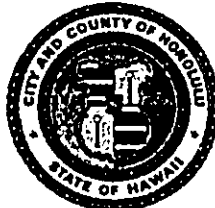


DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

630 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR



August 13, 1990

RECEIVED

SAM CALLEJO
DIRECTOR AND CHIEF ENGINEER

C. MICHAEL STREET
DEPUTY DIRECTOR

'90 AGO 20 P1:49

OFFICE OF ENVIRONMENTAL
QUALITY CONTROL

In reply refer to:
WPP 90-462

Office of Environmental Quality Control
State of Hawaii
465 S. King Street, Room 104
Honolulu, Hawaii 96813

Attention: Mr. Abdul Salau

Gentlemen:

Subject: Heeia Wastewater Collection System
Heeia, Koolaupoko, Oahu, Hawaii
TMK 4-6-04: 07, 08, 16, 18, 19, 20, 22, 23

Pursuant to Chapter 343, HRS, the Department of Public Works, City and County of Honolulu is submitting a Notice of Negative Declaration for Heeia Wastewater Collection System (Alii Bluff WWPS and FM and Punawai WWPS and FM). The construction of the proposed project will involve the use of City land and funds. This notice of determination was based on findings reported in an Environmental Assessment prepared by Calvin Kim & Associates, Inc. and Gerald Park Urban Planner for the Division of Wastewater Management and after consulting with other government agencies, community organizations, and individuals. Four (4) copies of the Notice of Negative Declaration/Environmental Assessment are attached. The pertinent data for this notice are as follows:

1. Proposing Agency - Department of Public Works, City and County of Honolulu.
2. Proposed Action - The primary objective of the project is to enhance the health and safety of the public by providing permanent wastewater facilities to effectively handle existing and planned wastewater flows from the Heeia Tributary Area. Three temporary sewage pump stations and their respective force mains will be replaced by permanent wastewater facilities. Two new wastewater pump stations will be constructed on sites now occupied by the Crown Terrace SPS No. 2 at the end of Halaulani Street and the Alii Bluffs SPS adjacent to Kamehameha Highway near Heeia Bridge.

Land required for expansion at the existing pump station sites will be provided by the Bishop Estate. The new pump stations will be constructed on previously filled land and will not affect the adjacent Heeia Marsh. Alignment corridors for new force mains will be located within the right-of-way of Kamehameha Highway and Halaulani Street. The cost of the project is estimated at \$4,413,000.

Environmental impacts are primarily short-term relating to construction activities. Air quality, ambient noise levels, and traffic circulation along Kamehameha Highway and Halaulani Street may be affected during construction. Construction activities also may affect underground utilities. However, construction plans will be submitted for review by utility companies and coordination during construction with these companies will be required to minimize any utility disruptions.

The contractor will be required to mitigate impacts during construction by adhering to State and County regulations for controlling noise and dust, posting warning signs to alert motorists and pedestrians of roadwork, covering or barricading trenches during non-working hours, and posting safety devices (and signs) at all times.

The primary long-term impact will be the provision of adequate sewer capacity to accommodate existing and planned sewage flows within the Heeia Tributary Area.

3. Determination - After reviewing the Environmental Assessment prepared for the project and consulting with other government agencies, community organizations, and individuals, we have determined that the proposed project will not have a significant impact on the environment, and an Environmental Impact Statement is not required.
4. Reasons Supporting Determination - Reasons and conclusion supporting the determination are based on the following criteria. The proposed project will not:
 - destroy any archaeological, historical or cultural resources;
 - affect any rare or endangered flora or fauna species and its habitat;
 - conflict with the State's environmental policies and goals expressed in Chapter 344, HRS;
 - adversely affect the economic or social welfare of the community or state;
 - affect an environmentally sensitive area;
 - degrade environmental quality;
 - involve a commitment for a larger action.

Office of Environmental
Quality Control

- 3 -

August 13, 1990

5. Contact Person - Richard Leong
Division of Wastewater Management
Department of Public Works
Honolulu Municipal Building, 14th Floor
650 S. King Street
Honolulu, Hawaii 96813
Telephone No. 527-5863

Very truly yours,

C. Michael Street
for SAM CALLEJO
Director and Chief Engineer

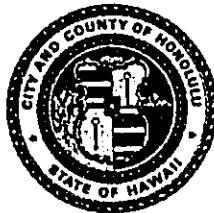
Attach. (4 copies)

cc: Department of General Planning
Department of Land Utilization

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR



April 30, 1990

RECEIVED

SAM CALLEJO
DIRECTOR AND CHIEF ENGINEER

'90 MAY -4 P4:21

In reply refer to:
OFC. OF ENVIRONMENTAL
QUALITY CONTROL WPP 90-240

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

Dear Dr. Miura:

Subject: Draft Environmental Assessment for
He'eia Wastewater Collection System
He'eia, Koolaupoko, Oahu, Hawaii

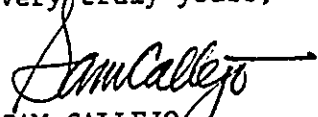
The Department of Public Works, City and County of Honolulu proposes to construct permanent sewage facilities to replace three existing temporary sewage pump stations and force mains presently serving the He'eia Sewage Tributary Area. The temporary facilities are old, in poor structural condition, and do not comply with current wastewater facility design standards. The primary objective of the project is to enhance the health and safety of those served by the system by providing permanent wastewater facilities to effectively accommodate existing flows from the tributary area.

We believe the project may be of interest to you or to your organization and ask for your participation in assisting us to complete the Environmental Assessment prepared for the project. A copy of the draft Environmental Assessment is enclosed with this letter for your review. Presently, the information we have obtained indicates that the project does not have any significant impacts and a Negative Declaration may be filed.

We would appreciate receiving written comments on the proposed project relative to your jurisdiction, expertise, local knowledge, or interest. We would like to receive your comments by May 21, 1990 and hope that you can respond by that time. Thank you for your cooperation.

If you have any questions, please call Mr. Richard Leong at 527-5863.

Very truly yours,


SAM CALLEJO
Director and Chief Engineer

Attachment

103

1990-09-08-0A-FEA

FILE COPY

FILE COPY

ENVIRONMENTAL ASSESSMENT

*** HE'EIA WASTEWATER COLLECTION SYSTEM ***

**(ALII BLUFFS WWPS AND FM AND
PUNAWAI WWPS AND FM CONSTRUCTION)**

HE'EIA, KOOLAUPOKO, OAHU, HAWAII

Prepared For:

**Division of Wastewater Management
Department of Public Works
City and County of Honolulu**

Prepared By:

**Calvin Kim and Associates, Inc.
and
Gerald Park Urban Planner**

ENVIRONMENTAL ASSESSMENT

FOR

HE'EIA WASTEWATER COLLECTION SYSTEM
(ALI BLUFFS WWPS AND FM AND PUNAWAI WWPS AND FM CONSTRUCTION)
HE'EIA, KOOLAUPOKO, OAHU, HAWAII

TAX MAP KEY: 4-6-04, 07, 08, 16, 18-20, 22, 33

This Document is Prepared Pursuant to
Chapter 343, Hawaii Revised Statutes
and Chapter 200, Title 11 Administrative Rules,
Department of Health, State of Hawaii

Proposing Agency

Department of Public Works
City and County of Honolulu
650 S. King Street
Honolulu, Hawaii 96813

Responsible Official:

C. Michael Street
for SAM CALLEJO
Director and Chief Engineer

Date:

8/10/20

Prepared for

Division of Wastewater Management
Department of Public Works
City and County of Honolulu

Prepared By

Calvin Kim and Associates, Inc.
and
Gerald Park Urban Planner

EXECUTIVE SUMMARY

PROJECT NAME: He'eia Wastewater Collection System
(Alii Bluffs WWPS and FM and Punawal WWPS and
FM Construction)

PROPOSING AGENCY: Division of Wastewater Management
Department of Public Works
City and County of Honolulu

PROJECT LOCATION: He'eia, Koolaupoko District, Oahu, Hawaii

TAX MAP KEY(S): 4-6-04, 07, 08, 16, 18-20, 22, 33

CONTACT PERSON: Richard Leong
Division of Wastewater Management
Department of Public Works
City and County of Honolulu
Ph: 527-5863

The Division of Wastewater Management, Department of Public Works, City and County of Honolulu, proposes to improve sections of the He'eia Wastewater Collection System. The primary objective of the project is to enhance the health and safety of the public by providing permanent wastewater facilities to effectively handle existing wastewater flows from the He'eia Sewage Tributary Area. A secondary objective is to provide for the safety of City personnel who must now enter the underground sewage pump stations for maintenance and repairs. The three temporary pump stations comprising the system do not meet current municipal pump station standards and should be replaced by permanent facilities.

Three construction alternatives are evaluated for environmental impacts in this Assessment.

Alternative I	Permanent Alii Bluffs Wastewater Pump Station (WWPS) and Force Main and Punawal Trunk Sewer (One Pump Station).
Alternative II	Permanent Alii Bluffs Wastewater Pump Station (WWPS) and Force Main; and New Punawal Wastewater Pump Station and Force Main (Two Pump Stations).
Alternative III	Upgrade Existing Alii Bluffs Sewage Pump Station and Force Main; Upgrade Existing Crown Terrace Sewage Pump Station No. 4 and Force Main; and Upgrade Existing Crown Terrace Sewage Pump Station No. 2 and Force Main.

The three construction alternatives provide a permanent sewer system in conformance with City design standards. Each alternative was developed based on flows generated within the existing tributary area; however, flow from an unsewered area beyond He'eia Bridge was added to that for the Aili Bluffs area. Engineering variations for the alternatives are based on replacing the three temporary pump stations and force mains with one, two, or three new pump stations, force mains, and gravity sewers.

A fourth alternative, the No Action alternative, was considered but dismissed. In monetary terms, the No Action alternative is the least cost option. However, the continued exposure of City personnel to hazards within the pump stations, the danger of structural failure of the three pump stations, and City design standards that require permanent type facilities make this alternative undesirable.

Upon careful evaluation of the operational, economic, and environmental characteristics of the three construction alternatives, it is recommended that Alternative II should be implemented to provide permanent sewage facilities for the He'eia Sewage Tributary Area.

This alternative is the least damaging to the environment since most work will occur within the rights-of-way of Kamehameha Highway and Halaulani Street. Two new wastewater pump stations will be required and sites for both are available adjacent to the stations to be replaced.

Potential impacts on air quality, acoustical quality, and traffic flow are anticipated. These impacts are of short-term duration and can be mitigated by measures described in this Assessment. Alternative II can be constructed entirely on public lands. Land required for the new Punawai WWPS and Aili Bluffs WWPS will be provided by the Bishop Estate. This recommended Alternative does not infringe on He'eia Marsh and thus will neither impact He'eia Stream nor the wetlands.

TABLE OF CONTENTS

		<u>Page</u>
	EXECUTIVE SUMMARY	
SECTION 1	<u>INTRODUCTION</u>	
	A. Location	1
	B. Statement of Objectives and Need for the Project	1
	C. Existing Collection System	4
	D. Related Wastewater Facilities	7
SECTION 2	<u>PRELIMINARY ENGINEERING ALTERNATIVES</u>	
	A. Technical Characteristics	9
	1. Alternative I	15
	2. Alternative II	18
	3. Alternative III	20
	4. Alternative IV	23
	B. Economic Characteristics	25
	C. Social Characteristics	25
SECTION 3	<u>DESCRIPTION OF THE AFFECTED ENVIRONMENT</u>	
	A. Existing Use	26
	B. Geographical Characteristics	26
	C. Topography	27
	D. Soils	27
	E. Flood Hazards	28
	F. Hydrological Characteristics	28
	1. Groundwater	28
	2. Surface Water	30
	G. He'eia Floodplain	30
	H. Wetland and Aquatic Biota	32
	1. He'eia Mangrove Swamp	32
	2. He'eia Marsh	35
	3. Meadow Land	36
	4. He'eia Stream	37
	5. Non-Wetland Areas	39
	I. Archaeological Resources	40
	J. Socio-Economic Characteristics	43
	1. Population	43
	2. Land Ownership	43

TABLE OF CONTENTS

	<u>Page</u>
SECTION 3 <u>DESCRIPTION OF THE AFFECTED ENVIRONMENT (Cont'd)</u>	
K. Public Facilities and Services	
1. Water	44
2. Roads	44
3. Drainage	44
4. Utilities	44
5. Public Services	46
6. Recreation	46
7. Protective Services	46
	47
SECTION 4 <u>RELATIONSHIP TO LAND USE PLANS, POLICIES, AND CONTROLS FOR THE AFFECTED AREA</u>	
A. State Land Use Districts	48
B. General Plan for the City and County of Honolulu	48
C. Koolaupoko Development Plan	50
1. Land Use	50
2. Public Facilities	51
D. Zoning	51
E. Special Management Area	51
F. Department of the Army (DOA) Permit	53
SECTION 5 <u>SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS AND MEASURES TO MITIGATE ADVERSE EFFECTS</u>	
A. Air Quality	56
B. Noise	57
C. Hydrological Characteristics	57
D. Flooding and Flood Hazards	57
E. Biological Resources	58
1. He'eia Wetlands	59
2. He'eia Stream	59
3. Rare, Threatened, or Endangered Species	62
F. Archaeological Resources	63
G. Public Facilities and Services	64
1. Traffic	65
H. Aesthetics	66
I. Socio Economic	66
	67

TABLE OF CONTENTS

	<u>Page</u>
SECTION 6 RECOMMENDED PLAN	69
SECTION 7 DETERMINATION AND REASONS SUPPORTING DETERMINATION	70
SECTION 8 LIST OF APPROVALS	73
SECTION 9 AGENCIES, ORGANIZATIONS, AND INDIVIDUALS CONSULTED IN THE PREPARATION OF THE ENVIRONMENTAL ASSESSMENT	74

REFERENCES

APPENDICES

APPENDIX A	LIST OF FLORA OBSERVED ALONG THE PUNAWAI TRUNK SEWER ROUTE
APPENDIX B	COST-EFFECTIVE ANALYSIS
APPENDIX C	PROPOSED WASTEWATER PUMP STATION SITE PLANS
APPENDIX D	CONSULTATION PERIOD COMMENTS AND RESPONSES
APPENDIX E	NEGATIVE DECLARATION OF ENVIRONMENTAL IMPACT

LIST OF FIGURES

<u>FIGURE</u>	<u>TITLE</u>	<u>PAGE</u>
1	LOCATION MAP	2
2	HE'EIA SEWAGE TRIBUTARY SUB-AREA MAP	3
3	EXISTING COLLECTION SYSTEM MAP	5
4	EXISTING FACILITIES MAP KANEOHE-KAILUA WASTEWATER COLLECTION AND DISPOSAL SYSTEM	8
5	ALTERNATIVE I	16
6	ALTERNATIVE II	19
7	ALTERNATIVE III	21
8	FLOOD MAP	29
9	LANDFORM DESIGNATIONS AT HE'EIA MARSH	33
10	CULTURAL SURVEYS HAWAII FIELD MAP	41
11	STATE LAND USE MAP	49
12	DEVELOPMENT PLAN PUBLIC FACILITIES MAP	52
13	SPECIAL MANAGEMENT AREA	54

LIST OF TABLES

<u>TABLE</u>	<u>TITLE</u>	<u>PAGE</u>
1	EXISTING FLOW DATA HE'EIA WASTEWATER COLLECTION SYSTEM	6
2A	DESIGN DATA HE'EIA WASTEWATER COLLECTION SYSTEM ALTERNATIVE I	10
2B	DESIGN DATA HE'EIA WASTEWATER COLLECTION SYSTEM ALTERNATIVE II	11
2C	DESIGN DATA HE'EIA WASTEWATER COLLECTION SYSTEM ALTERNATIVE III	12
2D	DESIGN DATA HE'EIA WASTEWATER COLLECTION SYSTEM ALII BLUFFS WASTEWATER PUMP STATION	14
3	TRAFFIC COUNTS KAMEHAMEHA HIGHWAY AT HE'EIA BRIDGE	45
4	COMPARISON OF ESTIMATES PRESENT - WORTH MONETARY COSTS	68

