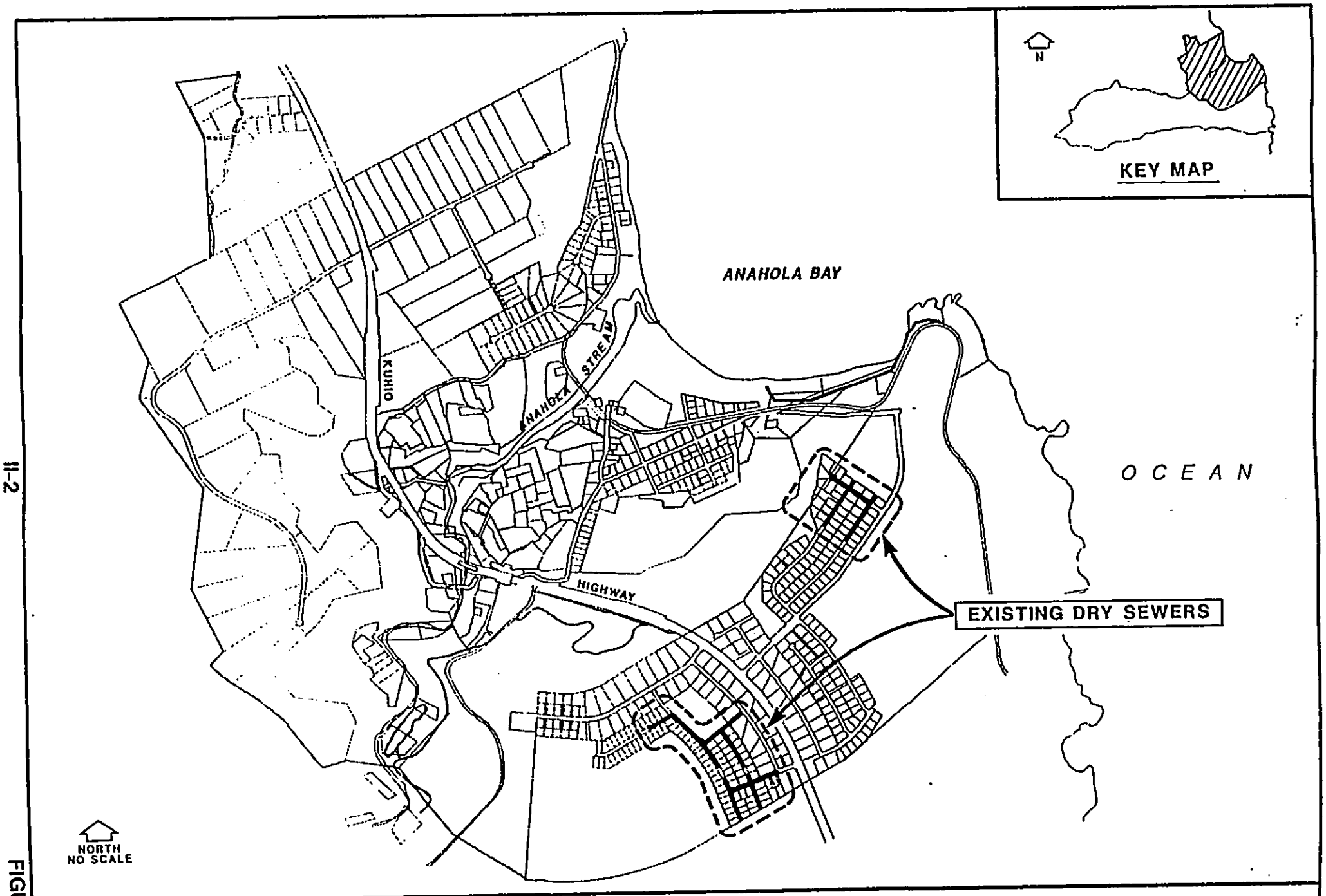


FIGURE 21

EXISTING DRY SEWERS

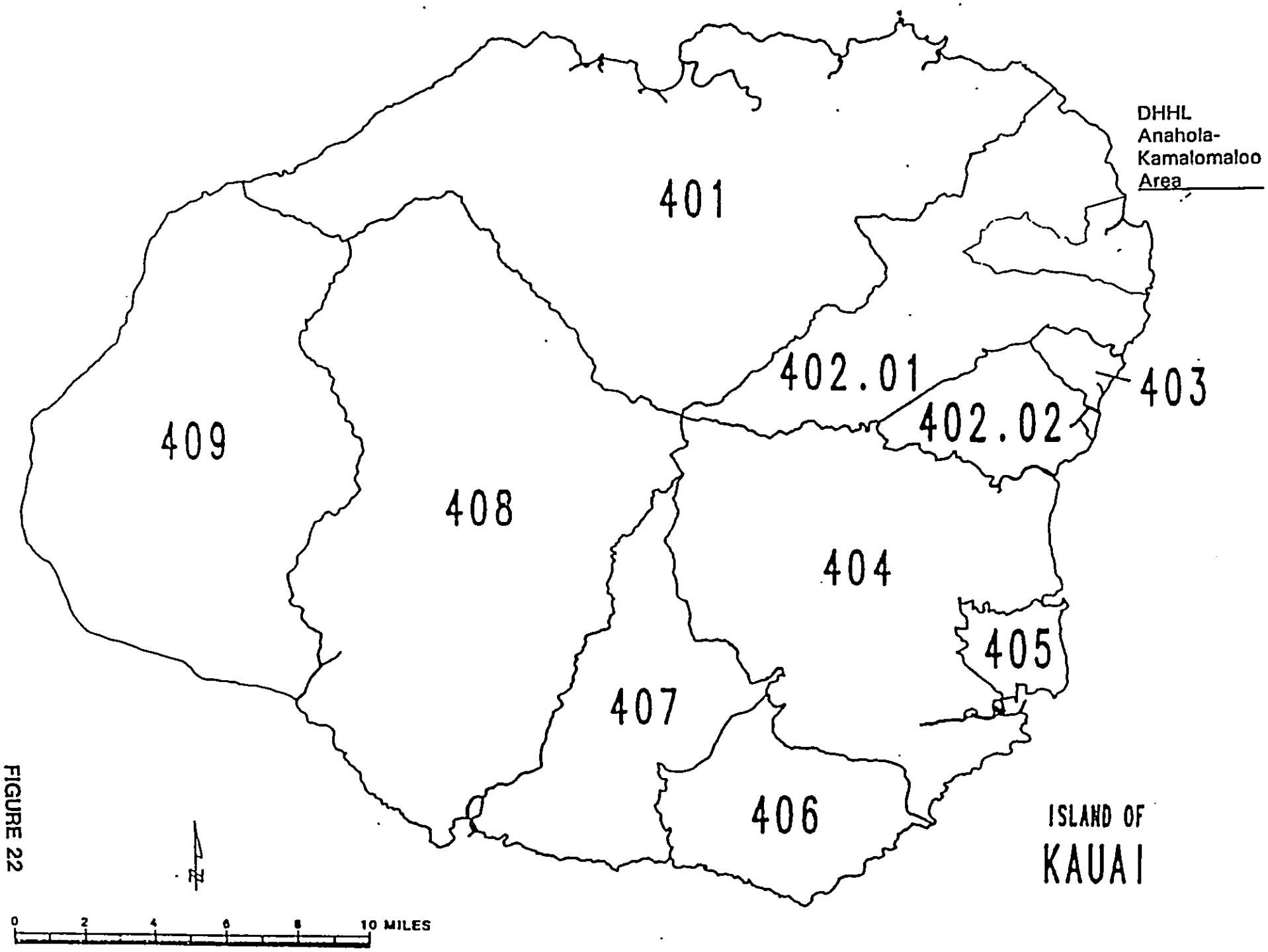

DHHL
Anahola-
Kamalomaloo
Area
401
402.01
402.02
403
409
408
404
405
407
406
ISLAND OF
KAUAI
0 2 4 6 8 10 MILES

FIGURE 22

areas will be an expensive undertaking, and should be accomplished in a logical, orderly and systematic manner consistent with the DHHL master plan implementation process and funding constraints. Based on studies conducted, the following phasing plan is suggested for consideration.

2.1.2.1. Anahola WWTP Phase I

The proposed location (TMK 4-8-03:18 & 4-7-04:7) for the Anahola WWTP is shown in **Figure-23**. The site is located on vacant land and is accessible from Kuhio Highway via an unimproved former "cane haul" road. Access to the site is via a dirt road from Kuhio Highway, through an existing Kauai County Department of Public Works rubbish storage area. The site is bordered on the north by a gulch, and otherwise surrounded by vacant land. At present, the nearest existing homes are approximately 700 feet to the north. The site and the surrounding areas are covered with grass, brush, and trees. The ground slopes upward at about 10% from east to west from an elevation of about 50 feet to about 100 feet.