SECTION 1
INTRODUCTION

A. Location

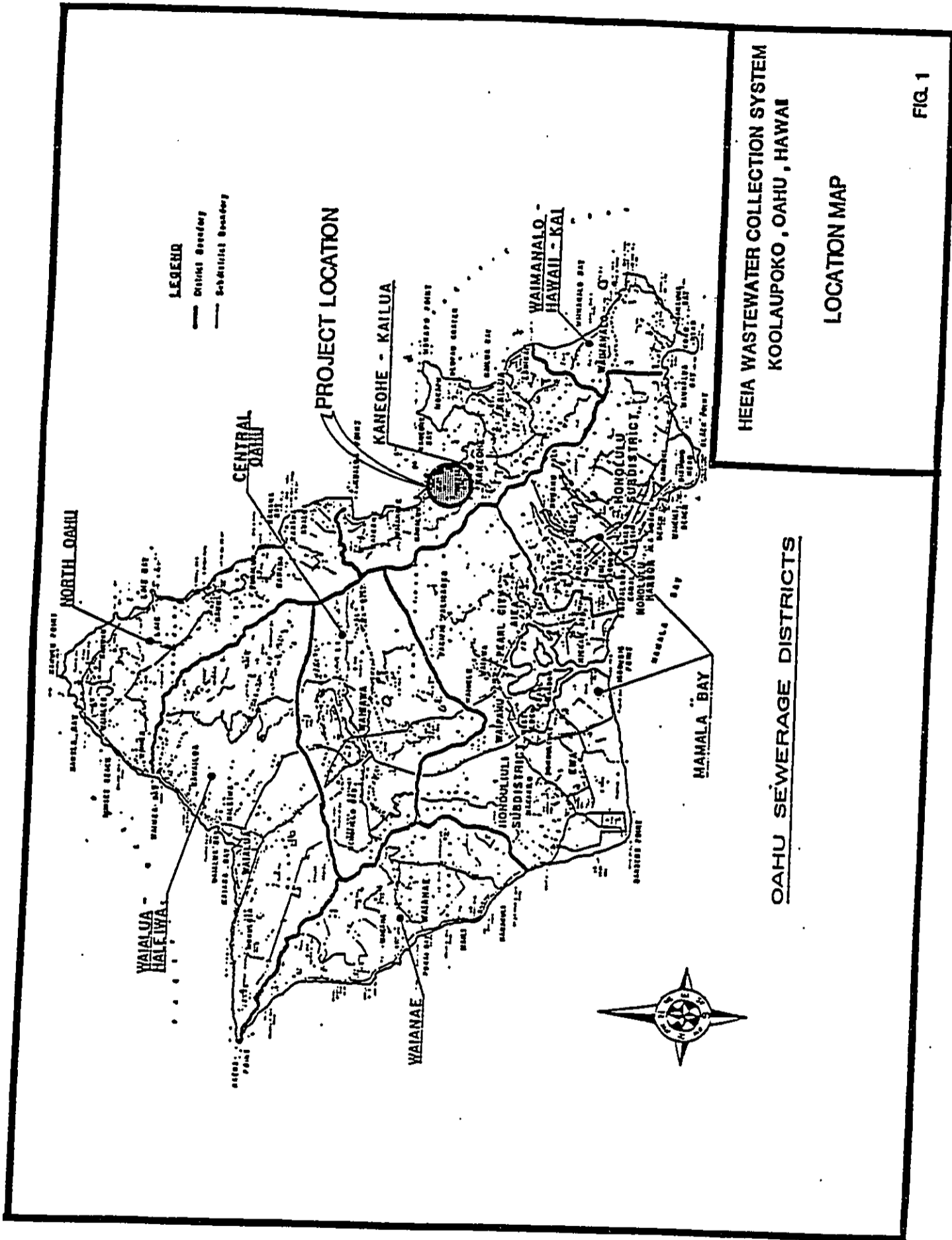
The Division of Wastewater Management, Department of Public Works, City and County of Honolulu, proposes to implement improvements to a portion of the He'eia Wastewater Collection System located in He'eia, Koolaupoko District, City and County of Honolulu, State of Hawaii. The location of the project is shown in Figure 1 and is identified by tax map key as First Taxation District 4-6-04, 07, 08, 16, 18-20, 22, and 33.

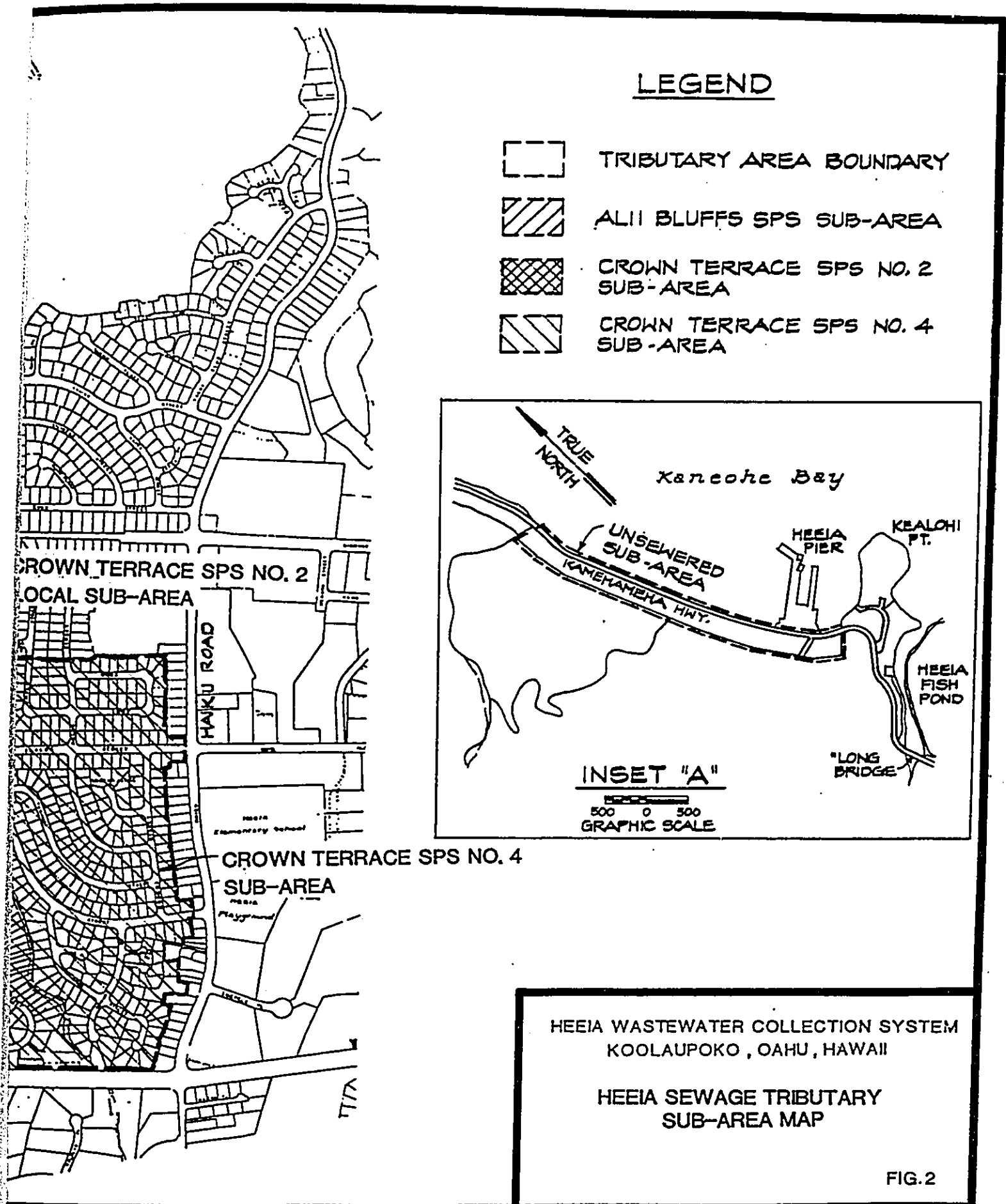
The system serves a sewage tributary area of approximately 205 acres as shown in Figure 2. The tributary area has been extensively developed for residential uses to include Crown Terrace, Aili Bluffs Mauka, Aili Bluffs Makai, and Aili Cluster subdivisions. Geographically, the area is generally bounded by Haiku Road to the south, Kahekill Highway to the west, and He'eia Fish Pond and a portion of Kaneohe Bay to the east. He'eia Marsh forms a meandering northern border between Kahekill highway on the west and He'eia Fish Pond on the east.

B. Statement of Objectives and Need for the Project

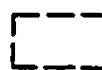


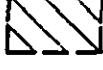
The primary objective of the project is to enhance the health and safety of the public by providing permanent wastewater facilities to effectively handle existing and planned wastewater flows from the He'eia Sewage Tributary Area.

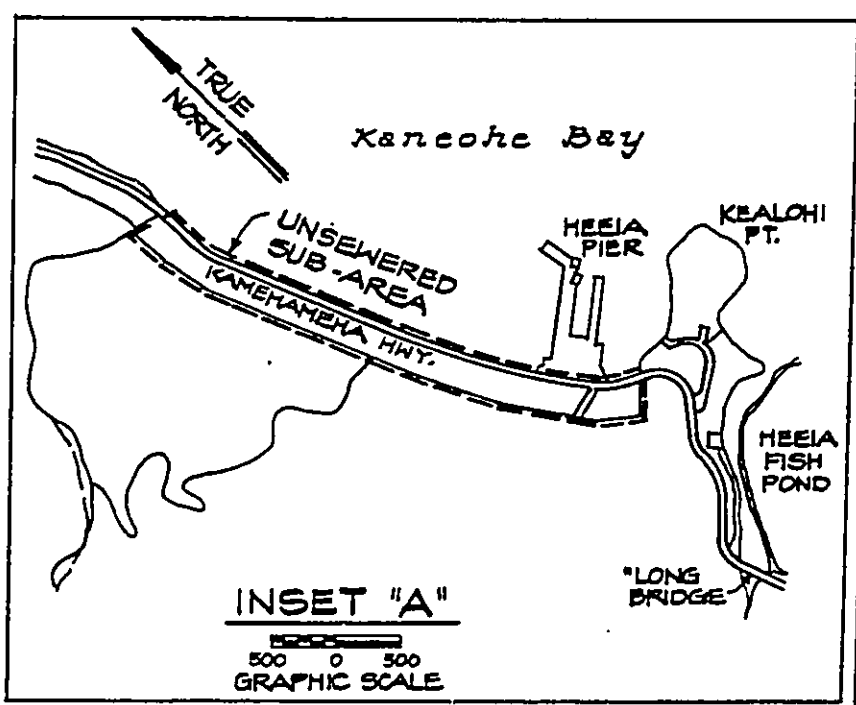
Three temporary sewage pump stations and force mains serve the 205 acre tributary area (see Figure 2). The existing temporary pump stations and force mains were constructed by the developers of the residential subdivisions in the He'eia area. These temporary facilities, which have been in use for at least 27 years, were intended to serve the initial phases of the planned residential development of He'eia and were to be replaced by permanent facilities after the balance of the area was completely developed. However, over the years, municipal land use planning considerations have changed and much of the He'eia lands have been prohibited from development as envisioned. As such, permanent sewage facilities to replace the earlier temporary facilities and serve the envisioned additional developed areas were not constructed.





LEGEND

-  TRIBUTARY AREA BOUNDARY
-  ALII BLUFFS SPS SUB-AREA
-  CROWN TERRACE SPS NO. 2 SUB-AREA
-  CROWN TERRACE SPS NO. 4 SUB-AREA



HEEIA WASTEWATER COLLECTION SYSTEM
 KOOLAUPOKO, OAHU, HAWAII

HEEIA SEWAGE TRIBUTARY
 SUB-AREA MAP

FIG. 2

In April, 1986 the City and County of Honolulu assumed the responsibility for the operation and maintenance of the three existing sewage pump stations and force mains from the He'eia Landing Homes developer through a monetary Settlement Agreement. That Agreement would also provide for the quit claim conveyances from Bishop Estate of the existing stations and lines and the dedication of the three existing temporary sewage pump station sites.

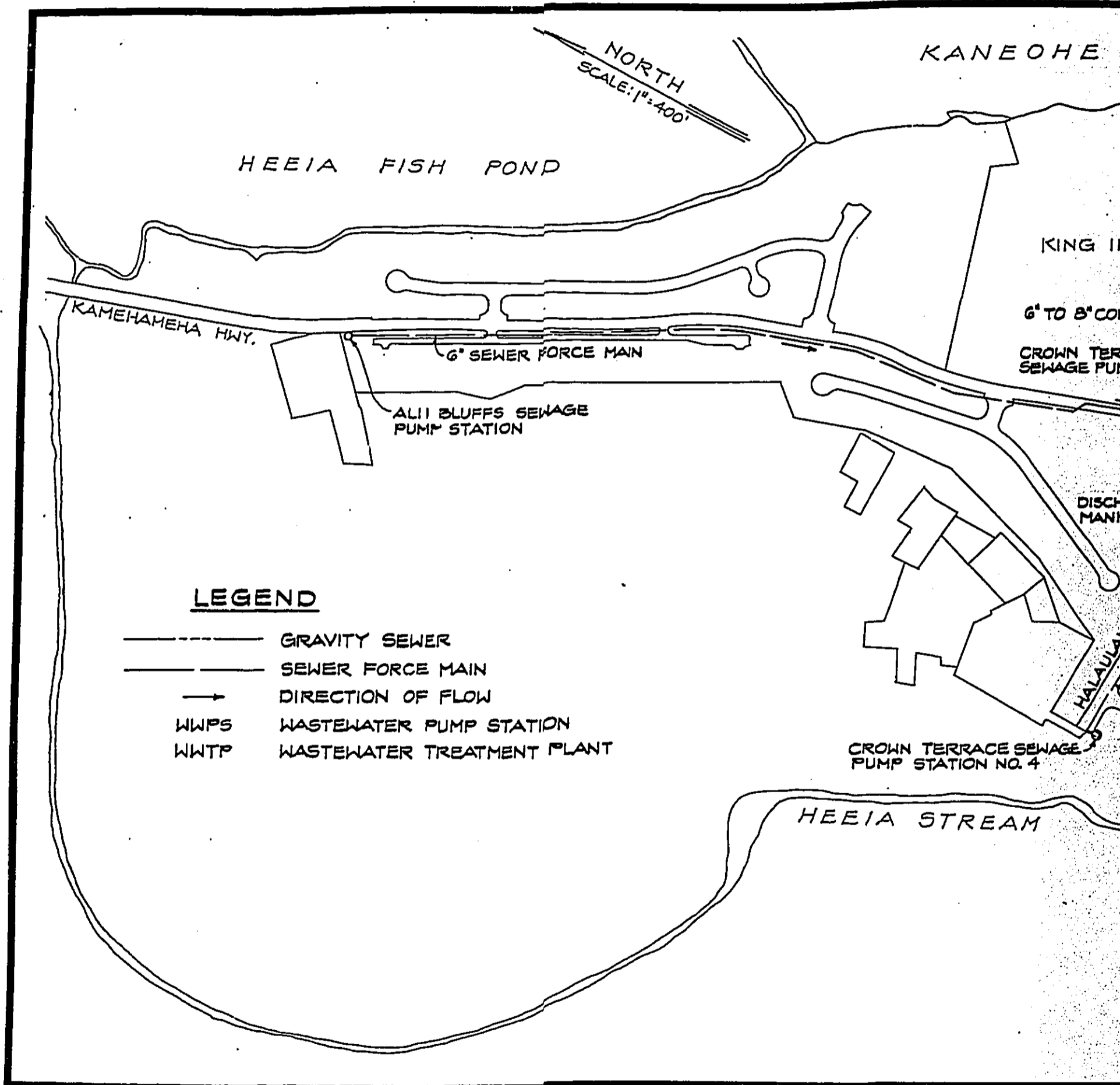
Prior to assuming the responsibilities for the existing facilities, the City had received numerous complaints that pointed to a lack of maintenance of the pump stations. Upon assuming this responsibility, the City has continuously strived to provide permanent type facilities.

A secondary objective is to provide for the safety of City personnel who must enter the underground stations for maintenance and repairs. A Preliminary Engineering Report for the project (Kim & Associates, 1989) concluded that the three temporary City operated and maintained pump stations do not meet current Division of Wastewater Management Wastewater Pump Station standards for reliability, access, redundancy and safety, and construction materials and therefore the stations should be programmed for replacement.