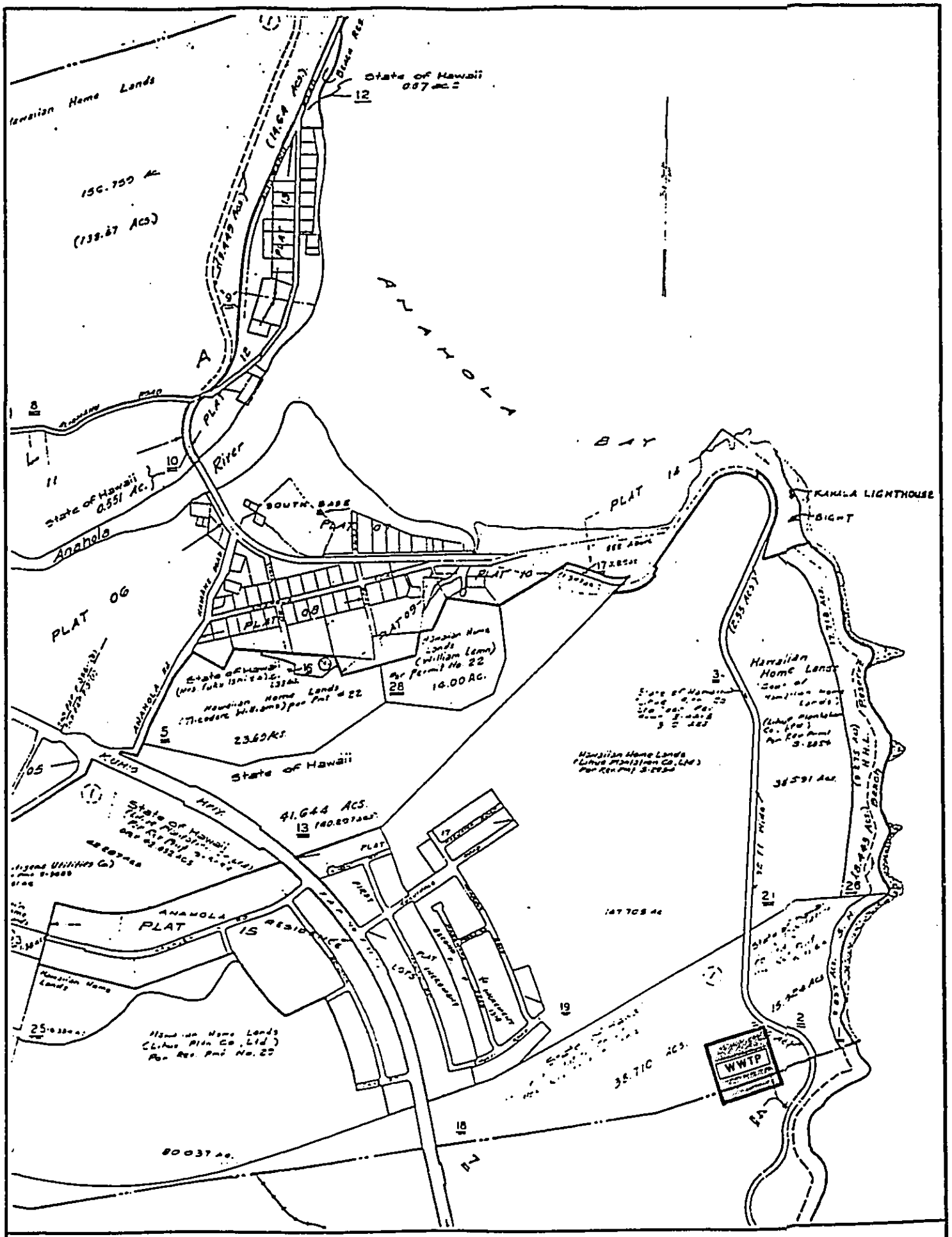
A site of about 15 acres is required to accommodate the projected full development flow of 1.6 MGD. The Anahola WWTP Phase I capacity is proposed to be 0.4 MGD. A flow chart of the major processes to be included in the treatment facility is shown in **Figure-24**. A conceptual layout of the proposed Anahola WWTP is shown in **Figure-25**. Major components of the first phase of construction are described below, and a summary of the preliminary functional design data is listed in **Table-4**.

(1). Off-site Improvements

Off-site improvements include a paved access road from Kuhio Highway to the treatment plant site, potable water supply piping, and electrical power service.

(2). Headworks

The headworks will include flow monitoring and screening. Both bar screens and mechanical screening devices are proposed. A mechanical grit removal process is being considered subject to further evaluations of costs, availability and operations and