C. Existing Collection System

Three temporary sewage pump stations—Crown Terrace Sewage Pump Station No. 2, Crown Terrace Sewage Pump Station No. 4, and All Bluffs Sewage Pump Station—and their respective force mains, comprise the main features of the existing collection system as shown in Figure 3. Existing sewage flow data is presented in Table 1.

Crown Terrace Sewage Pump Stations No. 2 and No. 4 were installed as temporary stations in 1962 and were to be abandoned upon the construction of permanent built-in-place facilities. They are factory-built, underground, pump stations. Both stations were constructed to serve the initial Crown Terrace Subdivision. Crown Terrace Sewage Pump Station No. 4 collects sewage from the lower areas of the subdivision then pumps the sewage through an 8-inch force main to a sewer manhole located in a higher area in the



NORTH
SCALE: 1" = 400'

KANE OHE

HEEIA FISH POND

KAMEHAMEHA HWY.

6" SEWER FORCE MAIN

ALII BLUFFS SEWAGE PUMP STATION

KING I
6" TO 8" CO
CROWN TER
SEWAGE PUM

DISCH
MAIN

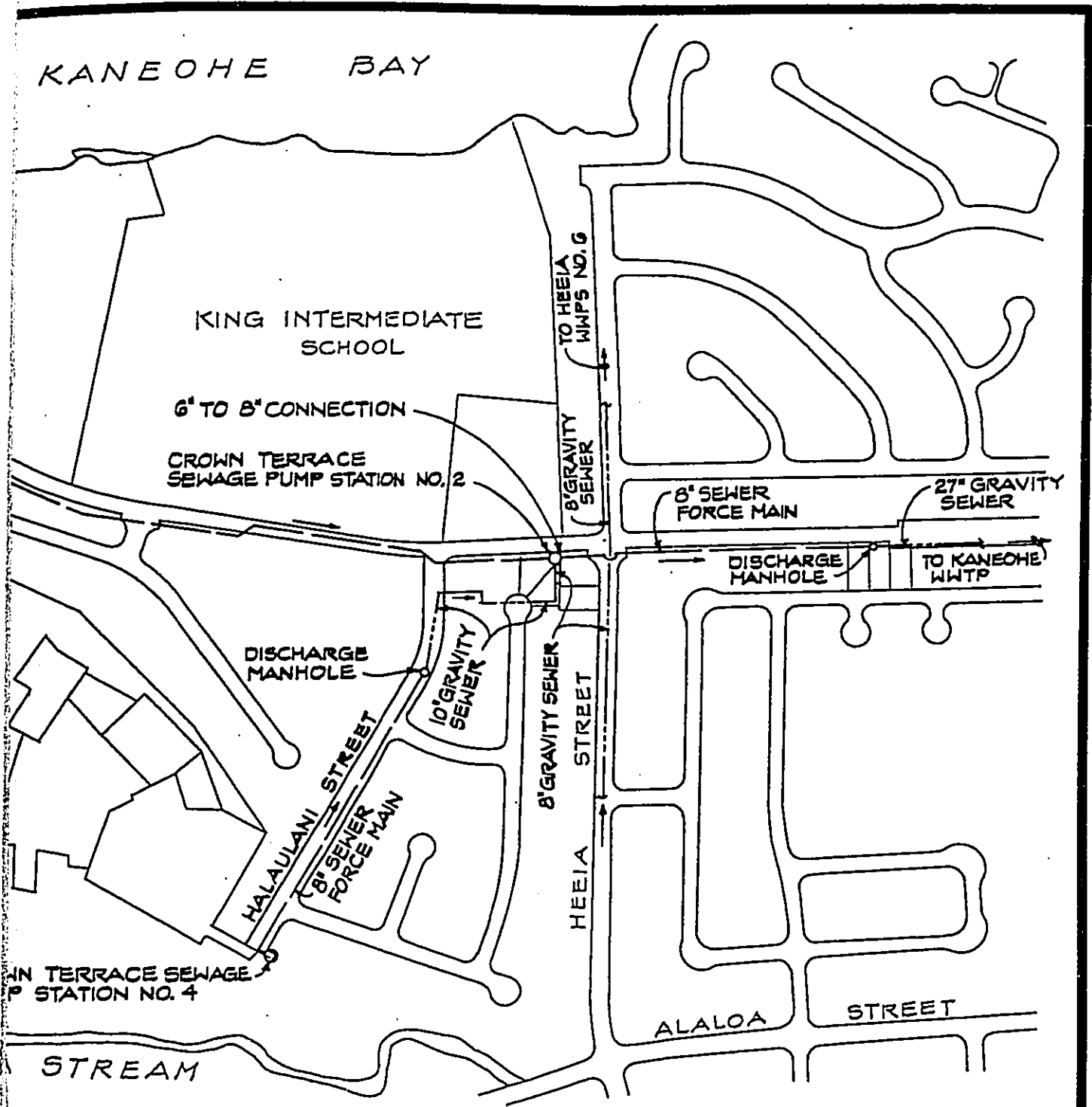
LEGEND

- GRAVITY SEWER
- SEWER FORCE MAIN
- DIRECTION OF FLOW
- WWPS WASTEWATER PUMP STATION
- WWTP WASTEWATER TREATMENT PLANT

CROWN TERRACE SEWAGE PUMP STATION NO. 4

HALAULA

HEEIA STREAM



HEEIA WASTEWATER COLLECTION SYSTEM
 KOOLAUPOKO, OAHU, HAWAII

EXISTING COLLECTION SYSTEM MAP

FIG. 3

TABLE 1

EXISTING FLOW DATA

HE'FIA WASTEWATER COLLECTION SYSTEM

	<u>Alli Bluffs Sewage Pump Station</u>	<u>Crown Terrace SPS No. 4</u>	<u>Crown Terrace SPS No. 2 (Local)</u>
Design equivalent population (persons)	633	2,332	76
Areas served (acres)	50	150	5
Average wastewater contribution (gallons per capita)	80	80	80
Maximum flow factor	5	4.42	5
Dry weather infiltration/inflow (gallons per day)	3,165	11,660	380
Wet Weather Infiltration/inflow (gallons per day)	62,500	187,500	6,250
Design Flow Rates (million gallons/day)			
Average Flow	0.054	0.199	0.006
Maximum Flow	0.256	0.836	0.031
Peak Flow	0.319	1.024	0.037

subdivision. From that manhole, sewage is conveyed by a 10-inch gravity line to Crown Terrace Sewage Pump Station No. 2 where it enters the station through an 8-inch gravity line. Crown Terrace Sewage Pump Station No. 2 also collects sewage from the higher areas of the subdivision and pumps the combined incoming sewage through an 8-inch force main to a municipal trunk sewer. The trunk sewer is located under Kamehameha Highway outside of the tributary area and at an elevation higher than Crown Terrace Sewage Pump Station No. 2.

The Aili Bluffs Sewage Pump Station was put into service in 1967 as a temporary station and was to be abandoned and replaced by a permanent facility. It too is a factory-built, underground pump station. It was constructed to serve the Aili Bluffs Mauka, Aili Bluffs Makai, and the Aili Cluster residential developments. This station collects sewage from those developments and pumps the sewage through a 6-inch force main which connects to the 8-inch force main from Crown Terrace Sewage Pump Station No. 2.

In 1974, Crown Terrace Sewage Pump Station No. 4 and, correspondingly, Crown Terrace Sewage Pump Station No. 2 were included in the extended collection system to serve the Haiku Park Unit I, Haiku Park Unit II, and Haiku Knolls residential subdivisions. The stations did not undergo any changes because they were determined to have adequate capacities.

D. Related Wastewater Facilities

The He'eia Wastewater Collection System is part of the Kaneohe-Kailua Wastewater Collection and Disposal System shown in Figure 4. Sewage flows generated in the He'eia Sewage Tributary Area are pumped by the three temporary sewage pump stations and their appurtenant force mains to a manhole in the City's municipal system in Kamehameha Highway. From that manhole, sewage is conveyed by gravity to the Kaneohe Wastewater Treatment Plant (WWTP) where received sewage is treated by the trickling filter process. Sludge resulting from the treatment process is handled by high-rate anaerobic digestion and mechanically centrifuged (dewatered). Treated effluent is pumped through a 42-inch force main to the Kailua WWTP. At the Kailua WWTP, the 42-inch force main connects to a 54-inch effluent force main from the Kailua WWTP. The 54-inch diameter effluent force main conveys the combined effluent flows to the Mokapu Deep Ocean Outfall for disposal.

SECTION 2

PRELIMINARY ENGINEERING ALTERNATIVES

A. Technical Characteristics

Three construction alternatives for improving the He'ela Wastewater Collection System are proposed in the Preliminary Engineering Report (Calvin Kim & Associates, 1989) prepared for the Department of Public Works. A fourth alternative, No Action, was considered and dismissed as conflicting with the objectives of the project. The alternatives are:

- | | |
|-----------------|---|
| Alternative I | Permanent All Bluffs Wastewater Pump Station and Force Main and Punawai Trunk Sewer (One Pump Station). |
| Alternative II | Permanent All Bluffs Wastewater Pump Station and Force Main and New Punawai Wastewater Pump Station and Force Main (Two Pump Stations). |
| Alternative III | Upgrade Existing All Bluffs Sewage Pump Station and Force Main; Upgrade Existing Crown Terrace Sewage Pump Station No. 4 and Force Main; Upgrade Existing Crown Terrace Sewage Pump Station No. 2 and Force Main (Three Pump Stations). |
| Alternative IV | Maintain Status Quo of Existing He'ela Wastewater Collection System (No Action). |

Each construction alternative provides permanent wastewater facilities in conformance with City design standards. Each alternative was developed based on flows generated within the existing tributary area. At the present time, further residential development in the project area is prohibited by the City's Koolauoko Development Plan. Consequently the design period is considered ultimate and wastewater flow quantiles are unchanged from existing flow rates. Design data and flow rates for each alternative are presented in Tables 2A, 2B, and 2C.

TABLE 2A

DESIGN DATA

HE'EIA WASTEWATER COLLECTION SYSTEM
ALTERNATIVE I

Design Period: 1989 (present) = Ultimate

	<u>All Bluffs WWPS</u>	<u>Punawai Trunk Sewer</u>	<u>Punawai By-Pass Sewer</u>
Design equivalent population (persons)	2,965	2,332	76
Areas served (acres)	200	150	5
Average wastewater contribution (gallons per capita)	80	80	80
Maximum flow factor	4.21	4.42	5
Dry weather Infiltration/Inflow (gallons per day)	14,825	11,660	380
Wet Weather infiltration/Inflow (gallons per day)	250,000	187,500	6,250
Design Flow Rates (million gallons/day)			
Average Flow	0.252	0.199	0.006
Maximum Flow	1.013	0.836	0.031
Peak Flow	1.263	1.024	0.037

TABLE 2B

DESIGN DATA

**HE'EIA WASTEWATER COLLECTION SYSTEM
ALTERNATIVE II**

Design Period: 1989 (present) = Ultimate

	<u>All Bluffs WWPS</u>	<u>Punawai WWPS</u>	<u>Punawai By-Pass Sewer</u>
Design equivalent population (persons)	633	2,332	76
Areas served (acres)	50	150	5
Average wastewater contribution (gallons per capita)	80	80	80
Maximum flow factor	5	4.42	5
Dry weather Infiltration/inflow (gallons per day)	3,165	11,660	380
Wet Weather Infiltration/inflow (gallons per day)	62,500	187,500	6,250
Design Flow Rates (million gallons/day)			
Average Flow	0.054	0.199	0.006
Maximum Flow	0.256	0.836	0.031
Peak Flow	0.319	1.024	0.037

TABLE 2C

DESIGN DATA

**HE'EIA WASTEWATER COLLECTION SYSTEM
ALTERNATIVE III**

Design Period: 1989 (present) = Ultimate

	<u>Alii Bluffs SPS</u>	<u>Crown Terrace SPS No. 4</u>	<u>Crown Terrace SPS No. 2</u>
Design equivalent population (persons)	633	2,332	2,408
Areas served (acres)	50	150	155
Average wastewater contribution (gallons per capita)	80	80	80
Maximum flow factor	5	4.42	4.38
Dry weather Infiltration/Inflow (gallons per day)	3,165	11,660	12,040
Wet Weather Infiltration/Inflow (gallons per day)	62,500	187,500	193,750
Design Flow Rates (million gallons/day)			
Average Flow	0.054	0.199	0.205
Maximum Flow	0.256	0.836	0.867
Peak Flow	0.319	1.024	1.061

The Division of Wastewater Management requires that the He'eia Wastewater Collection System accommodate wastewater flow quantities from an additional sub-tributary area. This sub-tributary area is an existing unsewered residential area of approximately 14 acres immediately north of He'eia Bridge. The design equivalent population is estimated at 453 persons. Based on the existing Development Plan designation (Residential) and zoning, the Division of Wastewater Management has estimated the additional flow as follows:

Design Average Flow:	52,000 gallons per day
Design Maximum Flow:	196,000 gallons per day
Design Peak Flow:	240,000 gallons per day

Given these additional flow rates, the design flow rates for the All Bluffs facility have been adjusted as shown in Table 2D. Collection lines will not be extended to this unsewered area as part of this project. Rather, the Department of Public Works is only providing additional capacity at the All Bluffs Wastewater Pump Station to accommodate projected flow.

TABLE 2D

DESIGN DATA

HE'EIA WASTEWATER COLLECTION SYSTEM

ALI BLUFFS WASTEWATER PUMP STATION

<u>Design Flow Rates (million gallons/day)</u>	<u>1989 (present)</u>	<u>Adjusted Ultimate</u>
<u>Alternative I</u>		
Average Flow	0.252	0.304
Maximum Flow	1.013	1.209
Peak Flow	1.263	1.499
<u>Alternative II</u>		
Average Flow	0.054	0.106
Maximum Flow	0.256	0.453
Peak Flow	0.319	0.555
<u>Alternative III</u>		
Average Flow	0.054	0.106
Maximum Flow	0.256	0.453
Peak Flow	0.319	0.555

1. Alternative I

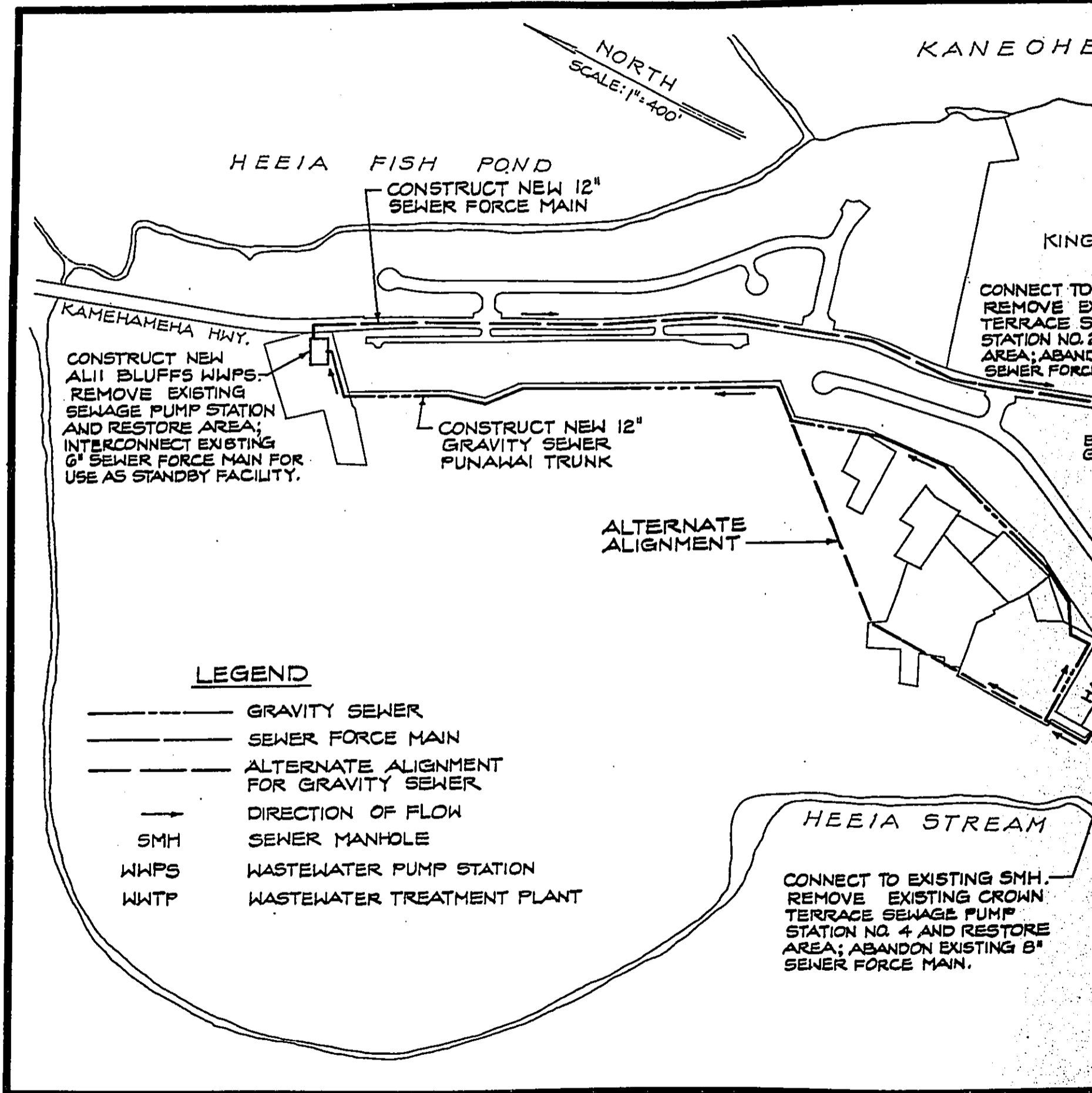
Alternative I was developed with the concept of constructing one new permanent wastewater pump station and force main and two new gravity mains (see Figure 5). These new facilities are adequate to collect and convey sewage that is now received by the three temporary sewage pump stations and force mains.