LOCATION OF ANAHOLA WWTP

FIGURE 23

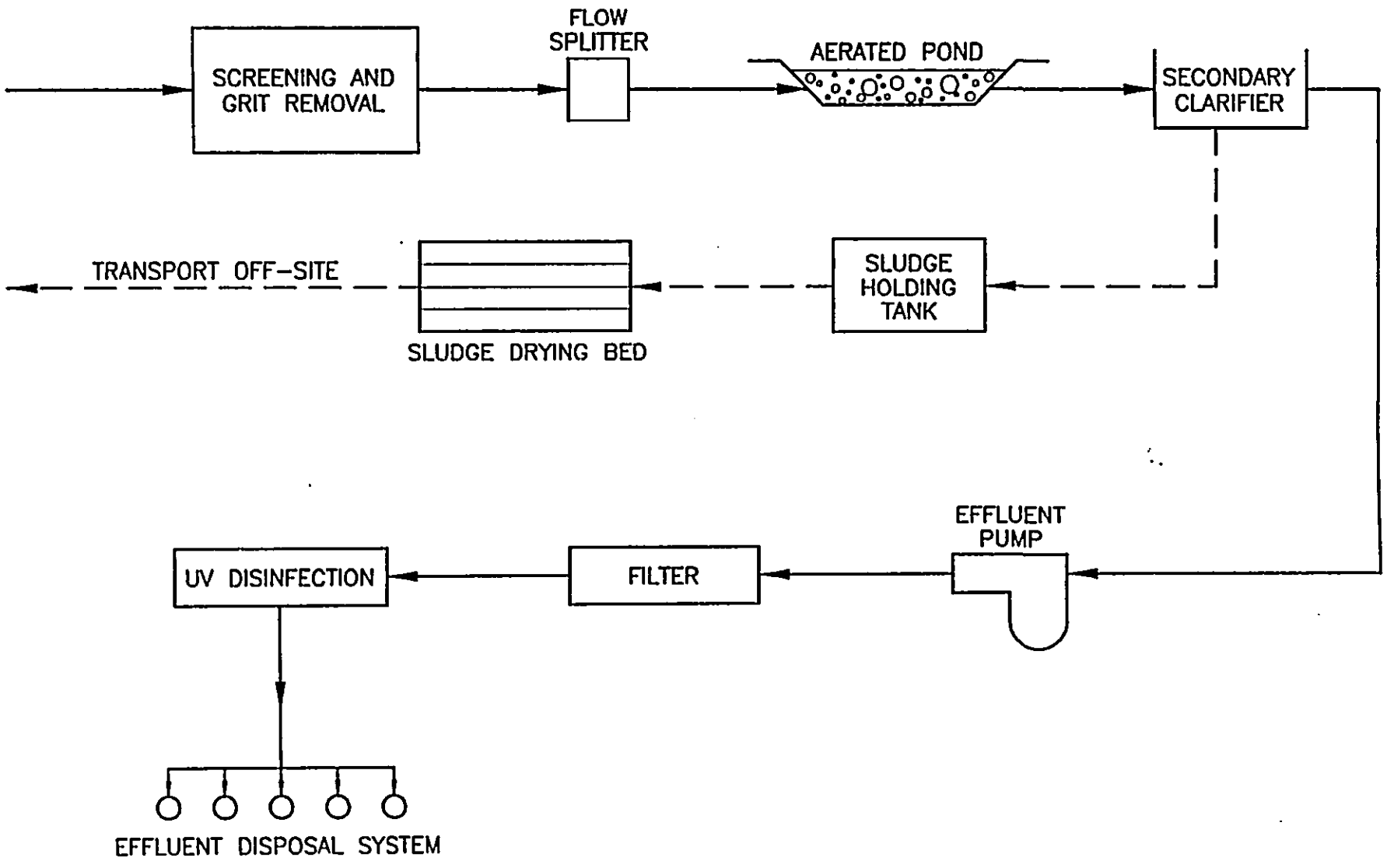


FIGURE 24

PROCESS FLOW SCHEMATIC - ANAHOLA WWTP

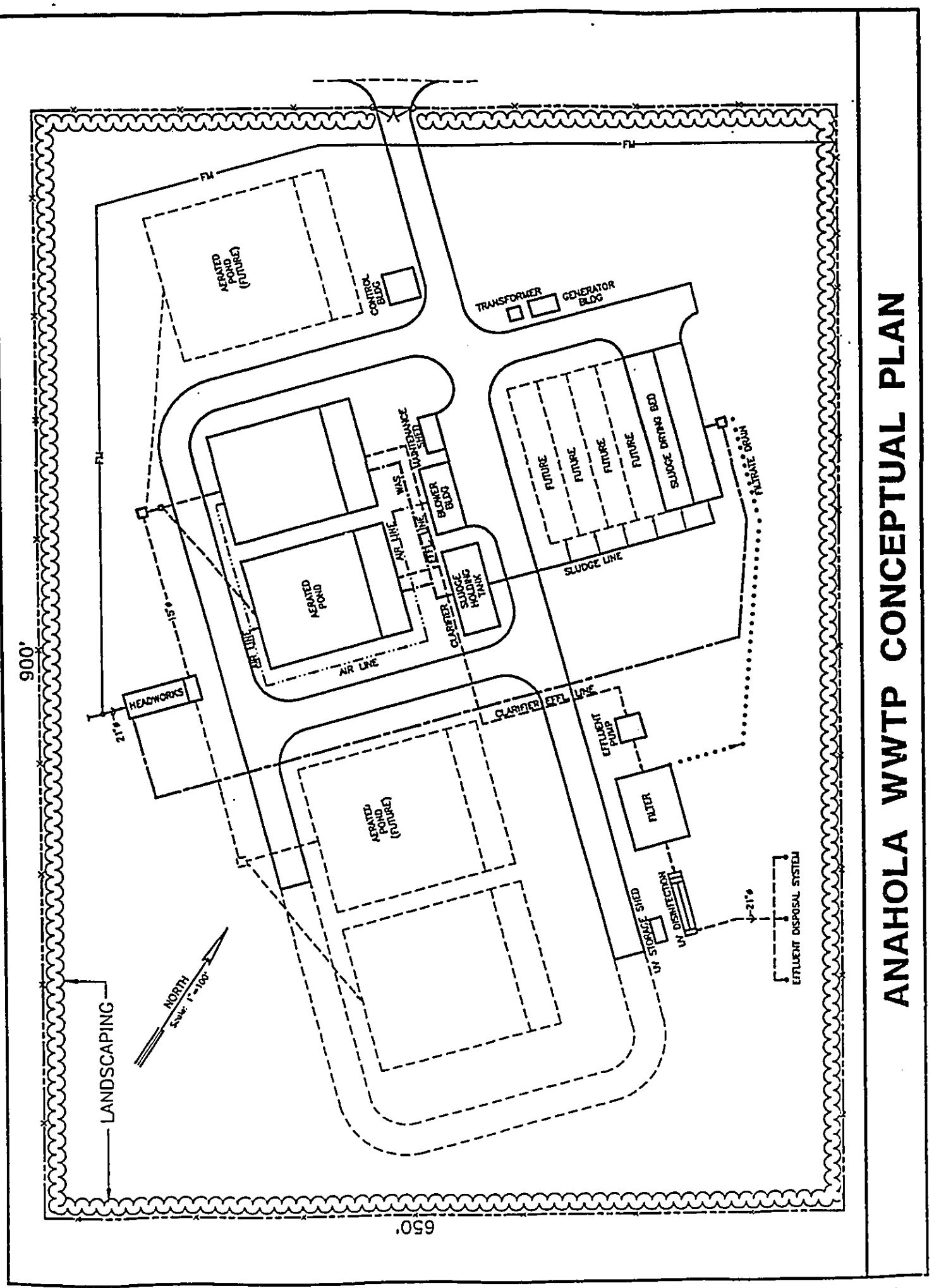

ANAHOLA WWTP CONCEPTUAL PLAN
900'
650'
FM
AERATED POND (FUTURE)
CONTROL BLDG
TRANSFORMER
GENERATOR BLDG
FUTURE
FUTURE
FUTURE
FUTURE
SLUDGE DRYING BED
FILTRATE DRAIN
SLUDGE LINE
MAINTENANCE SHED
BLOWER BLDG
AERATED POND
AIR LINE
SLUDGE HOLDING TANK
CLARIFIER
EFFL. LINE
HEADWORKS
15"ø
21"ø
EFFLUENT PUMP
FILTER
AERATED POND (FUTURE)
UV STORAGE SHED
UV DISINFECTION
EFFLUENT DISPOSAL SYSTEM
LANDSCAPING
NORTH
Scale: 1"=100'

FIGURE 25

TABLE VI-1
FUNCTIONAL DESIGN DATA FOR PHASE I OF ANAHOLA WWTP

		PHASE I	ULTIMATE
1.	Design flows and Loadings		
	Average daily, mgd	0.4	1.6
	Maximum daily, mgd	1.6	4.4
	Wet weather infiltration, mgd	0.4	1.5
	Peak hour, mgd	2.0	5.9
2.	Headworks		
	Mechanical bar screen, each	1	2
	Grit removal unit, each	1	2
3.	Aerated Pond		
	Number of ponds	2	5
	Pond volume (MG), each	0.33	0.33 x 2, 0.66 x 3
	Hydraulic retention time, hours	40	40
	Sludge age, days	50	50
4.	Final Clarifier		
	Number of tanks	2	5
5.	UV Disinfection		
	Number of Channels	2	2
	Number of Lamp Modules	2	6
6.	Effluent Filter		
	Number of units, each	1	2
7.	Effluent Disposal Pits, number to be determined during design.		
8.	Sludge Holding Tank		
	Volume, cubic feet	32,400	32,4000
	Depth (maximum), feet	10	10
9.	Sludge Drying Beds		
	Area, square feet	5000	18,750

10. Control Building, each at 630 square feet

11. Maintenance Shed, each at 450 square feet

12. Generator Building, each at 290 square feet

13. Blower Building, each at 1400 square feet

14. UV Storage Shed, each at 300 square feet

maintenance requirements. After flowing through the headworks, the flows will be distributed to aerated ponds for biological treatment.

(3). Aerated Ponds

The aerated ponds provide an environment where the wastewaters are biologically treated to reduce the organic content and stabilize the organic matter. The pond contents are aerated, mixed, and allowed to settle. The products generated are treated effluent (clarified liquid) and sludge (settled solids). Treated effluent from this process flows to a disinfection system for further treatment.

Sludge is separated from the aerated pond mixture, and flows to a sludge holding tank for thickening before being discharged to sludge drying beds to dry.

The aerated pond system incorporates a relatively long (48 hours) retention time and is able to handle shock loads without upsetting the treatment process. The process requires minimal operator attention.

Two (2) ponds are initially proposed to allow for flexible operations and facilitate maintenance. Each pond will be capable of handling 0.2 MGD of average daily flows.

The pond geometry is approximately 90 feet wide and 90 feet long, and is surrounded by an earth berm on three sides. A reinforced concrete settling tank, called a final clarifier, will be constructed on the fourth side. The pond will be lined with high density polyethylene. The interior side slopes of the berm will be at 1.5 horizontal to 1 vertical. The exterior side slopes will be 3 horizontal to 1 vertical to provide slope stability. To reduce the hazards of slipping on the pond liner, a textured liner will be used.

(4). Final Clarifier

After treatment in the aerated pond, the mixed and aerated liquid flows into a final clarifier that is built-in as part of each pond. The mixed liquid is allowed to settle in a quiescent environment, and the settleable solids settle to the bottom of the clarifier. The settled

solids are airlifted into a channel where most it is returned to the aerated pond inlet ("return activated sludge"), and some of the solids are taken out ("waste activated sludge") and conveyed to the sludge holding tank. The clarified liquid effluent overflows into a conduit and flows to the disinfection system.

(5). Disinfection Facilities

The State Department of Health (DOH) requires disinfection for all wastewater treatment plant effluent. A chlorination system would be a preferred disinfection facility if the hazards associated with the storage and handling of chlorine gas is not so great. The ultimate capacity of the WWTP would require the use of ton chlorine containers rather than 150 lb cylinders, thus involving greater hazards. As a consequence, ultraviolet (UV) disinfection is the preferred treatment process thanks to its simplicity, safety, and comparable economy.

(6). Filtration

The need for effluent filtration will be evaluated depending on the effluent disposal method, effluent disposal capacity, costs, and potential benefits. Filtration will provide effluent qualities far better than the minimum DOH standards specified for secondary treatment. It will also extend the service life of underground disposal facilities by attenuating clogging tendency.

(7). Effluent Disposal

Reuse of the treated effluent is the preferred effluent disposal method. However, there is sufficient rainfall in the area so that treated effluent is not considered to have much value for irrigation purposes, and the treated effluent must be disposed of by other means. Offshore discharge of effluent is not practical because of the high costs and stringent regulatory requirements. Other alternatives such as seepage pits and underground injection wells will be considered during design. Subsurface soils investigations and soil permeability testing will need to be completed during the design phase to determine the suitability of effluent disposal via seepage pits or underground injection wells at specific sites.

(8). Sludge Holding Facility

After the sludge is settled in the final clarifiers, most of the sludge is returned to the aerated pond inlet. The sludge that is wasted to the sludge holding tank is stored there for thickening before being discharged to the sludge drying beds. Sludge from aerated ponds is normally sufficiently stabilized so that no further biological treatment is necessary before discharging to sludge drying beds. Storing the sludge in the sludge holding tank also provides the option to pump out the sludge and haul it to a facility like the Lihue WWTP for disposal.

(9). Sludge Drying Beds

Sludge drying beds are proposed for dewatering the sludge. They are considered to be a cost-effective means for drying the sludge prior to disposal at a landfill site.

2.1.2.2. Anahola WWTP Expansion Phases

The "full development" capacity of the proposed Anahola WWTP is 1.6 MGD average daily flow. Additional space at the treatment plant will be provided to allow for future expansion. See **Figure-25**. Initially, the flows will be small and gradually increase as more collection sewers and sewage pump stations are constructed to serve the residences. Therefore, the proposed Anahola WWTP and the collection system will be constructed in phases. The initial construction, Phase I, will be designed to accommodate an average daily flow of 0.4 MGD. Subsequent phases should be in increments of 0.2 MGD and would need to be planned for when the actual flow reaches 75% of the design flow. A possible scenario for projecting expansions of the proposed Anahola WWTP is shown in **Figure-26**. It is anticipated that the proposed 0.4 MGD Anahola WWTP would be adequate to the year 2010.

2.1.2.3. Collection and Conveyance System Phasing

The wastewater collection and conveyance system for the Anahola area will be comprised of gravity sewers and sewage pumping stations with their associated force mains. The

Estimated Wastewater Flow & Service Population vs. Time

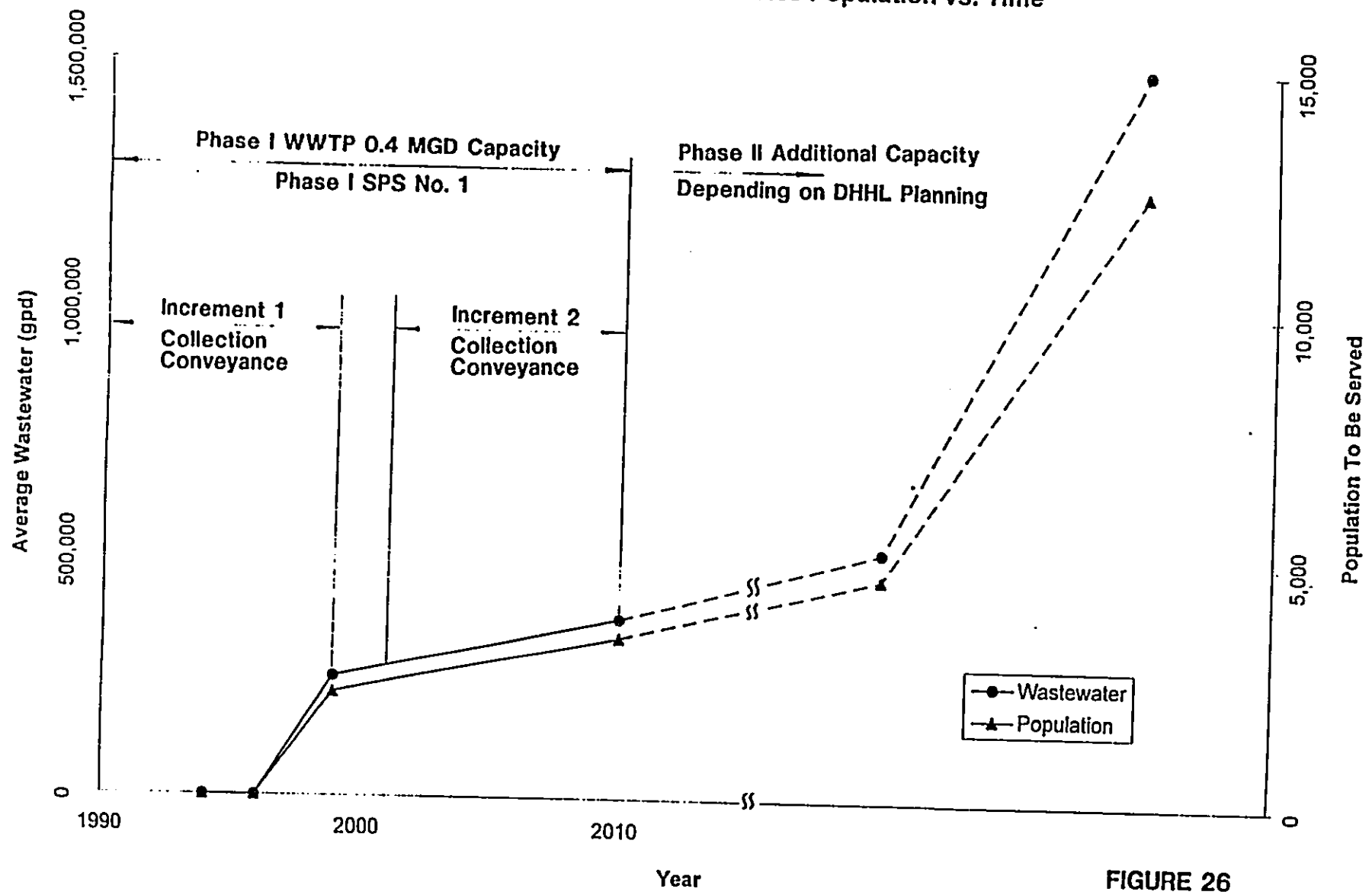


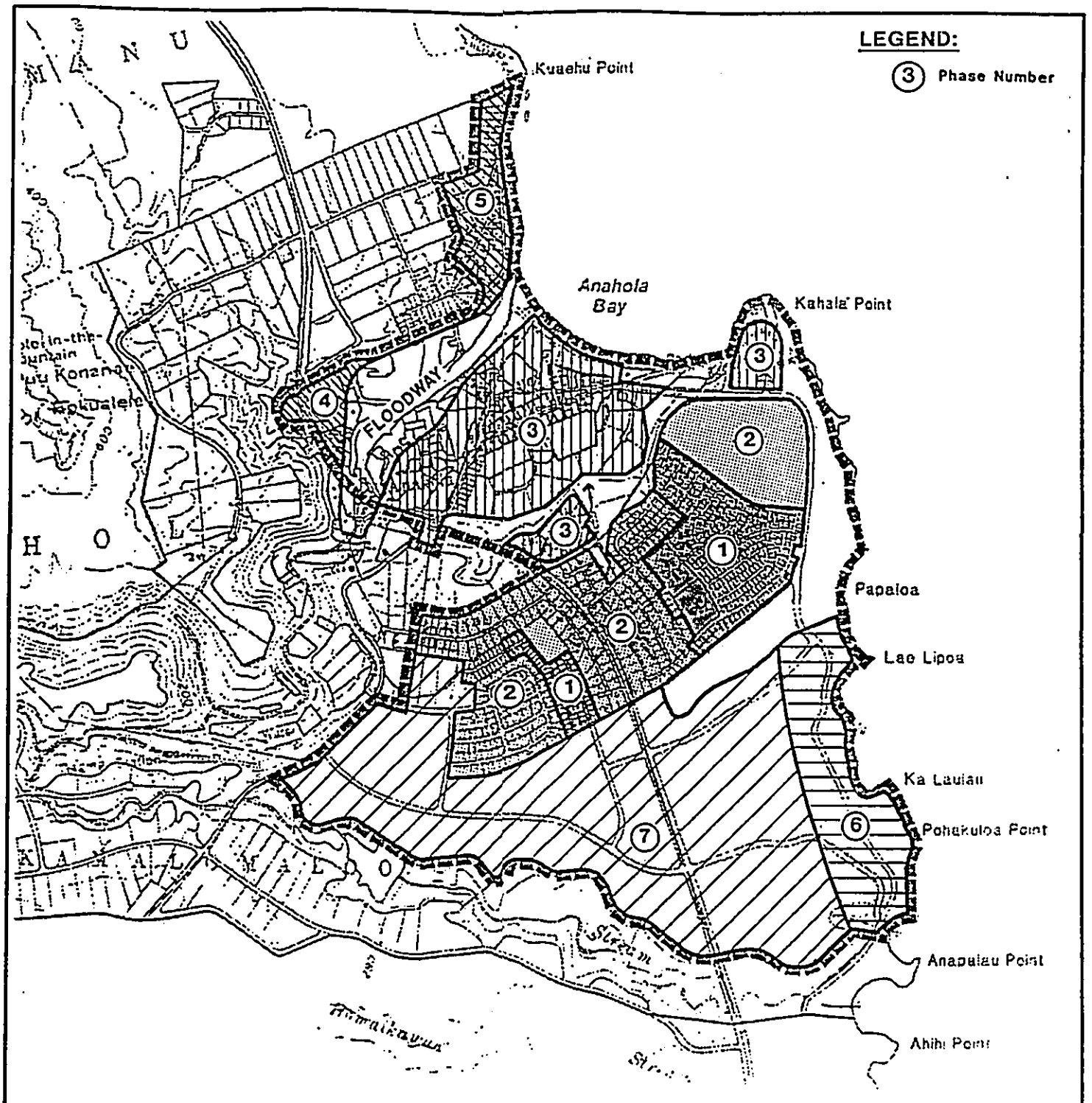
FIGURE 26

layout of the collection and conveyance system must be compatible with lot layouts, grading considerations and roadway networks. Ideally, the wastewater collection and conveyance system should be planned, designed and constructed together with the subdivisions. However, given the existing developed situation at Anahola, the collection and conveyance system would need to be engineered and fitted to the existing situation and also be compatible with future developments. There are large areas of vacant lands nearby, where subdivisions and other land uses are planned.

The sewerage service area is divided into seven generalized service sub-areas, associated with five (5) sewage lift stations served areas and one gravity collection system service area, as shown in **Figures-27 and 3**. Wastewater flows from future developments uphill of the proposed Anahola WWTP (seventh service area) could flow directly to the WWTP by gravity. **Table-5** summarizes flow projections, proposed phasing scheme, pumping capacities and force main sizes for the five (5) proposed pump stations.

The gravity sewers should be constructed in increments which would provide early connection to subdivisions which have dry sewers, and those subdivisions under design or construction which will be provided with a sewage collection system. Evaluations of the existing subdivisions, proposed developments, and roadway systems indicate that a trunk sewer system with one major sewage pumping station (SPS No. 1) before the WWTP would be appropriate. As future subdivisions are constructed, they could conveniently connect into the main trunk sewer. Individual sewage pump stations could also convey sewage from outlying areas into the trunk sewer. Construction of the collection system to serve other existing subdivisions and residences could proceed as funding, planning and designs can be implemented.