Actions needed to implement this alternative are described below.

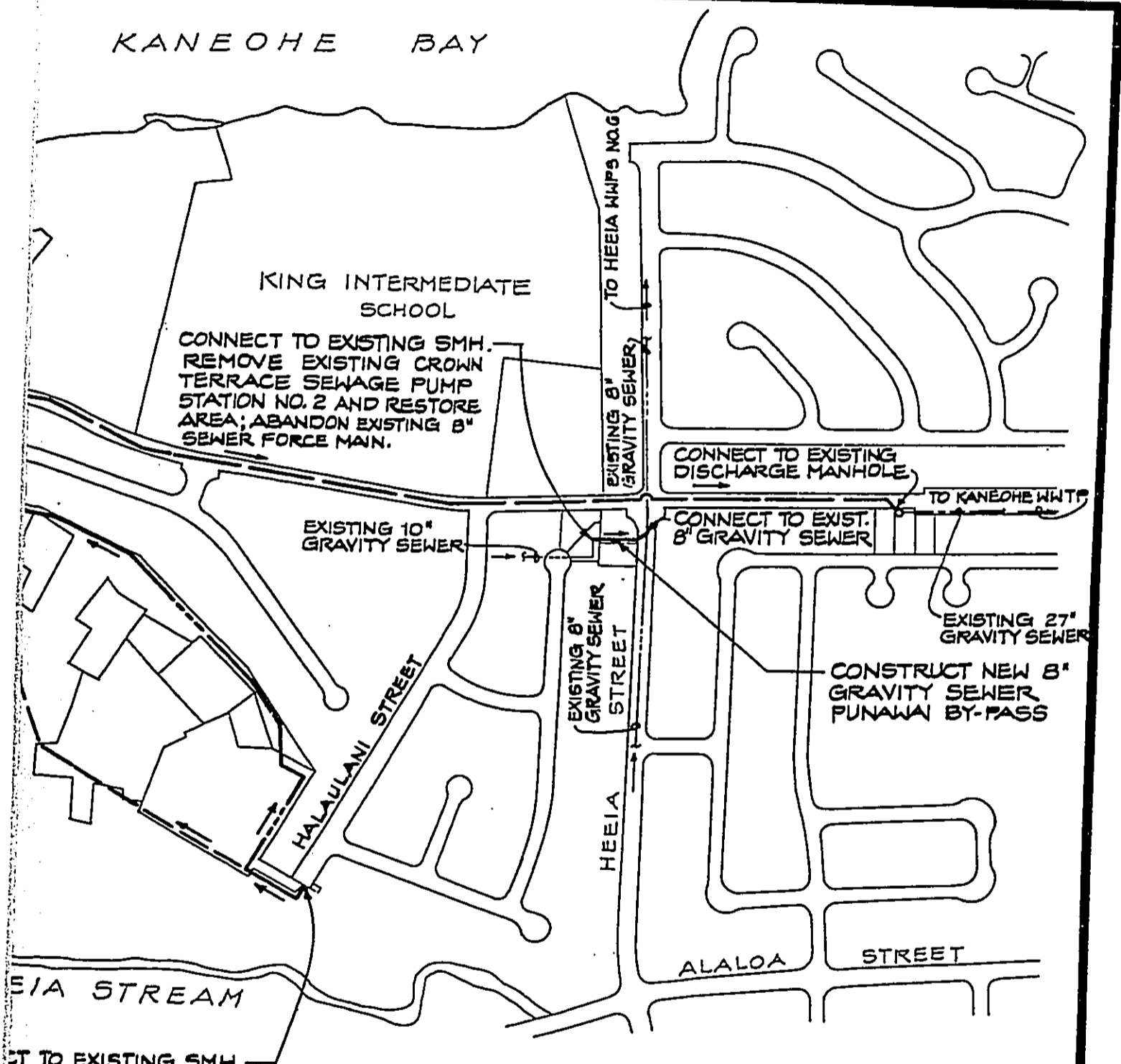
The existing Crown Terrace Sewage Pump Station No. 4 would be removed and 8-inch force main abandoned. Incoming sewage would discharge into an existing sewer manhole at the end of Halaulani Street and conveyed by a new 12-inch gravity line (Punawai Trunk Sewer) to a new pump station in the vicinity of the existing Aili Bluffs Sewage Pump Station.

The Punawai Trunk Sewer has a pipe length of 3,984 LF with a slope of 0.0090 ft/ft. Invert elevation is set at (-) 4.20 feet MSL at the new Aili Bluffs Wastewater Pump Station (WWPS) and +35.05 feet MSL at an existing manhole in Halaulani Street. This alternative requires a 10-foot wide sewer easement for maintenance purposes, drainage crossings, and driveway crossings at private driveways.

Two alignments were proposed for the Punawai Trunk Sewer. The primary alignment begins at a manhole at the end of Halaulani Street in the Crown Terrace Subdivision. The alignment proceeds north alongside the last residence, turns west immediately behind residences on the north side of Halaulani Street, and crosses a gravel driveway linking kuleana lands (the Patacsil property) with Ahui Nani Place in the Aili Cluster Subdivision. From here to the northern end of the Aili Cluster Subdivision, a distance of approximately 1,300 LF, the terrain is steep-sloped and a grade differential of approximately +30 feet separates the Patacsil property and Ahui Nani Place at the bottom and top of the slope respectively. The sewer line is aligned along the center of this steep slope. The sewer line continues north to the Aili Bluffs Wastewater Pump Station on a low slope alongside and above the eastern edge of the marsh. This section of the alignment is placed about 15 feet away from residential lots bordering the marsh.



KANE OHE BAY



CONNECT TO EXISTING SMH.
REMOVE EXISTING CROWN
TERRACE SEWAGE PUMP
STATION NO. 4 AND RESTORE
AREA; ABANDON EXISTING 8"
SEWER FORCE MAIN.

HEEIA WASTEWATER COLLECTION SYSTEM
KOOLAUPOKO, OAHU, HAWAII

ALTERNATIVE I
(ONE PUMP STATION)

FIG. 5

The alternative alignment also begins at a manhole at the end of Halaulani Street and proceeds north alongside the last dwelling. Rather than turning west, the alignment continues north alongside a plant nursery and into alluvial flatlands formerly used for taro and rice cultivation then turns west and crosses the He'eia Wetlands before turning north in the vicinity of the north end of the Aili Cluster Subdivision. This route then follows the primary alignment on to the Aili Bluffs Wastewater Pump Station.

The existing Aili Bluffs Sewage Pump Station would be removed and an existing 6-inch force main used as a standby facility. Incoming sewage to the new pump station would be pumped via a new 12-inch ductile iron force main to an existing discharge manhole in Kamehameha Highway.

The site of the new Aili Bluffs Wastewater Pump Station measures 9,450 SF (90' x 105'). The pumps would be housed in a reinforced concrete structure and planned improvements include a paved driveway, parking area, and an above ground fuel storage tank. The station wet well will have a storage volume of 2,749 gallons. Additional land will be required to site the facility.

From the pump station, approximately 4,700 LF of 12-inch ductile iron pipe (the new force main) will be constructed within the Kamehameha Highway right-of-way.

The existing Crown Terrace Sewage Pump Station No. 2 would be removed and 8-inch force main abandoned. Incoming sewage (now excluding discharge from Crown Terrace Sewage Pump Station No. 4) would be conveyed by gravity (Punawai By-Pass Sewer) to an existing 8-inch gravity main in He'eia Street.

Approximately 188 LF of pipe will be laid within an existing 10-foot wide sewer easement.

The estimated capital cost for Alternative I is \$5,387,000. The major cost items include maintenance easement improvements, land acquisition for the new All Bluffs WWPS, trench excavation and backfill, gravity sewer piping, pump station structure, pumps and piping, force main piping, emergency power, and instrumentation and controls.

2. Alternative II

Alternative II proposes the construction of two new permanent wastewater pump stations and force mains with revised pumping schemes and one new gravity main to accommodate sewage handled by the three existing pump stations (see Figure 6).

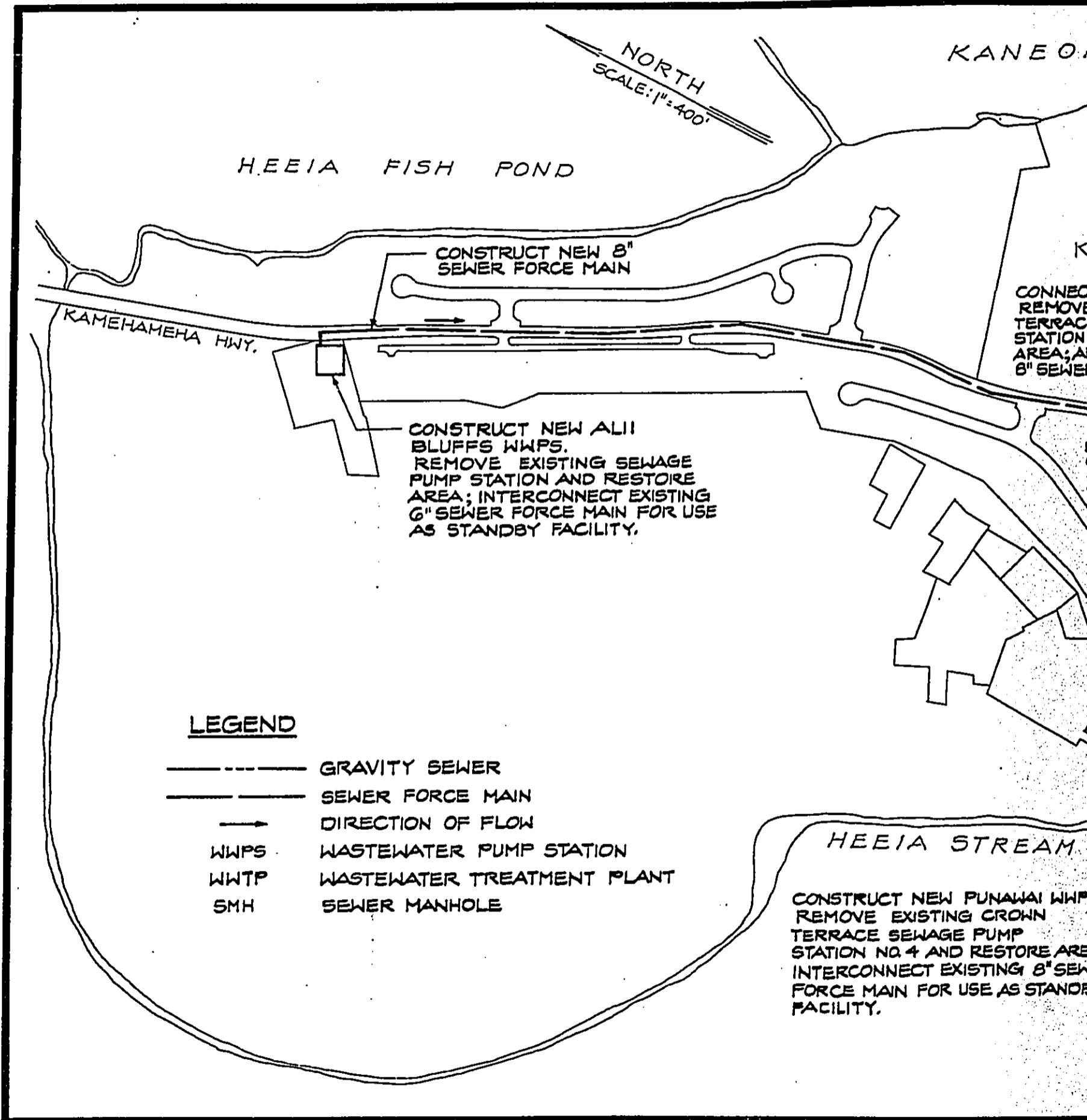
Actions needed to implement this alternative are described below:

The existing Crown Terrace Sewer Pump Station No. 4 would be replaced by a new permanent Punawai Wastewater Pump Station and the existing 8-inch force main used as a standby force main. Incoming sewage would be redirected to the new pump station and pumped through a new force main to a new discharge manhole in Kamehameha Highway.

The Punawai Wastewater Pump Station would be constructed of reinforced concrete and sited at the end of Halaulani Street to the southwest of the existing pump station. A 9,300 SF site (98' x 95') would accommodate the pump station, paved driveway and parking, and an above ground fuel storage tank. The station wet-well will have an operating volume of 1,851 gallons. Additional land will be required to site the facility.

From the Punawai Wastewater Pump Station a new 2,570 LF 8-inch ductile iron force main would be installed within Halaulani Street and Kamehameha Highway rights-of-way to a discharge manhole to be constructed in Kamehameha Highway.

The existing All Bluffs Sewage Pump Station would be replaced by a new permanent All Bluffs Wastewater Pump Station and the existing 6-inch force main used as a standby facility. Incoming sewage to the new pump station would be pumped through a new force main to a new discharge manhole in Kamehameha Highway.



NORTH
SCALE: 1" = 400'

KANE O.

HEEIA FISH POND

CONSTRUCT NEW 8" SEWER FORCE MAIN

KAMEHAMEHA HWY.