SPS No. 1 is a critical lift station and the building size should be designed for the "ultimate" size if practical. The initial pumping capacity should be adequate to accommodate an average daily flow of at least 0.4 MGD and a peak hour flow of 2 MGD, which correspond to the Phase I capacity of the WWTP. Since the gravity collection system will be designed to serve the various areas rather than a specific flow amount, the sewage collection system incremental development would not necessarily match the WWTP and SPS No.1 expansion phases. To distinguish the collection system phasing from the WWTP and SPS No. 1 expansion phasing, the collection system phasing will be identified by Increment 1



INCREMENTAL SERVICE AREAS

FIGURE 27

TABLE 5

SPS #	ESTIMATED CAPACITIES OF PUMP STATIONS AND FORCE MAINS Service Area	Pop.	Q (pop) gpd	Q(other) gpd	Q (total) gpd	Q (max) gpd	Q (I/I) gpd	Q (peak) gpd	Q (peak) gpm	F.M. (in.)	Vel. (fps)
1	Increment 1	1,584	158,400	31,500	189,900	816,570	118,750	935,320	650	10	2.65
									650	12	1.84
	Increment 2	1,828	182,800	6,700	189,500	814,850	278,750	1,093,600	759		
	Increment 1& 2	3,412	341,200	38,200	379,400	1,631,420	397,500	2,028,920	1,409	10	5.76
									1,409	12	4.00
	Increment 3	556	55,600	11,000	66,600	333,000	206,250	539,250	374		
	Increment 4	76	7,600	0	7,600	38,000	17,500	55,500	39		
	Increment 5	300	30,000	0	30,000	150,000	67,500	217,500	151		
	Increments 1,2,3,4 & 5	4,344	434,400	49,200	483,600	2,152,420	688,750	2,841,170	1,973	10	8.06
									1,973	12	5.60
2	Increment 1	0									
	Increment 2	0									
	Increment 3	556	55,600	11,000	66,600	333,000	206,250	539,250	374	6	4.25
	Increment 3,4, & 5	932	93,200	11,000	104,200	521,000	291,250	812,250	564	6	6.40
3	Increment 1	0									
	Increment 2	0									
	Increment 3	0									
	Increment 4	76	7,600	0	7,600	38,000	25,000	63,000	44	3	1.99
4	Increment 1	0									
	Increment 2	0									
	Increment 3	0									
	Increment 4	76	7,600	0	7,600	38,000	17,500	55,500	39	3	1.75
	Increment 5	300	30,000	0	30,000	150,000	67,500	217,500	151	4	3.86
	Increment 4 & 5	376	37,600	0	37,600	188,000	85,000	273,000	190	4	4.84
5	to be built in remote future to serve development in the peripheral area.										

and Increment 2, etc., and the WWTP and SPS No. 1 phasing will be identified by Phase I and Phase II.

Increment 1 of the collection system will provide service to the existing Anahola Residence Lots Unit 4 above Kuhio Highway and Anahola Residence Lots Unit 5 below the highway. Both these existing residential subdivisions have dry sewers. Increment 1 would also include the 200± Anahola Residence Lots Unit 6 subdivision under design.

Increment 2 of the collection system will provide service to existing subdivisions in the Phase I service area which do not have dry sewers, and to the future units downhill of Units 5 and 6. This phase will require DHHL to plan, scope, and fund the project(s) on a timely basis before design and construction can proceed. Sewers would need to be constructed along the subdivision roadways and sewer laterals extended into each property. Procedures for connections from the residences to the sewer laterals would need to be resolved by DHHL during the planning and scoping stages. The time schedule for such planning, design, and construction work is not known, but should be accomplished before the year 2000.

Increment 3 will provide sewage collection and conveyance services to low lying residences on the south side of Anahola River. SPS No. 2 is needed to pump the flows generated at the low-lying area south to the Anahola River to SPS No. 1. A trunk sewer along Anahola Road is also proposed.

Increments 4 and 5 will provide sewer service to the upland areas north of Anahola River. Some of the areas are in difficult-to-serve locations (due to topography), and will require sewage pump stations (SPS No. 3 and SPS No.4). In addition, some of the homes are private residences not under DHHL control.

Increment 6 of the collection system is for the recently transferred lands (DLNR to DHHL) south of Increment 1 area and makai to the proposed WWTP, as shown in **Figure-3**. Because the developments in this area is very uncertain, only the general location of the proposed sewage pump station (SPS. No. 5) is shown in **Figure-3**.

Increment 7 is also the recently transferred lands located mauka to the proposed WWTP.

Wastewaters generated from future development in this area are expected to flow to the WWTP by gravity.

The time schedules and sequences for Increments 3, through 7 are not known, but would probably be accomplished after the year 2000.

For SPS No. 1, the initial construction phase would be Phase I, and would provide a facility capable of pumping 0.4 MGD average daily flow and 2 MGD peak hour flow. Phase II, the next phase, would probably be implemented sometime around the year 2000. At full development the SPS. No. 1 pumping capacity would be about 3 MGD peak hour flow. See **Table-5**.

(1). Phase I South Side Sewer Trunk Line And Pump Stations

Anahola House Lots Units 4 and 5, and Unit 6 currently under design already have or will have sewer laterals and an existing sewer collection network with which to connect. To serve those subdivisions a major sewer trunk line (Sewer Trunk No. 1) is proposed along Kukuihale Road. The subdivision sewer system would connect to the trunk line, and the wastewaters would be conveyed to the proposed Sewage Pump Station No. 1. See **Figure-3**. Sewer Trunk No. 1 would be sized to accept full development flows from subdivisions on the higher ground south of Anahola River.

SPS No. 1 is also a critical part of the Anahola-Kamalomaloo sewage collection system because it will ultimately receive flows from practically all of the service areas north of the Anahola WWTP or about 75% of the service area. **Figure-28** shows the conceptual plan for SPS No. 1. SPS No. 1 is a critical pump station, it will be designed as a "permanent built-up" type of facility with the following major features:

a. Sitework including access road, fenced-in site, and landscaping.
b. Reinforced concrete wet well, dry pump pit, and masonry superstructure.
c. Emergency electrical power supply system.

Alternative designs utilizing constant flow pumps and/or variable speed pumps will be considered proposed. Supervisory Control And Data Acquisition (SCADA) systems to

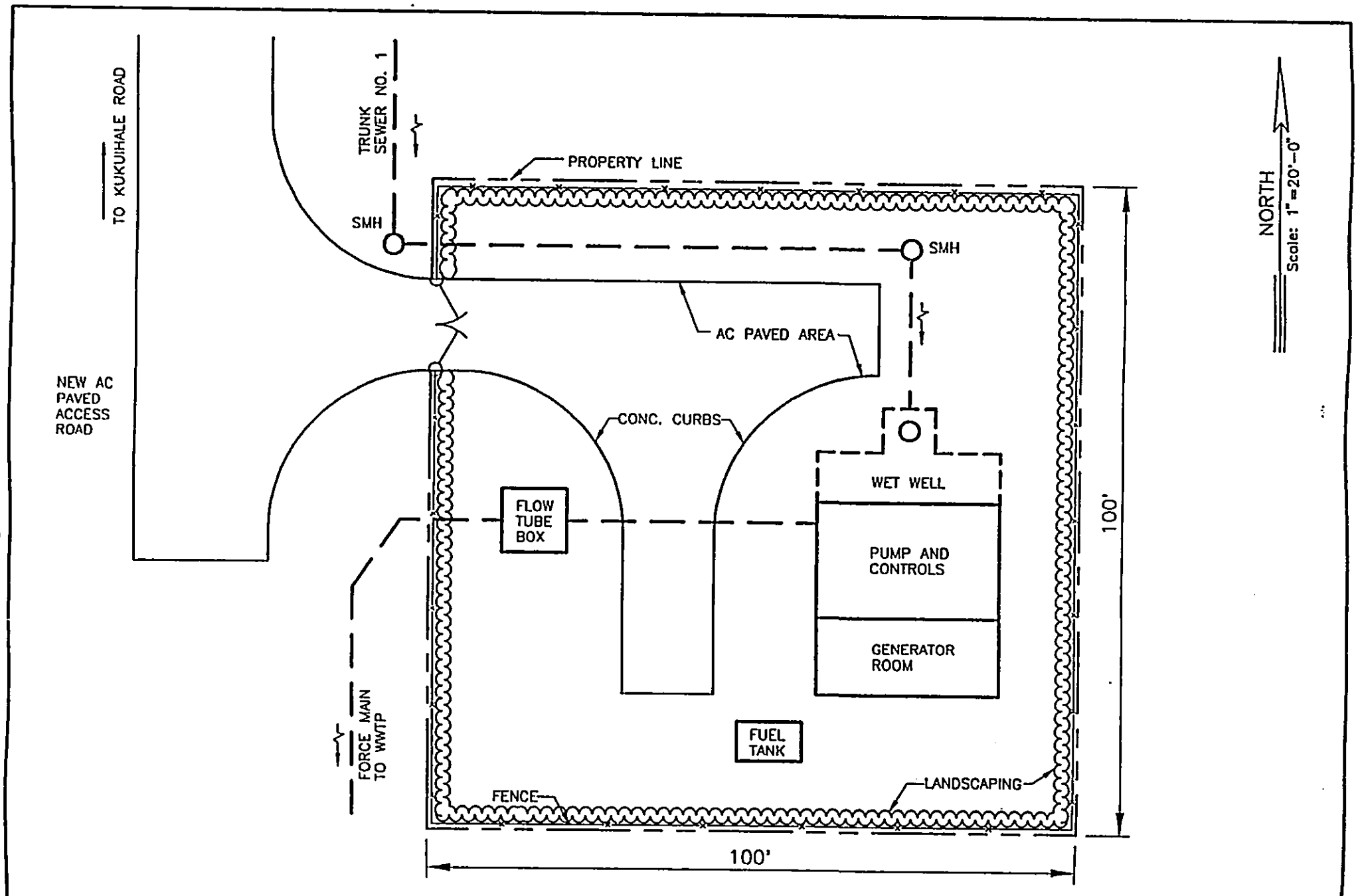


FIGURE 28

CONCEPTUAL PLAN - BUILT-UP SEWAGE PUMP STATION NO. 1

allow monitoring of pump station operations from a central location will also be considered during design.

(2). Phase II South Side Sewer Trunk Line and Pump Stations

Two sewer trunk lines are proposed under Phase II. Sewer Trunk No. 2a is proposed on the high ground south of Anahola River. Sewer Trunk No. 2a will serve the residences along Kalaiea Road and connect to Trunk Sewer No. 1. Sewer Trunk 2b will serve the existing homes in the Anahola Lots 2nd Increment. These subdivisions do not have dry sewers and careful planning, engineering, budgeting, and funding will be required to provide sewage collection service.

(3). Future Extensions of the Collection and Conveyance System

Time schedules for extension of the wastewater collection and conveyance system to other subdivisions are difficult to predict. Thoughtful planning, budgeting, funding, engineering, construction, and connections to individual lots are some of the issues that would need to resolved by DHHL. **Table-6** indicates a preliminary phasing sequence, but the time schedules for incremental development will be determined by the DHHL.

2.1.3. Estimated Construction Costs for the Proposed Action

Preliminary estimated construction costs were based on Honolulu prices times a Kauai area factor of 1.35. Estimates are summarized as follows:

DESCRIPTION	ESTIMATED COST
Anahola WWTP (Phase I)	$6,870,000
Including access road from Kuhio Highway	
Collection/Conveyance Service Area 1	
Trunk Sewer No. 1	$1,050,000
Sewage Pump Station No. 1	$2,825,000
Force Main	$ 555,000

TABLE 6

PRELIMINARY PHASING SEQUENCE

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Beyond 2010
Anahola WWTP Phase I	—	—	—														
Collection/ Conveyance SA 1	—	—	—														
Collection/ Conveyance SA 2						—	—	—									
Anahola WWTP Future Phases																	——
Collection/ Conveyance SA 3													—	—	—		
Collection/ Conveyance SA 4																	——
Collection/ Conveyance SA 5																	——
Collection/ Conveyance SA 6																	——
Collection/ Conveyance SA 7																	——

2.1.4. Permits and Approval

Implementation of the proposed plan will require permits and approvals from the following agencies:

Federal Agencies: Corps of Engineers -- SPS No. 1 Force Main gulch crossing before entering treatment plant. Permit application for crossing possible wetland or dry stream.

State Agencies: State Department of Hawaiian Home Lands -- review of planning, design, and construction contract documents

State Department of Health:

a. Wastewater Treatment Facility (Title 11, Chapter 62)
b. Underground Injection Control Permit (Title 11 Chapter 23)
c. Fulfillment of September 5, 1990 Cesspool Variance Requirements

Office of Environmental Quality Control -- Environmental Assessment

Commission on Persons with Disabilities

State Department of Transportation -- Review of sewer trunk lines and force mains

County of Kauai: Department of Public Works -- Wastewater Systems plan review and Grading Permit

Department of Water Supply -- Water service connection

2.1.5. Alternatives to the Proposed Action

(1). No Action Alternative

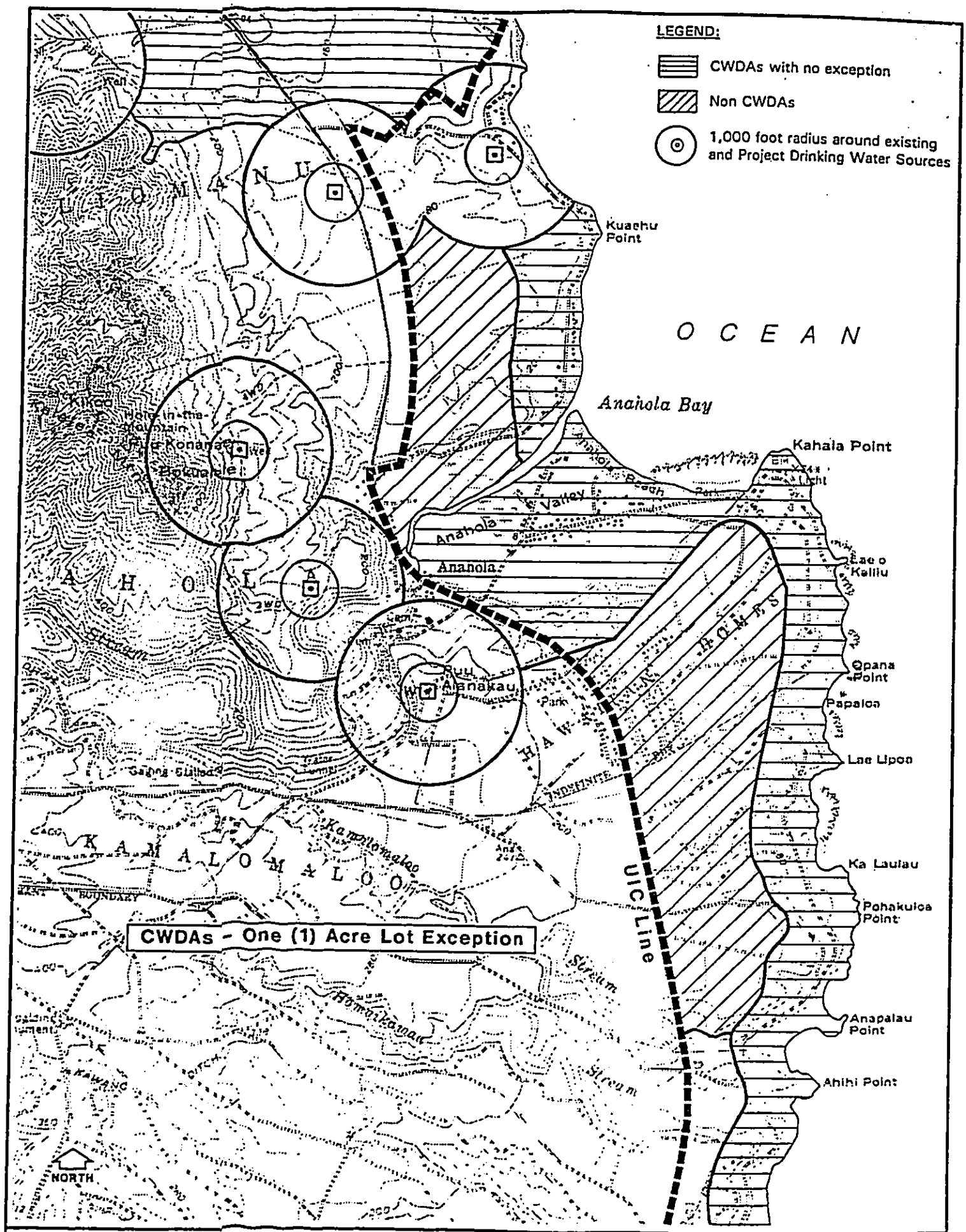
The no action alternative is not reasonable because current public policies and regulations prohibit the construction of new cesspools statewide. Septic tanks with underground disposal systems are appropriate for large agricultural lots, but are not suitable for small single family residential homestead lots because of the relatively large space requirements for installing the septic tank and effluent disposal system.

If no action was taken, the Department of Hawaii Home Lands could not proceed with developing residential subdivisions in the Anahola area. Since the demand for DHHL developed homestead lots is very high, the no action alternative would not be acceptable.

(2). Full Sewerage Service For The Planning Area

Another alternative is to provide municipal sewerage services to all lots within the Anahola-Kamalomaloo planning area.

Areas above the UIC line and generally above Kuhio Highway have been designated by Title 11, Chapter 62 of the State DOH regulations as Critical Wastewater Discharge Areas (CWDAs). See **Figure-29**. In the CWDAs, lots larger than 1 acre may utilize individual wastewater treatment systems such as septic tanks and effluent disposal systems. Areas below Kuhio Highway have portions designated as CWDAs with no exceptions, and other portions designated as non-CWDA areas. The designations are shown on **Figure-29**. Discussions with the State DOH indicated that for the Anahola area, areas designated for non-CWDA will be treated as if they were within the CWDAs. Accordingly, the State DOH has required the DHHL single family residential subdivisions like Unit 4 and 5 to be provided with dry sewers. Most of the land area above Kuhio Highway is zoned for agricultural use. As such, many of the subdivided parcels are larger that one acre, and individual wastewater treatment facilities are permitted. There are also subdivided parcels within the non-CWDA north of Anahola River where individual wastewater treatment facilities are permitted.