CONNEC
REMOVE
TERRAC
STATION
AREA; A
8" SEWER

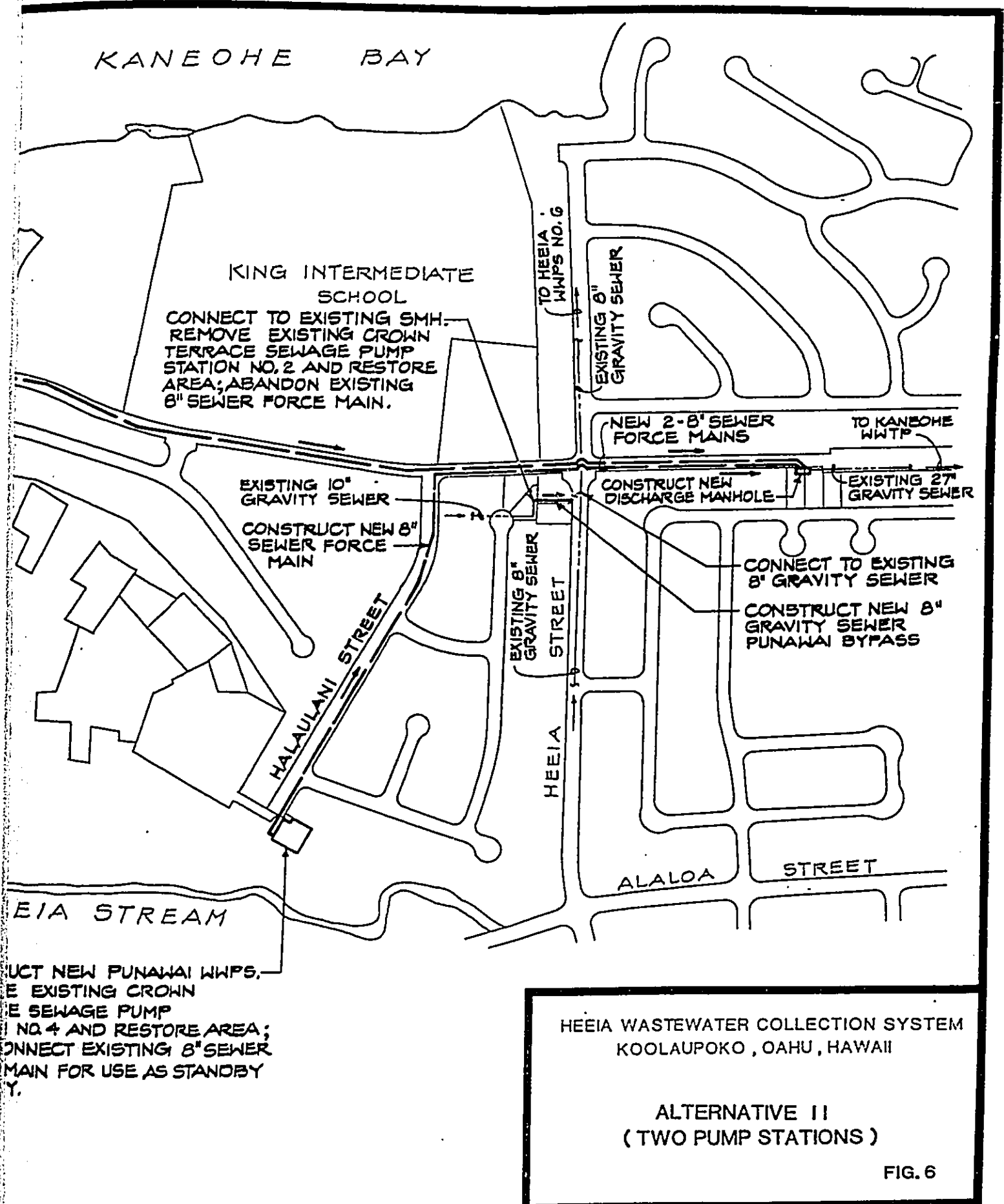
CONSTRUCT NEW ALII BLUFFS WWS. REMOVE EXISTING SEWAGE PUMP STATION AND RESTORE AREA; INTERCONNECT EXISTING 6" SEWER FORCE MAIN FOR USE AS STANDBY FACILITY.

LEGEND

- GRAVITY SEWER
- SEWER FORCE MAIN
- DIRECTION OF FLOW
- WWS WASTEWATER PUMP STATION
- WWTP WASTEWATER TREATMENT PLANT
- SMH SEWER MANHOLE

HEEIA STREAM

CONSTRUCT NEW PUNAWAI WWS. REMOVE EXISTING CROWN TERRACE SEWAGE PUMP STATION NO. 4 AND RESTORE AREA. INTERCONNECT EXISTING 8" SEWER FORCE MAIN FOR USE AS STANDBY FACILITY.



KANE OHE BAY

KING INTERMEDIATE SCHOOL

CONNECT TO EXISTING SMH. REMOVE EXISTING CROWN TERRACE SEWAGE PUMP STATION NO. 2 AND RESTORE AREA; ABANDON EXISTING 8" SEWER FORCE MAIN.

TO HEEIA WHPs NO. 6

EXISTING 8" GRAVITY SEWER

NEW 2-8" SEWER FORCE MAINS

TO KANOHOHE WWT

EXISTING 10" GRAVITY SEWER

CONSTRUCT NEW 8" SEWER FORCE MAIN

CONSTRUCT NEW DISCHARGE MANHOLE

EXISTING 27" GRAVITY SEWER

HALAULANI STREET

EXISTING 8" GRAVITY SEWER

STREET

HEEIA

CONNECT TO EXISTING 8" GRAVITY SEWER

CONSTRUCT NEW 8" GRAVITY SEWER PUNAWAI BYPASS

ALALO A

STREET

EIA STREAM

CONSTRUCT NEW PUNAWAI WHPs. REMOVE EXISTING CROWN TERRACE SEWAGE PUMP STATION NO. 4 AND RESTORE AREA; CONNECT EXISTING 8" SEWER FORCE MAIN FOR USE AS STANDBY.

HEEIA WASTEWATER COLLECTION SYSTEM
KOOLAUPOKO, OAHU, HAWAII

ALTERNATIVE II
(TWO PUMP STATIONS)

FIG. 6

The new Aili Bluffs Wastewater Pump Station would be constructed on a 9,450 SF site to the north of and adjacent to the existing pump station. The larger site would accommodate a reinforced concrete structure, concrete driveway and paved parking, and outdoor fuel storage area. The station wet-well will have a storage volume of 1,178 gallons. Additional land will be required to site the facility.

The Aili Bluffs force main for this alternative is similar in length (4,700 LF) as Alternative I. The difference is that the pipe size would be 8-inch instead of 12-inch. A new discharge manhole will be constructed near He'eia Street to accommodate the Aili Bluffs and Punawai force mains.

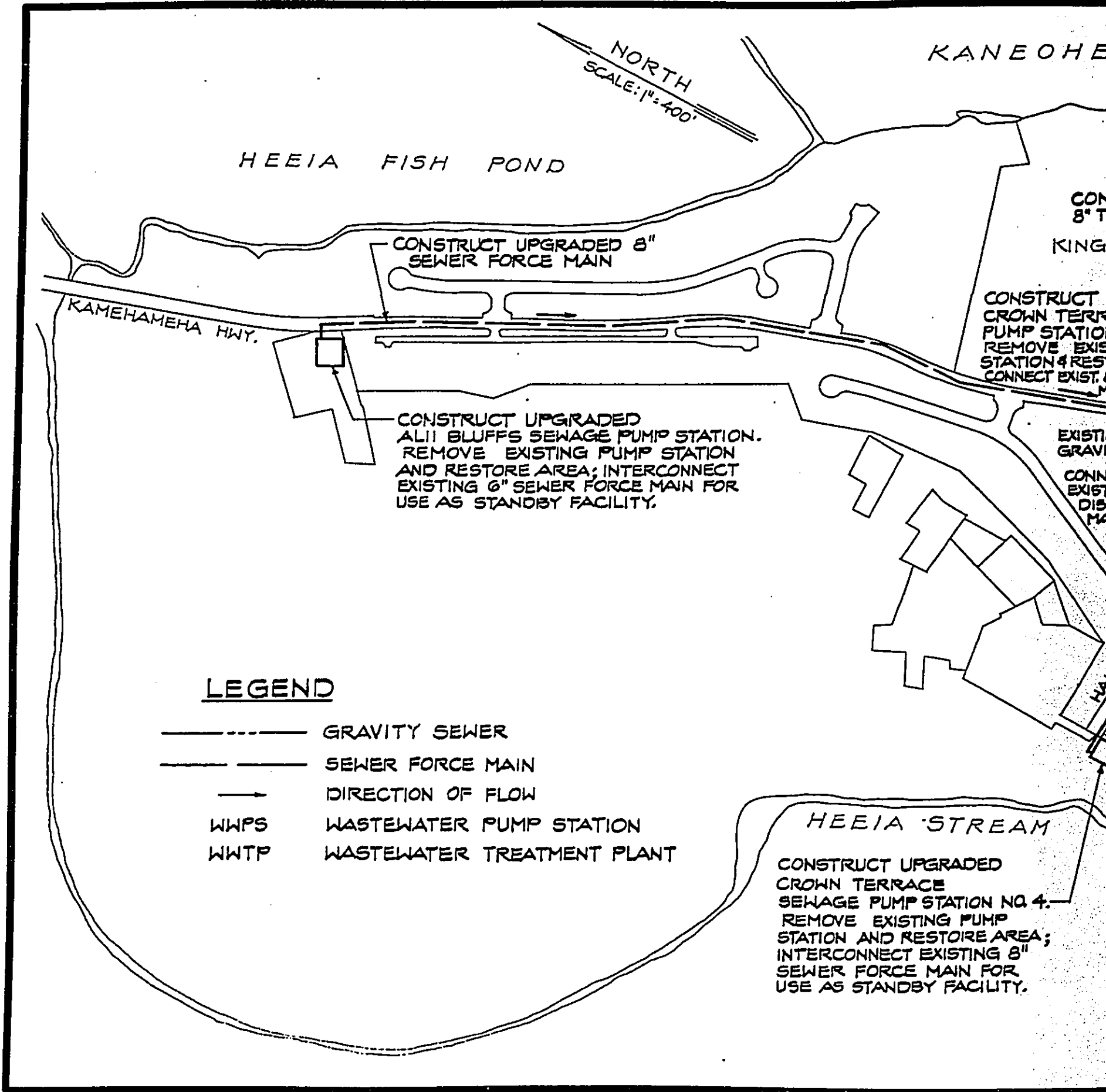
The existing Crown Terrace Sewage Pump Station No. 2 would be removed and 8-inch force main abandoned. Incoming sewage (now excluding previous discharge from Crown Terrace Sewage Pump Station No. 4) would be conveyed by gravity (Punawai By-Pass Sewer) to an existing 8-inch gravity main in He'eia Street. This disposition under Alternative II is the same scheme as with Alternative I.

The estimated capital cost for Alternative II is \$4,413,000.00. The major cost includes land acquisition for the new Aili Bluffs and Punawai WWPSs, trench excavation and backfill, pump station structures, pumps and piping, force main piping, emergency power, and instrumentation.

3. Alternative III

Alternative III was developed with the concept of using the existing pumping scheme but upgrading the three existing temporary sewage pump stations and force mains with three new permanent pump stations and force mains (see Figure 7). Upgrading would consist of replacing existing facilities. Actions needed to implement this alternative are described below.

The existing Crown Terrace Sewage Pump Station No. 4 would be replaced by a new permanent wastewater pump station and the existing 8-inch force main would be used as a standby force main. Incoming sewage to the new pump station would be pumped through a 8-inch new force main to an existing discharge manhole in Halaulani Street.



NORTH
SCALE: 1"=400'

KANEOHE

HEEIA FISH POND

CONSTRUCT UPGRADED 8"
SEWER FORCE MAIN

CON
8" T
KING

KAMEHAMEHA HWY.

CONSTRUCT
CROWN TERR
PUMP STATION
REMOVE EXIS
STATION 4 RES
CONNECT EXIST.

CONSTRUCT UPGRADED
ALII BLUFFS SEWAGE PUMP STATION.
REMOVE EXISTING PUMP STATION
AND RESTORE AREA; INTERCONNECT
EXISTING 6" SEWER FORCE MAIN FOR
USE AS STANDBY FACILITY.

EXISTI
GRAV
CONN
EXIST
DIS
MA

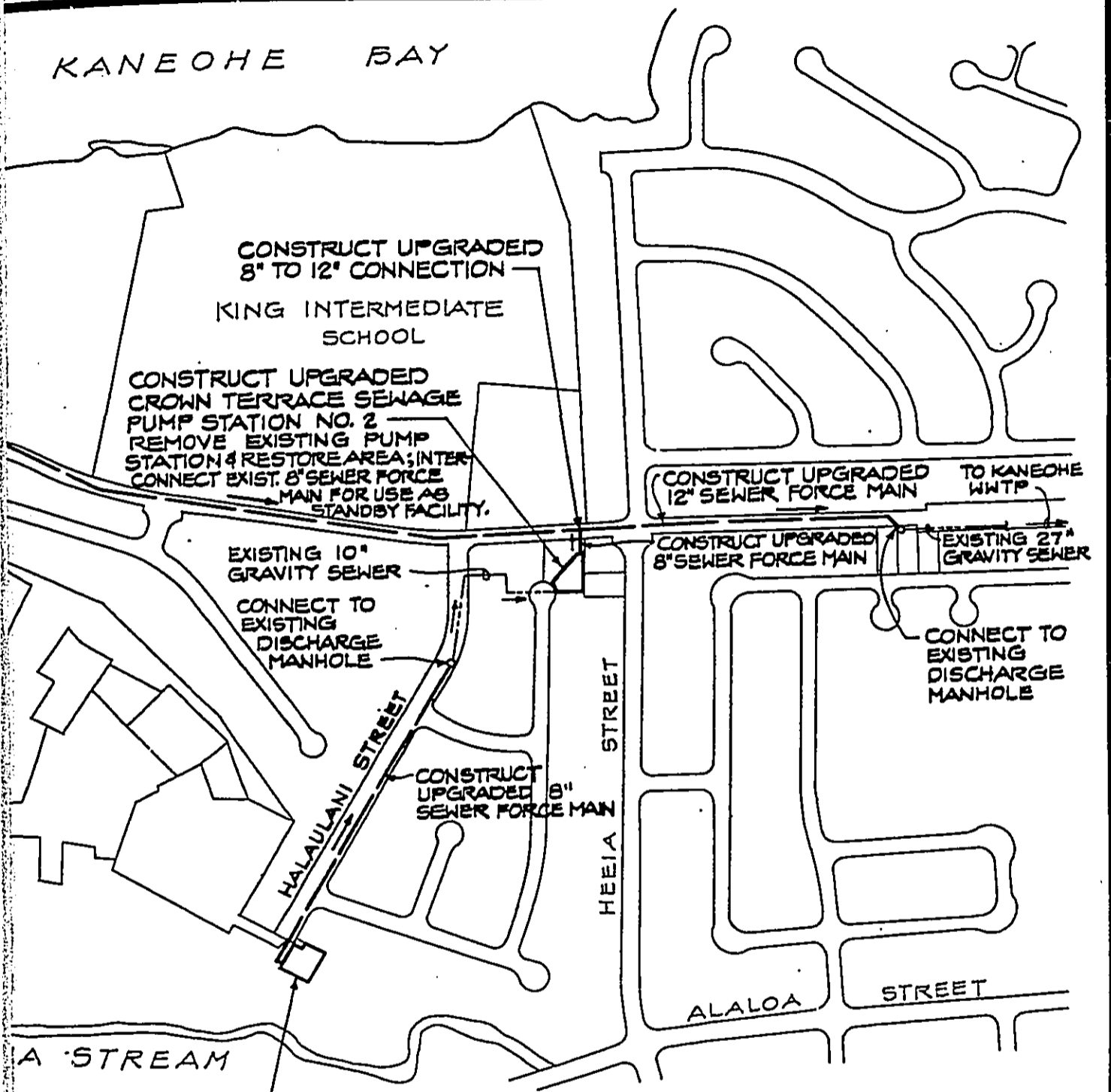
LEGEND

- GRAVITY SEWER
- SEWER FORCE MAIN
- DIRECTION OF FLOW
- WWPS WASTEWATER PUMP STATION
- WWTP WASTEWATER TREATMENT PLANT

HEEIA STREAM

CONSTRUCT UPGRADED
CROWN TERRACE
SEWAGE PUMP STATION NO. 4.
REMOVE EXISTING PUMP
STATION AND RESTORE AREA;
INTERCONNECT EXISTING 8"
SEWER FORCE MAIN FOR
USE AS STANDBY FACILITY.

KANEOHE BAY



CONSTRUCT UPGRADED
8" TO 12" CONNECTION
KING INTERMEDIATE
SCHOOL

CONSTRUCT UPGRADED
CROWN TERRACE SEWAGE
PUMP STATION NO. 2
REMOVE EXISTING PUMP
STATION & RESTORE AREA; INTER-
CONNECT EXIST. 8" SEWER FORCE
MAIN FOR USE AS
STANDBY FACILITY.

CONSTRUCT UPGRADED
12" SEWER FORCE MAIN TO KANEOHE
WWTP

EXISTING 10" GRAVITY SEWER
CONNECT TO
EXISTING
DISCHARGE
MANHOLE

CONSTRUCT UPGRADED
8" SEWER FORCE MAIN

EXISTING 27" GRAVITY SEWER

CONNECT TO
EXISTING
DISCHARGE
MANHOLE

CONSTRUCT
UPGRADED 8" SEWER FORCE MAIN

HEEIA STREET

HALAULANI STREET

ALALOA STREET

A STREAM

HEEIA WASTEWATER COLLECTION SYSTEM
KOOLAUPOKO, OAHU, HAWAII

ALTERNATIVE III
(THREE PUMP STATIONS)

FIG. 7

CONSTRUCT UPGRADED
CROWN TERRACE
PUMP STATION NO. 4.
REMOVE EXISTING PUMP
STATION & RESTORE AREA;
CONNECT EXISTING 8"
SEWER FORCE MAIN FOR
STANDBY FACILITY.

The upgraded Crown Terrace Wastewater Pump Station No. 4 would be sited at the end of Halaulani Street to the southwest of the existing pump station. A 9,310 SF site (98' x 95') is required to accommodate a reinforced concrete structure, paved driveway and parking area, and an above ground fuel storage tank. The station wet-well will have a storage volume of 1,851 gallons. Additional land will be required for this pump station.

A new 8-inch ductile iron force main would be installed in the right-of-way of Halaulani Street from the new permanent Crown Terrace Wastewater Pump Station to the existing discharge manhole a distance of 1,024 LF.

The existing Crown Terrace Sewage Pump Station No. 2 would be replaced by a new permanent wastewater pump station and the existing 8-inch force main used as a standby facility. Incoming sewage to the new pump station would be pumped through a new 8-inch force main to the connection point with the new 8-inch force main from the Aili Bluffs Wastewater Pump Station, and then through a new 12-inch force main for the combined pumpage to the existing discharge manhole in Kamehameha Highway.

Crown Terrace Sewage Pump Station No. 2 would be replaced by a new permanent station. Because this pump station is located in a residential area, upgrading the plant requires acquiring a residential house lot adjoining the existing station. The larger site would accommodate a reinforced concrete structure, paved driveway and parking area, and an above ground fuel storage tank. The station wet-well will have a storage volume of 1,851 gallons.

A new 8-inch ductile iron force main from the station will connect to a new 8-inch force main from the Aili Bluffs Wastewater Pump Station. The connection point is within Kamehameha Highway. From the connection point, a new 12-inch ductile iron force main will direct the combined flows into the discharge manhole in Kamehameha Highway.

The existing Aili Bluffs Sewage Pump Station would be replaced by a new permanent wastewater pump station and the existing 6-inch force main of polyvinyl chloride (PVC) pipe material used as a standby facility. Incoming sewage to the new pump station would be pumped through a new 8-inch force main to the connection point

with the new 8-inch force main from the new Crown Terrace Wastewater Pump Station No. 2.

The upgraded Aii Bluffs Wastewater Pump Station would sit on a 9,450 SF site (90' x 105') to the immediate north of the existing pumping station. The larger site would accommodate a reinforced concrete structure housing the pumps, paved driveway and parking area, and an above ground fuel storage tank. The station wet well will have a storage volume of 1,178 gallons. Land would have to be acquired to site the new station.

An upgraded 8-inch ductile iron force main would be placed under Kamehameha Highway a distance of 3,830 LF where it would connect to a new 8-inch force main from the upgraded Crown Terrace Wastewater Pump Station No. 2. From the point of connection a new 12-inch force main will direct the combined flows from the two stations to the discharge manhole in Kamehameha Highway.

The estimated capital cost for this alternative is \$5,795,000. The major cost include land acquisition to construct the upgraded wastewater pump stations for Aii Bluffs, Crown Terrace No. 2 and Crown Terrace No. 4, trench excavation and backfill, pump station structures, pumps and piping, force main piping, emergency power, and instrumentation and controls.

4. Alternative IV

Alternative IV, a "No Action" Alternative, would maintain the status quo of the existing Heeia Wastewater Collection System. Additional land to provide safe entry and parking areas for City O&M vehicles would not be acquired. Additional land to enlarge the existing pump station structures to facilitate access to and maneuverability by City O&M personnel around the equipment in the underground chamber would not be acquired. Additional land and roadway space to accommodate new gravity sewers and sewer force mains would not be committed. City O&M personnel would continue to provide necessary daily, weekly, monthly, and annual tasks to enable the existing facilities to function properly. Replacement of the various equipment and other space parts would be programmed for purchase at regular intervals, but untimely breakdown of the old equipment would not be predictable.

At the present time, the City has improved the reliability of pump station operation during power outages by installing portable emergency generators at each of the existing stations. Other necessary work would include sealing the walls and raising the tops of the wet-walls to minimize infiltration/inflow into the system. In addition, corrective measures of the existing inadequate hydraulic capacities would be required. These corrective measures include the following:

1. Replace 8" x 45 Lin. Ft. gravity sewer to Crown Terrace SPS No. 2 with larger 12" pipe.
2. Replace 6" x 6 Lin. Ft. gravity sewer to All Bluffs SPS with larger 10" pipe.
3. Replace pumps at All Bluffs SPS to pump 222 gallons per minute under simultaneous pumping conditions with the pumps at Crown Terrace SPS No. 2.

However, the existing underground steel chamber at the All Bluffs SPS is in imminent danger of structural collapse. This poses a severe safety hazard to the City O&M personnel who must enter the underground steel chamber to perform their work. This exposure to possible loss of life makes the "No Action" alternative an unacceptable consideration.

Under the "No Action" Alternative, the monetary cost to implement the construction alternatives, i.e., land acquisition, construction, and operation and maintenance would be avoided. In addition, temporary inconveniences resulting from construction work would be avoided. And as affected by Alternative III, the acquisition of one residential lot and the displacement of its occupants will be avoided. On the other hand, exposure of the City O&M personnel to the hazards associated with the lack of safety in entering and leaving the pump station sites, the danger of structural failure at the All Bluffs SPS, and in attending to the equipment in all the cramped underground chambers would continue. In addition, monetary cost to operate and maintain the existing facilities, and to replace the aging equipment and spare parts would continue. Finally, the possibility of structural failure of the similar underground steel chambers at Crown Terrace SPS No. 2 and SPS No. 4 would still exist.

CORRECTION

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

At the present time, the City has improved the reliability of pump station operation during power outages by installing portable emergency generators at each of the existing stations. Other necessary work would include sealing the walls and raising the tops of the wet-wells to minimize infiltration/inflow into the system. In addition, corrective measures of the existing inadequate hydraulic capacities would be required. These corrective measures include the following:

1. Replace 8" x 45 Lin. Ft. gravity sewer to Crown Terrace SPS No. 2 with larger 12" pipe.
2. Replace 6" x 6 Lin. Ft. gravity sewer to Aili Bluffs SPS with larger 10" pipe.
3. Replace pumps at Aili Bluffs SPS to pump 222 gallons per minute under simultaneous pumping conditions with the pumps at Crown Terrace SPS No. 2.

However, the existing underground steel chamber at the Aili Bluffs SPS is in imminent danger of structural collapse. This poses a severe safety hazard to the City O&M personnel who must enter the underground steel chamber to perform their work. This exposure to possible loss of life makes the "No Action" alternative an unacceptable consideration.

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B. Economic Characteristics

The proposed project will be funded by the City and County of Honolulu. The estimated capital cost for each construction alternative is as follows:

Alternative I	\$ 5,387,000
Alternative II	\$ 4,413,000
Alternative III	\$ 5,795,000

Land required for various sewer rights-of-way will be acquired through easements. Land required for expansion at the existing Crown Terrace SPS No. 4 and Aili Bluffs SPS will be provided by Bishop Estate. The exception is one occupied residential houselot required for upgrading the Crown Terrace Sewage Pump Station No. 2 (Alternative III) which will be acquired through direct purchase.

C. Social Characteristics

Alternative I and II will neither displace any residents nor affect any business establishments. If Alternative III is to be constructed, one occupied residential houselot will be acquired to accommodate the upgraded Crown Terrace Sewage Pump Station No. 2. The affected homeowner will be adequately compensated for the loss of land and improvements. Construction within road rights-of-way may inconvenience motorists and create minor traffic delays. Private rights-of-way and driveways will be kept open at all times unless the owners of properties using these rights-of-way are otherwise provided for satisfactorily.

Construction along He'eia Marsh will require crossing private properties. Landowners and lessees will be notified and rights-of-entry obtained well ahead of actual construction. The general contractor will be responsible for restoring work areas to existing or better condition. Owners will also be compensated for unforeseen property damages incurred directly as a result of construction.

SECTION 3

DESCRIPTION OF THE AFFECTED ENVIRONMENT

A. Existing Use

The sewage tributary area can be categorized as suburban residential in character. Approximately 205 acres in size, the tributary area consists primarily of single-family residential subdivisions (Crown Terrace, Aili Bluffs), townhouse developments (Aili Cluster), and institutional uses (King Intermediate School, churches).

The tributary area adjoins He'eia Marsh which serves as open space in addition to its environmental value as a flood plain and wetland. Just as lands surrounding the marsh have been extensively altered for urban uses, the marsh also has been modified in historic and recent times for various agricultural uses including the growing of taro, rice, and sugarcane. The land is still used for various agricultural activities although on a smaller, less intensive, and fragmented scale. Present day agricultural uses include a commercial plant nursery north of Crown Terrace Sewage Pump Station No. 4, taro and banana cultivation on kuleana lands downslope of the Aili Cluster townhouse development, and pasturing horses in the northern section of the marsh near the Aili Bluffs Sewage Pump Station.

B. Geographical Characteristics

The climate of windward Oahu, can be characterized as windy, warm, and moderately wet. The northeast tradewinds prevail throughout most of the year with occasional southerly (or "Kona") winds during the winter months. Average annual wind speeds are approximately 15 miles per hour with speeds during the summer months generally greater. Average annual temperature is about 75 degrees F with little seasonal variation. Average humidity is about 75 percent. Annual rainfall averages 50 inches along the coast to 150 inches along the crest of the Koolau Mountains. Approximately 70 percent of the annual rainfall occurs between November and April. In comparison, rainfall measures 20 inches or less along the arid leeward coast of Oahu less than 15 miles from the rainfall rich Koolau Mountains.

C. Topography

The topography for most of the tributary area can be characterized as hilly. Elevations along Kahekili Highway range from 180 feet to 120 feet above mean sea level (MSL). The roadway elevation of Kamehameha Highway ranges from 90 feet to 20 feet above MSL. The roadway elevation of Haiku Road ranges from 180 feet to 90 feet above MSL. The area abutting He'eia Stream is relatively flat terrain, ranging in elevation from approximately 50 feet to 10 feet above MSL.

The separation of major sub-areas comprising the sewage tributary area and the configuration of the existing sewer collection system are the result of topographical conditions. The common boundaries between the sub-areas demarcate the high ground elevations that had precluded a continuous gravity system across those lines at the time of development.

D. Soils

The Punawai Trunk Sewer alignment of Alternative I generally follows the interface between Hanalei Silty Clay (HnA), Lolekaa Silty Clay (LoE), and Marsh (MZ) soils (Soil Conservation Service, 1972). The Hanalei Series, which comprises a vast portion of He'eia Marsh, "is a poorly drained soil occurring on bottom lands and flood plains." Lolekaa clay is a "well drained soil occurring in drainageways and on fans and terraces on the windward side of the island of Oahu". Usually found on 25-40% slopes, LoE soils are difficult to work because of the steep slopes and the erosion hazard can be moderate to severe. Marsh (MZ) consists of wet, periodically flooded areas covered dominantly with grasses and is usually found along coastal areas.

Kamehameha Highway passes through the Lolekaa Series but this clay (LoB) is usually found on less steep slopes (3-8%). Unlike its LoE countertype, LoB soils are easy to work with and the erosion hazard is slight.

E. Flood Hazards

Flood hazard areas in the vicinity of He'eia Stream have been identified on Flood Insurance Rate Maps (FIRM) prepared by the Federal Emergency Management Agency (1987). The sewage tributary areas are in Zone X [Unshaded] which are defined as "areas determined to be outside the 500-year flood plain".

Undeveloped lowlands adjacent to He'eia Stream are placed in Zone AE (Floodway) and Zone AE 100-year flood hazard area (see Figure 8). The floodway area is along the main channel of He'eia Stream and includes portions of the adjacent flood plain which must be kept free of encroachment. The flood hazard area is the entire area inundated by the 100-year flood.

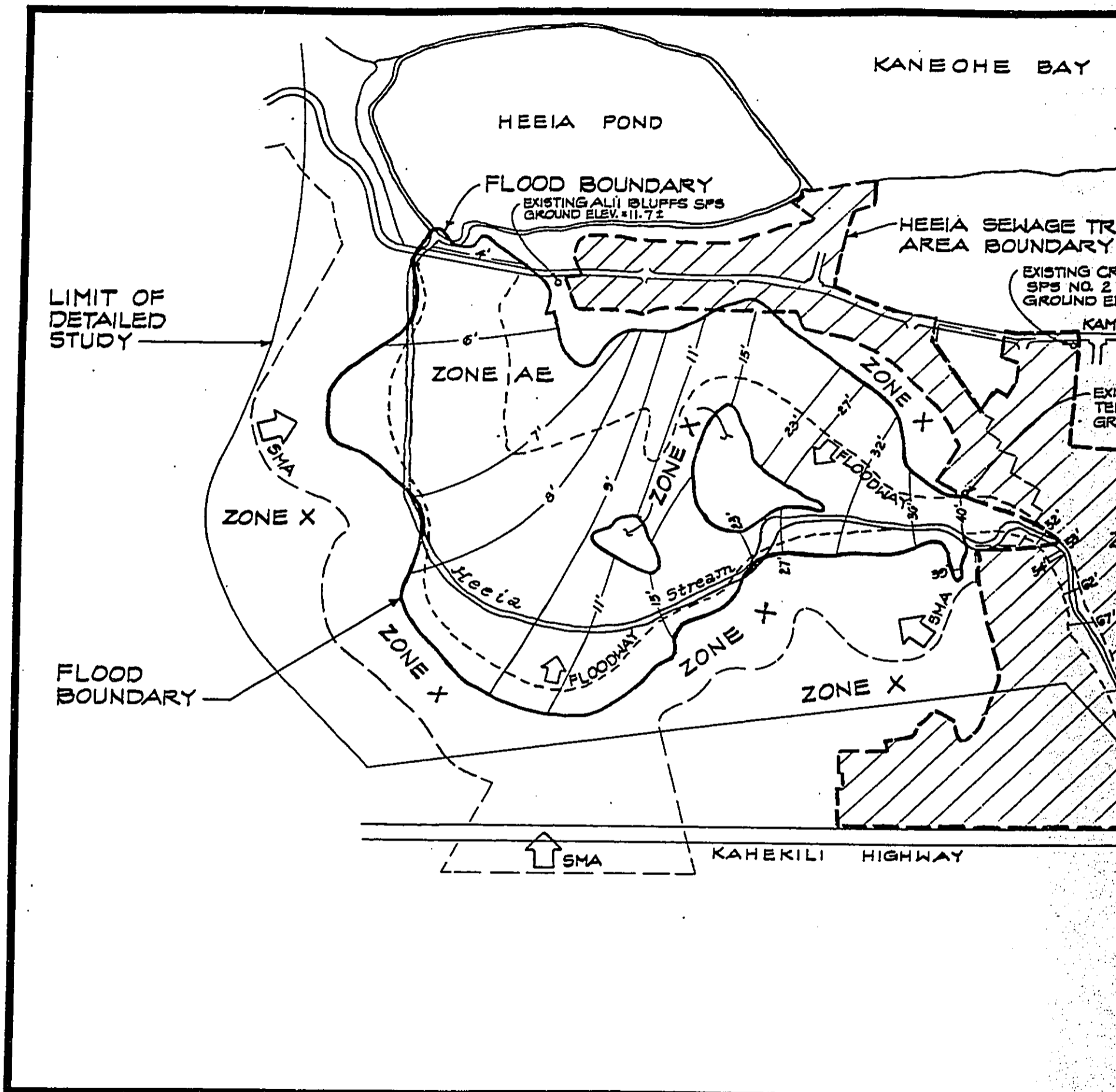
The northern segment of He'eia Stream flows in a narrow, shallow channel that is densely lined by hau trees. The stream channel is oftentimes blocked by debris in this segment and stream flow is diverted onto the adjoining lands resulting in local flooding or marshy conditions. Local residents point out that flooding has been caused by depositing fill in areas throughout the marsh. Flood conditions have been exacerbated ever since an elevated earth road was constructed across the middle of the marsh. The road was built to haul excess fill from developing areas mauka of Kahekill Highway for deposition near the All Bluffs SPS. Supposedly only a temporary feature on the landscape, the road dams overland flow during rainy periods creating a backwater condition wherein low lying residences are flooded periodically.