CRITICAL WASTEWATER DISPOSAL AREAS (CWDAs)

FIGURE 29

The provision of municipal sewerage services to all lots in the Anahola-Kamalomaloo planning area would be unnecessary and expensive, and therefore would not be cost effective. Utilization of individual wastewater treatment facilities where acceptable would be more practical.

(3). Partial Municipal Sewerage Service For The Planning Area

There are many options for providing partial municipal sewerage service for the planning area. Areas designated as CWDA with no exception must be provided with sewerage service. Areas designated by the State DOH as non- CWDA, but identified by the State DOH as areas with single family subdivisions which must be served by the municipal system, must be sewered. However, some discretion is allowed for other non-CWDAs, and coverage for these areas can vary. Rather than considering the numerous possible different scenarios, the approach to be followed is to provide sewerage service to the following:

a. All residences within 1,000 feet of an existing drinking water source,

b. For areas designated as CWDAs with one acre lot exception (areas above the UIC line), single family residences on lot sizes less than one acre,

c. All residences within CWDAs with no exceptions except for residences within the Anahola River floodway,

d. All single family residences, commercial and industrial land uses below the UIC line and within non-CWDAs which occupy lot sizes less than one acre,

e. Selected agricultural lots within non-CWDAs which may have cesspool disposal problems and which are relatively close to the municipal sewer collection system.

The above approach formed the basis for delineating the sewerage service area (SSA) shown in **Figure-1**. The service area thus delineated satisfies DOH requirements, and provides municipal collection and treatment services to many DHHL residences at reasonable costs.

The third alternative is deemed to be the most reasonable one for the Anahola-Kamalomaloo planning area, and is therefore recommended for design and construction.

At full development one central wastewater treatment facility is proposed for the SSA, and at least six sewage pump stations would be developed. As above discussed, a network of sewers to collect the sewage generated from the service area would also need to be constructed. See **Figure-3.**

2.1.6. List of Agencies and Organizations Consulted

The following agencies and organizations were consulted during preparation of this environmental assessment

State Department of Health Safe Drinking Water Branch
State Department of Health Wastewater Branch
State Department of Health, Kauai County District
County of Kauai Planning Department
County of Kauai Department of Public Works
Corps of Engineers

CHAPTER III

ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

3.1. Existing Environmental Conditions

The existing physical, social, and environmental conditions were described in Chapter I. The proposed action was described in Chapter II. This chapter discusses the environmental impacts of the proposed action.

3.2. Summary of Proposed Action

The proposed action involves the development of a sewerage system to serve most of the residents in the Anahola-Kamalomaloo area. The sewerage system will be comprised of a central wastewater treatment plant, a series of sewage lift stations and a sewerage collection system. See **Figure-3**. The sewerage system will be constructed in phases. Initially, the first phase of the WWTP, SPS No. 1, and Trunk Sewer No. 1 will be constructed.

The proposed site for the Anahola WWTP is located in Anahola, Kauai, Hawaii and identified by TMK 4-8-03:18 and 4-7-04:7. See **Figure-22**. There are no existing houses within the parcel. The surrounding land is currently vacant and had been used for sugarcane cultivation. According to the DHHL, a long-term lease agreement to the Lihue Plantation has already expired. The land may still be leased out for short terms, but can be available for construction of WWTP within short notice. The land generally slopes downward from Kuhio Highway to the ocean (west to east) at an approximate slope of 10 per cent. The WWTP site elevations range from about 100 feet at the west end to 50 feet at the east end.

Sewage lift station sites will be near or within developed areas and could be close to existing homes. The proposed SPS No. 1 site is presently located on vacant land, but residential subdivision developments of adjacent land are expected in the future.

Collector sewers, sewer laterals, and trunk sewers are proposed to be located within

roadways to facilitate accessibility for repair and maintenance, and to minimize the need for easement.

3.3. Environmental Impacts

3.3.1. Short-Term Impacts

Construction of the proposed Anahola WWTP, sewage lift stations, and collection systems will result in short term environmental impacts involving air quality, traffic, construction noise, access, aesthetics, and erosion. However, the impacts would be temporary and are limited to the relatively short construction time schedules. Construction of the WWTP is expected to have the most short-term impacts due to the magnitude of the projects. Short-term impacts from the initial construction phase are not expected to be significant because the construction site will be more than 700 feet from the closest existing residences. The short-term impacts can be mitigated by conscientious adherence to governmental regulations requiring the contractor's implementation of appropriate dust and noise control measures. The WWTP is located away from the Kuhio Highway, and the construction site will not be readily visible from the highway. Once the construction project is completed, the WWTP site will be landscaped, and the aesthetic impact will not be objectionable.

Air quality may temporarily deteriorate due to the release of fugitive dust from excavation, backfilling and grading operations, and exhaust fumes from construction machinery and vehicles. The impacts are expected to be minimal because dust and noise control requirements will be incorporated into the construction specifications and implemented by the contractor.

During construction, excavating, grading, and filling work will be accomplished by the contractor. The work will impact local flora and fauna species on each construction site, and expose the land to the natural elements. The impacts are expected to be temporary and short-term. Erosion control measures will be implemented as required. The County's grading, erosion, and sediment control ordinances will be complied with to minimize the potential adverse effects to adjacent lands and coastal waters. The construction work sites

will be planted and protected from erosion as soon as practicable after construction.

Traffic along Kuhio Highway will increase slightly because of the construction activity. The increase will be temporary and is not expected to be significant because the construction work crew is anticipated to normally involve about 15 people, and at most, approximately 30 people at any one time. Except for the occasional traffic congestion caused by large construction vehicles such as concrete trunks, access to the Anahola area will not be affected. Construction work, machinery operation and truck traffic will generate temporary noise, particularly within the immediate surrounding area. Noise impacts are expected to be minimal due to the relatively far distance from the residences.

The most serious short-term impacts are expected to occur when collection sewers and trunk sewers are constructed, because many of the sewers will be installed in existing roadways within or near residential areas. Construction work to trench, install piping, and repaving operations will have an impact on the nearby homes, local traffic and people. Trench excavations will be covered at the end of each work day, and flagmen or policemen will be stationed to direct traffic on the roads as deemed necessary. The potential inconveniences will be short-term. Efforts will be made by the DHHL to promptly address resident's concerns during the construction process.

Mitigation measures to ensure that no negative impacts will occur to unidentified historic sites which may be unearthed during construction will include having a State archaeologist available on call, and training of construction crew about the potential of uncovering artifacts and proper procedures to follow in the event of a discovery.

3.3.2. Long-Term Impacts

There will be no long term negative impacts on historical and archaeological sites and the general environment. There are no known archaeological nor historical sites near the project sites.

The sewerage system facilities will not adversely impact nearby agricultural lands, stream, nor the ocean.

Construction of the wastewater treatment plant will not have any long- term impacts on any recreational open space, nor any long-term negative impacts on noise or aesthetics. The treatment plant and the effluent disposal sites are not within the 100-year flood zone, nor within the special management area of the Coastal Zone Management Program.

No adverse impacts to the transportation facilities or traffic flow are expected in areas where sewage lift stations and the centralized treatment plant would be constructed. Traffic to individual sewage lift stations would involve two stops (for checking) per station, at most, per 24 hour period. A separate access road off Kuhio Highway would be provided to the wastewater treatment plant so that traffic within the subdivision would be minimally affected, if at all.

There will be some long-term visual impacts from individual sewage lift stations located within residential zoned areas. Neutral color schemes and landscaping will be provided to reduce visual impacts.

The wastewater pumping and treatment facilities will occasionally have some odors because of the nature of the materials handled. However, since the plant is located in an area away from existing residences, the impacts are expected to be minimal and infrequent. The systems will be designed to minimize odor emissions. Operators will be trained and certified to operate the plant effectively and to take actions to minimize the emission of odors.

Public health and safety will be enhanced because the numbers of individual cesspools which chronically have problems will be significantly reduced. The sewage and wastewaters generated by the public and served by the collection and treatment facilities will be treated in an effective and environmentally safe manner. The treatment will result in high quality effluent which will not pollute the environment. The general public will not be permitted to enter the treatment plant and the disposal sites so there should be little or no public health or safety problems associated with the wastewater facilities.

3.3.3. Secondary Impacts

There will be secondary growth impacts associated with the construction of the WWTP. The existing backlog of Hawaiian Home Lands applicants is the primary thrust behind the potential accelerated growth. The construction of wastewater treatment facilities will allow for further development of a master planned DHHL community rather than serve to encourage uncontrolled private developments.

Another secondary impact is the increased utility consumption, such as for electricity and water. The treatment facilities will be designed to be as energy efficient as practical, and with considerations to conserving power and water resources.

3.4. Possible Conflicts between the Proposed Action and the Objectives of Federal, Regional, and Local Land Use, Plans, Policies, and Controls for the Area Concerned

The Anahola sewerage systems will be constructed in phases consistent with funding and land management plans. Ultimately, some of the collection conveyance facilities will be in the SMA, and permits will be required. However, the initial increment of construction is not within the SMA, see **Figure-11**, therefore, a permit for the proposed initial construction phase is not required.