F. Hydrological Characteristics

1. Groundwater:

Despite its almost persistent 'wet' conditions, no groundwater sources have been developed in the immediate area. The coastal portion of He'eia between the foot of the Koolau Mountains to the ocean is essentially caprock consisting of marine deposits and alluvium (Board of Water Supply, 1975).

In an area below the northern end of Ahui Nani Place, the ground was observed to be moist well above the marsh indicating the possibility of fresh water seeps.



ANEHOE BAY

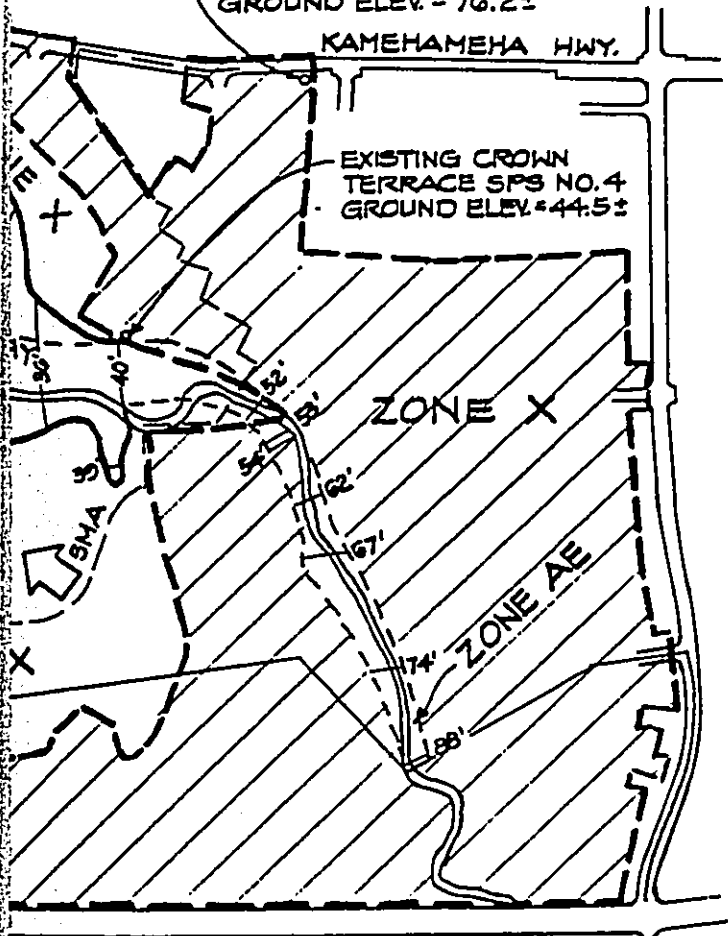
TRUE NORTH
SCALE: 1"=800'

HEEIA SEWAGE TRIBUTARY
AREA BOUNDARY






EXISTING CROWN TERRACE
SPS NO. 2
GROUND ELEV. = 76.2±

KAMEHAMEHA HWY.

EXISTING CROWN
TERRACE SPS NO. 4
GROUND ELEV. = 44.5±



LEGEND

-  HEEIA SEWAGE TRIBUTARY AREA
-  FLOOD BOUNDARY LINE
-  FLOODWAY LINE
-  BASE FLOOD ELEVATION LINE W/ ELEVATION IN FEET
-  SPECIAL MANAGEMENT AREA BOUNDARY LINE
- ZONE AE 100-YR. FLOOD HAZARD AREA
- ZONE X AREA OUTSIDE OF 500-YR. FLOOD PLAIN

SOURCE: FLOOD INSURANCE RATE MAP
FEDERAL EMERGENCY
MANAGEMENT AGENCY

HEEIA WASTEWATER COLLECTION SYSTEM
KOOLAUPOKO, OAHU, HAWAII

FLOOD MAP

FIG. 8

2. Surface Water:

He'eia Stream, a perennial windward Oahu stream, meanders some 3.2 miles from its mouth to the 2,826 foot summit of the Koolau Mountains. The stream drains Haiku and Ioleka'a Valleys and its drainage basin encompasses 2,750 acres of mountainous valleys and low-lying coastal plains.

Stream flow averages 2.76 cfs for years of record and the highest flow recorded was 27.3 cfs at USGS Station 16275000 (Wilson Okamoto, 1983). The stream has an average gradient of 1.3% and is well defined in its upper reaches (30-50 foot sections with 10-20 foot depths). Its lower reach is characterized by marshy floodplain conditions.

G. He'eia Floodplain

The He'eia Floodplain is a low-lying area located along the lowest reach of He'eia Stream, between the mouth of the stream and a point approximately one mile upstream. The stream itself is some 3.2 miles long, draining Haiku and Ioleka'a Valleys on windward Oahu. Recent surveys (AECOS, Inc., 1983, 1988) have reported He'eia Stream to be relatively pristine throughout much of its length, a somewhat unusual circumstance considering its proximity to Kaneohe where nearly all of the other perennial streams have been extensively modified (channelized). Timbol and Maciolek (1978) calculated that 14 percent of the channel length of He'eia Stream had been altered (realigned, reveted, or confined to a lined channel or culvert), but some additional modifications have been made since the 1970's (see Wilson Okamoto & Associates, Inc., 1983). At least one diversion of stream water exists (USFWS, 1977).

The floodplain of He'eia Stream occupies an area of some 200 acres along the windward coast of Oahu at Kaneohe Bay. The flood plain is surrounded by foothills of the Ko'olau Ridge below Haiku Valley. This low-lying land can be divided into three distinct types of wetland environments: 1) a mangrove swamp comprising about one-quarter of the floodplain at its seaward end; 2) a marsh comprising perhaps one-half or less of the total area; and 3) a seasonally wet meadow (pasture land). Additionally, the project area includes low-lying fill areas and upland slopes. From a biological perspective there are at least four distinct aquatic environments. These are: A) stream (both lentic and lotic habitats), B) marsh (including lentic habitats), C) mangrove swamp, and D) estuary.

The mangrove swamp, which was first recorded in 1920, began as a few mangroves growing around the stream mouth along the shore of Kaneohe Bay and He'eia Fishpond (Evans, 1975). The mangrove was introduced to Hawaii about two decades earlier. Over time, the forest expanded both landward and seaward. The swamp floor was gradually elevated as sediments carried in by the stream were deposited around the mangrove prop-roots. This expansion of the mangrove stand and deposition of sediment has reduced the extent of both the marsh and estuarine environments, and has altered water flow patterns with respect to both the stream channel locations and the extent of tidal incursion (AECOS, Inc. 1976). Historically, fishpond construction and rice and taro cultivation must have had similar profound impacts on the hydrology of the floodplain.

He'eia Marsh proper is mostly that portion of the floodplain above the mangrove area to a point where the channel of He'eia Stream can be clearly defined. According to Elliott and Hall (1977), the "wettest areas ... lie in the northern sector, in a broad arch which curves from the mangrove stand on the east to the pasture on the west." Within this area, the stream channel is no longer readily discernible (William Brewer, personal communication). The marsh is extensively overgrown with California grass (Brachiaria mutica), an introduced species that tends to occlude open-water areas, and honohono (Commelina diffusa).

The remaining, upper portions of the floodplain are utilized as pasture for horses and cattle. Because this land is low-sloping and of low elevation, some or most may be flooded or become marshy during the rainy season. For this study, this land is classified as seasonally wet meadow. He'eia Stream flows along the south and west sides of this meadow within a channel that is densely lined by hau (Hibiscus tillaceus). Because of blockage of He'eia Stream by debris within the hau forest, a portion of the flow was being diverted at the time of the field surveys into the upper meadow. This water was flowing around the east side of a low ridge which prominently divides the meadow portion of the floodplain into northern and southern sectors. The hau forest grades upstream into a riparian forest above the marsh.

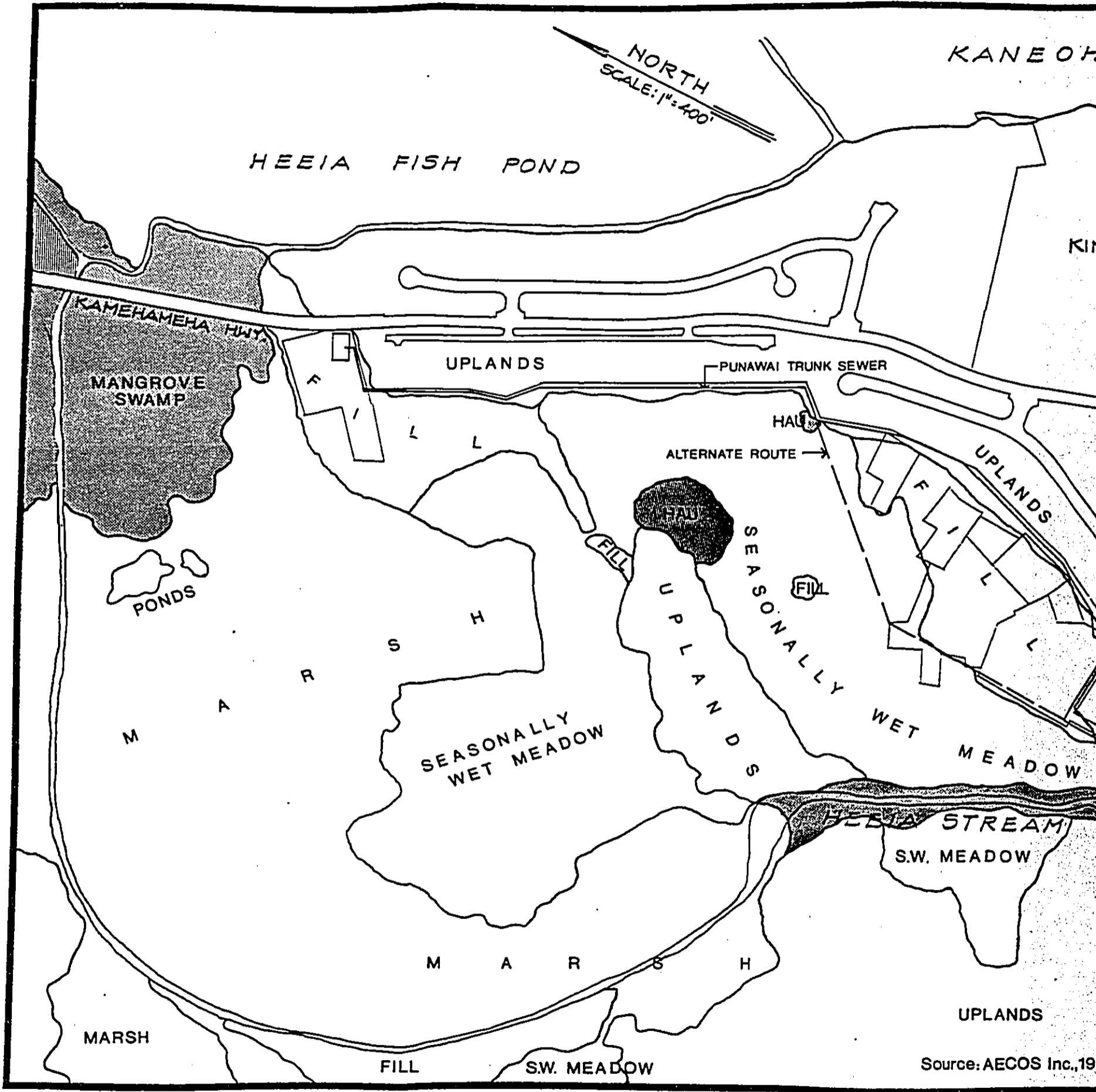
Much of the land which surrounds the marsh and meadow rises relatively steeply from the level of the marsh. In some areas, soil fill has raised previous marsh or meadow above an elevation subject to normal seasonal flooding, creating low elevation fill land. Included within this "fill" designation in Figure 9 are some areas of low lying land which do not normally become inundated but which may not be man-made fill, representing instead natural fans of alluvial material. The uplands and fill areas are, for the most part, open pasture or densely vegetated and used for grazing, agriculture, or residential structures. The proposed alignment of the Punawai Trunk Sewer is entirely within the uplands landform unit (including some areas designated as fill land). The alternate alignment (which involves only a portion of the proposed route) crosses seasonally wet meadow and fill land.

H. Wetland and Aquatic Biota

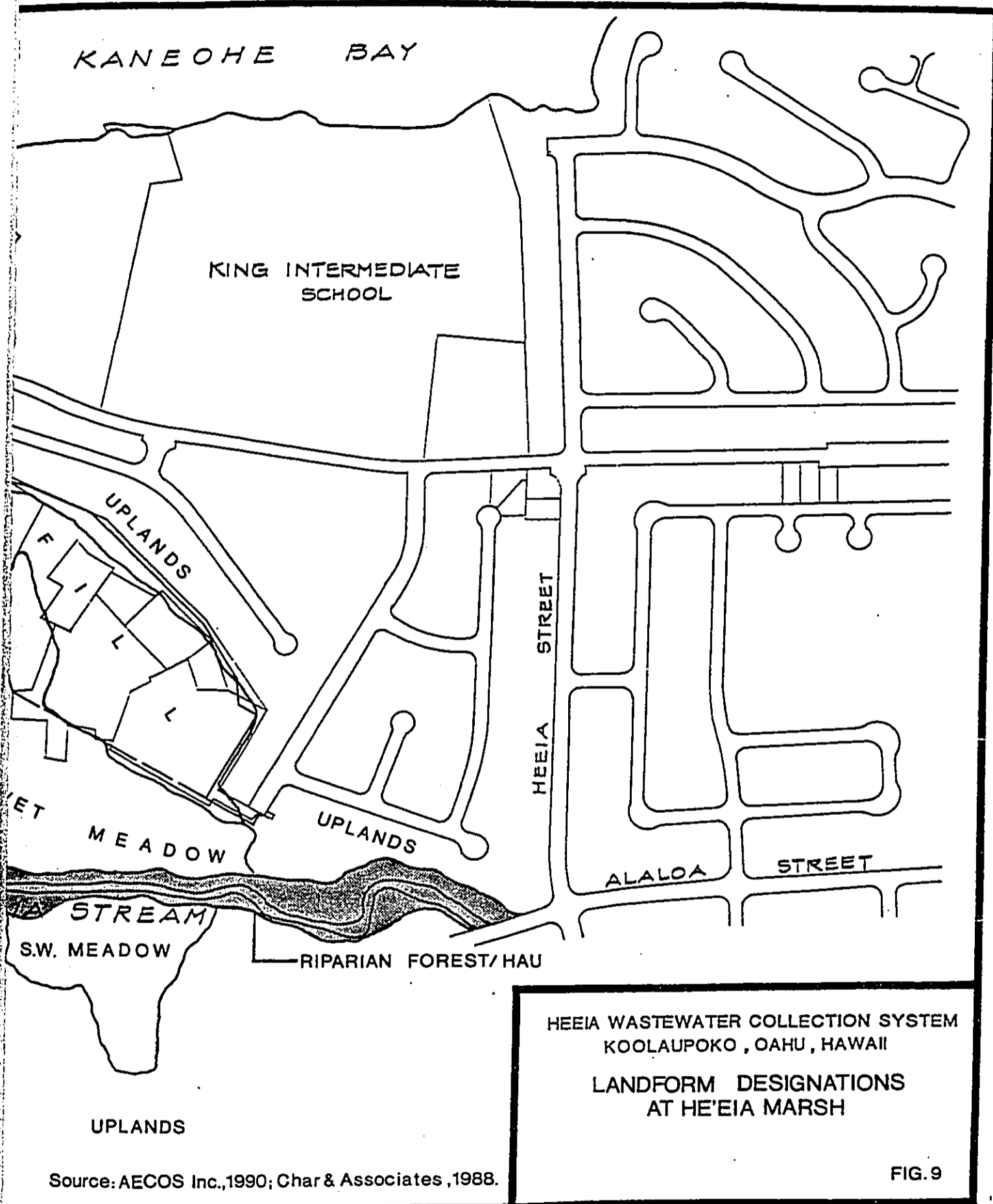
The following describes the kinds of biological resources present in each of the principal environments in the project area (see Figure 9). Included are discussions of the relationships between the various environments.