The proposed project must be reviewed by State and County agencies and will be consistent with government policies concerning land-use developments and wastewater treatment and disposal. The wastewater collection and treatment facilities will provide for the adequate wastewater treatment of flows generated from the serviced community. The wastewater collection and treatment facilities will minimize the opportunities for pollution and will produce good quality effluent which would not degrade the existing environment. The treated effluent will probably be disposed of by underground injection or seepage. State DOH permits for underground injection will be obtained as necessary.

3.5. Relationship between Local Short-term Uses of Man's Environment and the Maintenance and Enhancement of Long-term Productivity

The practice of implementing individual sewage disposal systems such as cesspools is severely restricted by the DOH for public health reasons. All new residential subdivisions, commercial, and industrial developments must connect to a municipal sewerage system where available. The existing short-term uses of man's environment to dispose of domestic sewage and miscellaneous wastewaters via cesspools or other individual systems will be minimized.

Natural resources will be preserved and conserved to the extent possible.

The proposed 0.4 MGD capacity of the Anahola WWTP will be capable of accommodating all of the existing residences and proposed developments that are master planned by the DHHL in the Phase I coverage area as shown in **Figure-2**. The remaining areas are either in the difficult-to-serve low lands or at Kamalomaloo where development is not expected to occur earlier than the 2010. These areas will be served in future as the WWTP expands to its ultimate capacity of 1.6 MGD.

A large municipal sewerage system has the advantages of economy of scale, high quality treatment capacities, and operation and maintenance by trained personnel which characterize reliability of performance and management effectiveness. Although the capital and operation/maintenance costs are large, such a system will result in enhancing the environment and increasing long-term productivity, because of the significantly decreased potentials for contamination, nuisance, and degradation of the environment. However, long term use of a portion of the land is required to construct the treatment and disposal facilities.

3.6. Mitigation Measurements to Minimize Impacts

Various construction measures and design features are expected to mitigate the impacts associated with the proposed project. These are described in **Table-7**.

Short-term impacts associated with the construction process will be mitigated with effective scheduling of various work tasks to reduce the potentials for traffic congestion, dust and noise. Dust will be controlled by sprinkling with water.

Long-term impacts associated with the implementation of the project will be mitigated by appropriate and low profile design, and competent, efficient, and effective operations and maintenance.

3.7. Irreversible and Irretrievable Commitments of Resources

There are several irreversible commitments of resources including land and financial resources to construct capital improvements, operate, and maintain the facilities. The land commitment for the Anahola WWTP is approximately 10 acres. DHHL must develop a method to fund the wastewater system improvements and to operate and maintain the facilities. Time schedules for capital improvements will also be developed commensurate with the availability of funds.

Estimated costs for the initial phase of construction are summarized below and represent the irreversible financial commitment. The land, labor, materials, energy, equipment and financial resources committed to collecting and treating wastewaters from the Anahola area are irreversible and irretrievable.

DESCRIPTION	ESTIMATED COST
Anahola WWTP (Phase I)	$6,870,000
Including access road from Kuhio Highway	
Collection/Conveyance Service Area 1	
Trunk Sewer No. 1	$1,050,000
Sewage Pump Station No. 1	$2,825,000
Force Main	$ 555,000

3.8. Assessment of Environmental Impacts

Based on the above analyses, the proposed project is not anticipated to have significant adverse impacts on the coastal water, groundwater, the local ecology, hydrology, and atmosphere. A Negative Declaration determination is suggested.

Development of the wastewater collection and treatment system will allow DHHL to further develop the area in an orderly manner consistent with their master planning efforts and with minimal adverse impacts to the environment.

There will be short-term and temporary impacts involving noise, dust, and other aesthetics due primarily to construction operations and work. These impacts will be mitigated by adherence to governmental regulations, and implementation of appropriate control measures when necessary.

There will be no adverse impacts on historical, archaeological sites and wetlands.

The treated effluent will be disposed of via effluent disposal wells. Negative environmental impacts to the groundwater and nearby ocean waters are not anticipated.

TABLE-7

MITIGATION MEASURES AND CONSIDERATIONS

Probable Effect	Duration	Mitigation Measures and Considerations
<u>Construction</u>		
Traffic Congestion	Temporary	Construction schedules, public information and flagmen
Noise	Temporary	Construction schedules and public information
Dust	Temporary	Sprinkling, minimize areas to be excavated or graded
Visible Structures	Long-term	Appropriate design, low profile, and landscaping
<u>Treatment Plant Operations</u>		
Noise	Long-term	Housed in sound insulated facilities
Odor	Occasional	Good operations and operators, Order control equipment
Effluent Disposal	Long-term	Good operations and operators, Chlorinator
Solids Handling	Long-term	Mechanical dewatering with sludge beds as standby, Good operators

CHAPTER IV

DRAFT ENVIRONMENTAL ASSESSMENT COMMENTS AND RESPONSES

This chapter has been added to the Draft Environmental Assessment to be part of the Final Environmental Assessment document.

The Draft Environmental Assessment was submitted to the Office of Environmental Quality Control (OEQC) in May 1995, and was published in the OEQC Bulletin on June 8, 1995. The deadline for public comment was July 8, 1995. One set of comments was received during the official 30-day OEQC comment period. The comments were by the OEQC. Copies of the OEQC comments and the Department of Hawaiian Home Lands response follow.

BENJAMIN J. CAYETANO
GOVERNOR

GARY GILL
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
220 SOUTH KING STREET
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HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
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June 27, 1995

Mr. Kali Watson, Chair
Hawaiian Homes Commission
P.O. Box 1879
Honolulu, Hawaii 96805

Dear Mr. Watson:

Subject: Draft Environmental Assessment for the Anahola Wastewater Treatment Plant, Phase I, Anahola, Kauai

Thank you for the opportunity to comment on the subject document. We have the following comments.

1. In May of 1993, the Department of Hawaiian Homelands submitted a draft environmental assessment for the Anahola Bayview Lots and Anahola Residence Lots. A final environmental assessment pursuant to §343-5(b) has not been submitted for the Anahola Lots. We recommend that a final environmental assessment that combines all proposed actions by DHHL in the Anahola area be prepared and submitted. This final assessment should consider all residential projects as well as related infrastructure improvements in the area.

2. Effluent from the wastewater facility will be disposed via seepage pits or underground injection wells. Please describe the impacts of the seepage pits and injection wells on groundwater and ocean resources.

3. Please describe in detail the systems that will be implemented to minimize odor emissions.

If you have any questions, please call Jeyan Thirugnanam at 586-4185. Mahalo.

Sincerely,

Gary Gill
Director

BENJAMIN J. CAYETANO
GOVERNOR
STATE OF HAWAII

KALI WATSON
CHAIRMAN
HAWAIIAN HOMES COMMISSION

JOBIE M. K. M. YAMAGUCHI
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

May 14, 1996

bcc: ADMIN/LDD Reading File (PY)
LDD PF: Anahola Wastewater Plant
LDD SF: EA
LDD Staff: PY/GML

Mr. Gary Gill, Director
Office of Environmental
Quality Control (OEQC)
State of Hawaii
220 South King Street, 4th Floor
Honolulu, Hawaii 96813

Dear Mr. Gill:

SUBJECT: Draft Environmental Assessment for the Anahola Wastewater Treatment Plant, Phase I, Anahola, Island of Kauai

I apologize for taking so long in responding to your letter dated June 27, 1995 regarding the above project. Since receiving your letter, the Department of Hawaiian Home Lands (DHHL) has been working with the Department of Health, Wastewater Division.

The following respons to your concerns:

a. OEQC Comment #1. Request for a final Environment Assessment for both the Anahola Bayview and the Anahola Residence Lots.

The final environmental assessment for the Anahola Bayview Lots and the Anahola Residence Lots was submitted to your office on July 12, 1995.

b. OEQC Comment #2. Anticipated impacts of the seepage pits and disposal well on ground water and ocean resources.

Impacts from the underground effluent disposal system are expected to be minimal, because of the relatively high quality secondary treated sewage effluent and the location of the disposal system, which is downstream of the State Department of Health's underground injection control line. The impacts of the underground effluent disposal system on the ocean resources are also expected to be minimal because of the distance from the

c : Fukunaga & Assoc.

coastline, length of travel time anticipated before it reaches the ocean, the relatively small volumes of effluent being discharged, and the high quality of treated effluent. The sewage treatment process will incorporate secondary treatment with denitrification. Therefore, the treated effluent is expected to be of high quality with low nitrate levels. Initially, the treatment system will be designed to accommodate 0.4 mgd. In the future, the system could accommodate 1.6 mgd as originally planned. Reclamation of sewage effluent for landscape irrigation and other purposes will also reduce the volume of effluent discharged.

c. OEQC Comment #3. Details regarding minimizing odor emissions.

Several odor control systems are being considered including tank covers, scrubbing equipment, and use of earth or biofilters. The technology for such equipment is changing rapidly, and final selection would more appropriately be made during the design phase to allow the designer flexibility in selecting a system that will meet the specific design conditions and be cost effective. Accordingly, details of the odor control system would be available during the design phase, and the system will be reviewed by DHHL and the State Department of Health.

If you have any questions, please have your staff contact Mike Crozier, Administrator of our Land Development Division at 586-3815.

Warmest aloha,

Kali Watson

Kali Watson, Chairman
Hawaiian Homes Commission

cc: Fukunaga & Associates, Inc.