1. He'eia Mangrove Swamp

A swamp is a wetland dominated by trees. The mangrove swamp at He'eia is dominated by the red mangrove (Rhizophora mangle), with the oriental mangrove (Bruguiera gymnorhiza) reported as present (Elliott and Hall, 1977). No part of the proposed construction would directly involve mangrove areas, so this environment was not surveyed for this project. The Alii Bluffs Wastewater Pump Station would be constructed at the site of an existing pump station on existing fill land adjacent to the mangrove swamp at approximately elevation 15 feet above MSL.



Source: AECOS Inc., 19



Although mangroves are regarded throughout the world for their value in providing coastal shoreline protection and habitat, particularly along the ocean shore where the roots shelter various juvenile stages of marine fishes and crustaceans, they are often regarded as a weedy species in Hawaii (AECOS, Inc., 1987). This is because mangroves are introduced species (the first around 1902) which can radically alter shoreline and coastal pond environments, reducing the habitat value for native shore and wetland birds. The mangrove also "destroys" ancient fishponds by overgrowing and disrupting rock walls and promoting siltation within the pond. Mangrove forests have not been extensively studied in Hawaii and therefore documentation of their ecological value here is lacking.

The mangrove forest at He'eia is the largest on windward Oahu, and has had an impact on the He'eia wetlands (see Walsh, 1967; AECOS, Inc., 1976; Evans, 1975; Elliott and Hall, 1977). The expansion of this particular stand over the last several decades has reduced the area of marshland once utilized by native waterbirds and substantially altered He'eia Fishpond. The extent to which native waterbirds such as the Hawaiian Coot and Hawaiian Gallinule might now utilize the mangrove swamp is unknown. The estuary of He'eia Stream would now seem to be limited to the main channel below the Kamehameha Highway ("Long") bridge. Although the mangrove is not native, and therefore not particularly compatible with much of the native wetland biota, the mangrove areas do harbor a variety of marine and estuarine organisms including swimming crab (Thalamita integra) and Samoan crab (Scylla serrata) which are sought for bait and food. Further, the complex habitat provided by the prop-roots and associated fouling assemblages very likely provide valuable shelter for juveniles which, as adults, may populate freshwater or marine environments.

Evidence (some from Walsh, 1967) suggests that the mangrove swamp at He'eia serves as a filter removing nutrients and particulates carried by He'eia Stream before the water enters Kaneohe Bay. In this way, the swamp contributes to the preservation of the desirable marine characteristics of the reefs in the Bay.

2. He'ela Marsh

No part of He'ela Marsh (in the strict sense of the perennially wet marsh and associated channels and ponds) is included in the proposed construction areas of any of the three alternatives and therefore this environment was not surveyed during this study. However, a proposed alternate route does cross seasonally wet meadow, and a traverse along this route was made.

Elliott and Hall (1977) provide a description of the marsh and marsh vegetation (p. 89):

The interior of the marsh is an extensive pasture dominated by Brachiaria mutica and to a lesser degree Commelina diffusa. [The] ... vegetation is so dense that the [He'ela] stream's waters are often covered throughout most of its length within the marsh. The rapid growth of mangrove at the stream outlet has resulted in further clogging and backing up of waters. A pond ... has been formed and its sides are bordered by Scirpus validus, Brachiaria mutica, and Ludwigia octovalvis. Cattle egrets and the black-crowned night heron were observed in the area ... [and] other species of waterbirds may occasionally feed here.

The marsh provides at least occasional feeding and loafing habitat for the endangered Hawaiian Gallinule (Gallinula chloropus sandvicensis), Hawaiian Duck or koloa (Anas wyvilliana), Hawaiian Coot (Fulica americana alai), and Hawaiian Stilt (Himantopus mexicanus knudseni) (Ahuimanu Productions, 1977; USFWS, 1978). The dense growth of California grass (an introduced species) which tends to overgrow pond shoreline areas and even open water areas, has perhaps had a greater negative impact on native waterbird habitat than has the mangrove at He'ela.

The U.S. Fish and Wildlife Service (1978) ranked the He'eia wetlands as a "secondary area" in terms of existing or potential value to endangered water birds, recommending management of the marsh as water bird habitat. An Instream use survey for windward Oahu (Wilson Okamoto & Assoc., Inc., 1983) rated the marshland as having high potential value for stream fauna and water bird habitats.

3. Meadow Land

The seasonally wet meadow portion of the He'eia Floodplain would be the "wetland" environment most directly impacted by the proposed Punawai Trunk Sewer construction, particularly if the alternate alignment were to be constructed. This environment was surveyed during two visits to the site. It was clearly evident that during heavy rains and/or high water flow in He'eia Stream, much of this area does become marshy. The portion surveyed (south sector) is terraced, and in March and April, 1989, was covered by water to a depth which varied from a few inches to a foot or more. Drainage channels and small ponds in this area may be deeper.

Much of the meadow land is heavily grazed, making determinations of the several kinds of grasses present difficult. These are, however, introduced species which are clearly dominated by California grass (Brachiaria mutica) in the wet areas or in areas fenced off from grazing. Other common facultative wetland species present include honohono (Commelina diffusa), sensitive plant (Mimosa pudica), sedge (Fimbristylis littoralis), and Job's tears (Coix lachryma-jobi). The west side of the meadow, along He'eia Stream, is a dense thicket of hau trees (Hibiscus tiliaceus).

Some parts of the meadow have more "natural" marsh characteristics where the flow from He'eia Stream is diverted into channels and lower lying areas. In such places the vegetation includes some obligate wetland plants such as arrowhead plant (Sagittaria sagittifolia) and kamole (Ludwigia octovalvis). Bullfrogs (Rana catesblana) were observed in small ponds in the seasonally wet meadow.

In an area below the northern end of Ahul Nani Place, the proposed Punawai Trunk Sewer of Alternative I would cross a small swale and pass close to the meadow. Actually, the route as flagged cuts through the edge of the hau thicket. The ground here is moist to an elevation well above the marsh, indicating fresh water seeps. The vegetation is somewhat unique and includes a fern (Marattiaceae), wetland taro (Colocasia esculenta), Chinese taro (Alocasia cucullata), honohono (Commelina diffusa), wedella (Wedella trilobata), California grass (Bracharia mutica), banana (Musa x paradisiaca), yellow ginger (Hedychium flavescens), Impatiens (Impatiens sultanii), heliconia (Heliconia sp.), primrose willow (Ludwigia octovalvis), and mango (Mangifera indica). It is suspected that the ground here remains moist year around, as some of these plants are obligate wetland species (require wetlands) or are associated with high soil moisture content.

4. He'ela Stream

The macrofauna and riparian vegetation of He'ela Stream above the project area have been surveyed on several previous occasions (Timbol and Maciolek, 1978; AECOS, Inc., 1983, 1988). The following description is taken from AECOS, Inc., 1988 (p. 12) and incorporates information from the Timbol and Maciolek survey:

The upstream section [above Kahekili] is a natural stream bed within a forested area. The stream is characterized by large boulders, and a typical complex of riffles and small pools. Swordtails (Xiphophorus helleri) occur in the pools. Timbol and Maciolek (1978) report mosquitofish (Gambusia affinis), loach or dojo (Miscurnus anguillicaudatus), shortfin molly (Poecilia mexicana), and guppy (P. reticulata) as common exotic fishes found upstream of ...[Haiku Eden Condominium]. The endemic shrimp or 'opae kalaole (Atya bisulcata) and [introduced] crayfish (Procambarus clarki) were found here as well. Plants common along the stream just above Haiku Eden are basketgrass (Opismenus hirtellus), wedella (Wedella trilobata), sword fern (Microsorium scolopendria), and mosses. Trees overhanging the stream include rose apple (Eugenia jambos), guava (Psidium guajava), macaranga (Macaranga grandifolia), octopus tree (Brassala actinophylla) and hau (Hibiscus tiliaceus).

The reach immediately downstream of Kahekili Highway is in a deep gully. The stream bed is overgrown with honohono, Job's tears, and mulesfoot fern. Also present are yellow ginger (Hedychium flavescens), ape (Alocasia macrorrhiza), umbrella sedge (Cyperus alternifolius) and impatiens (Impatiens sultanii). The report by Timbol and Maciolek (1978) includes a list of stream animals from this section of the stream. A number of exotic fishes, including Chinese catfish (Clarias fuscus), guppy (Poecilia reticulata), green swordtail (Xiphophorus helleri), loach or dojo (Misgurnus anguillicaudatus), and shortfin molly (Poecilia mexicana) were observed. The Tahitian prawn (Macrobrachium lar) and the crayfish (Procambarus clarki) were also common. Native o'opu or gobies (Awaous genivittatus and Eleotris sandwicensis) were present but rare.

The unmodified stream below Kahekili Highway was rated as having a high potential as stream habitat in the Instream Use Survey by Wilson Okamoto & Associates (1983). Timbol and Maciolek (1978) rate the entire stream as having moderate to high quality water and/or natural values. The stream bed is modified where it passes through Haku Plantations (above Kahekili Highway), is contained in a raised box culvert under Kahekili Highway, and is modified for a short distance below Alaloa Street. AECOS, Inc. (1988) noted that He'ela Stream in the vicinity of Kahekili Highway was perhaps the most pristine of the several windward streams crossed by the highway with respect to water quality and natural habitat values.

The proposed Punawai WWPS (to replace Crown Terrace Sewage Pump Station No. 4 under Alternatives II and III) would be located on a parcel of land at the foot of Halaulani Street. This area is above He'ela Marsh, including the seasonally wet meadow, and lies along He'ela Stream. The parcel is dominated by various weedy species, including wedella (Wedella trilobata), field bindweed (Convolvulus arvensis), Flora's paint brush (Emilia sonchifolia), California grass (Brachiaria mutica), spiny amaranth (Amaranthus spinosus), graceful spurge (Euphorbia glomerifera), rattlebox (Crotalaria sp.), and indigo (Indigofera suffruticosa). A drainage ditch, inhabited by tilapia (Oreochromis mossambica) and bullfrogs (Rana catesblana) and overgrown with honohono (Commelina diffusa), extends from the end of Halaulani Street, directing the run-off from a storm drain into He'ela Stream.

Along He'eia Stream in this area, Java plum (Eugenia cumini) and hau (Hibiscus tiliaceus) are the dominant trees. The understory vegetation in this riparian environment includes Job's tears (Coix lachryma-jobi), wedelia (Wedelia trilobata), basket grass (Opismenus hirtellus), dumb cane (Dieffenbachia picta), elephant's ear 'ape (Xanthosoma robustum), banana (Musa x paradisiaca), and umbrella sedge (Cyperus alternifolius). The stream bed is a mixture of small rounded stones and sandy-mud. The most abundant fishes in this area are the green swordtail (X. helleri), catfish (Corydoras cf. aeneus), and guppy (P. reticulata). Moderately large tilapias (Oreochromis) are present. No crustaceans were observed. The snail, Mellania, was very abundant in some locations within the stream. The presence of Corydoras, a common aquarium-trade catfish, is unusual. The fish is very abundant at this location and the population appears well established.

Downstream from the point where He'eia Stream enters the seasonally wet meadow, the stream is densely lined with hau. This area, which extends to the northern sector of the marsh, is a hau-tree swamp. Material (sediment and vegetation) brought into the swamp from upstream creates dams which cause rerouting of the stream flow, forcing some of the water into the south sector meadow.

5. Non-Wetland Areas

Most of the preferred route for the Punawai Trunk Sewer of Alternative 1 skirts the edge of the marsh and meadow. The ground rises steeply along much of this northern and eastern boundary of He'eia Marsh, and the vegetation is a mixture of common lowland trees, introduced weeds, and escaped ornamentals. Plants noted along this route are listed in Appendix B. Although by no means an exhaustive list, particularly with respect to smaller, herbaceous species, the list does demonstrate the diversity and abundance of escaped ornamentals found along much of the route.

Fill land areas around He'eia Marsh were described briefly by Winona Char (1988) as follows:

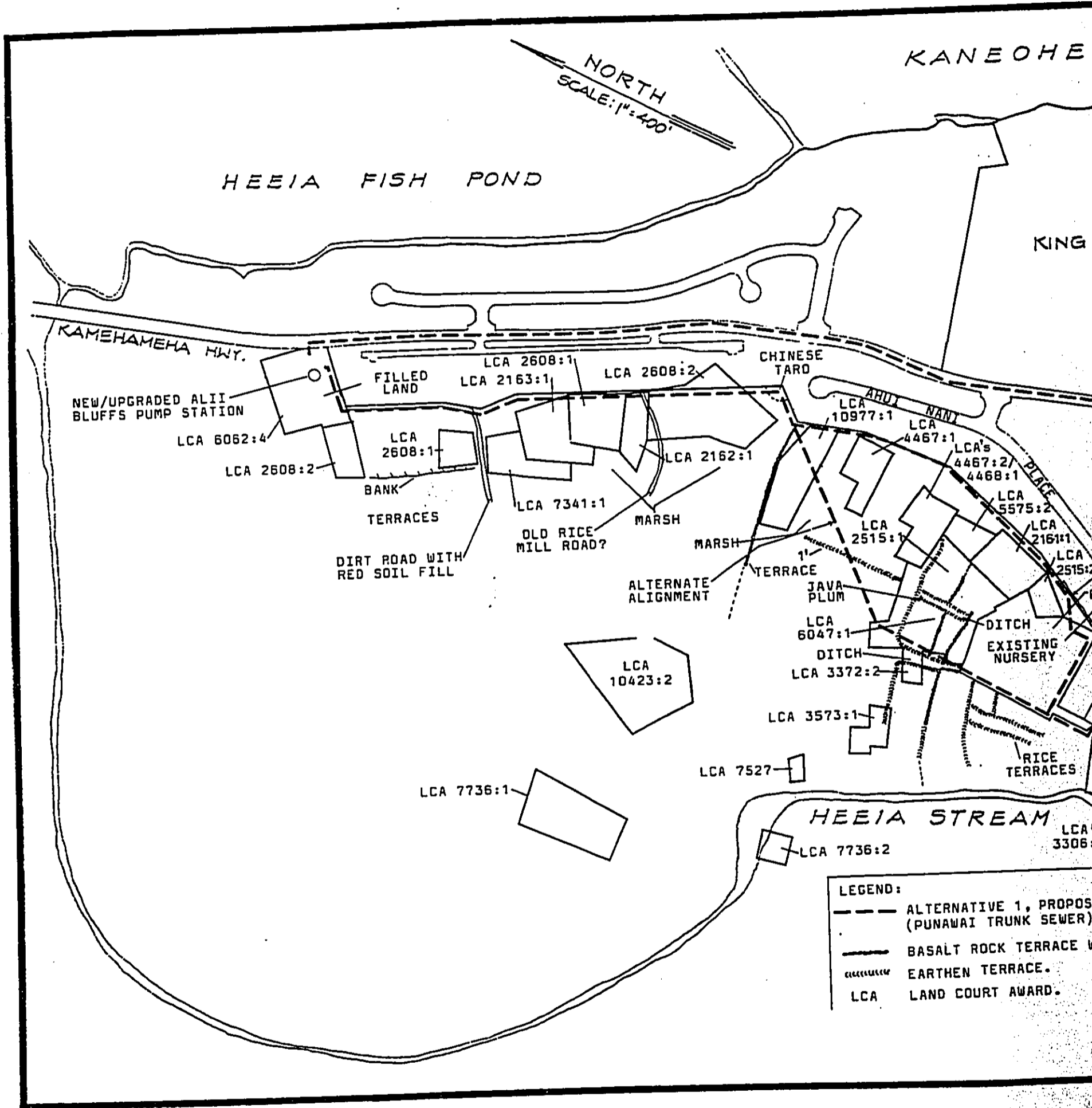
These elevated areas usually represent fill lands used for dikes, roadways, house sites, etc. Although these areas may be intermittently flooded, they do not support obligate wetland plant species. Vegetation on these elevated parcels consists primarily of Hilo grass (Paspalum conjugatum) along with a number of weedy species such as puhianhila or sleepinggrass (Mimosa pudica), Cuba jute (Sida rhombifolia), saplings of Java plumb (Syzygium cumini), and the thorny wait-a-bit (Caesalpinia sepiaria).

Listed in Appendix A are several species of plants which are potential indicators of wetland or aquatic environments. Included are both obligate and facultative species (indicated by an "O" or "F" in column three) considered important wetland species by Elliot and Hall (1977). Obligate wetland plants are those species which require an aquatic environment in order to flourish, and are thus indicators of wetland conditions. Facultative species are frequently found associated with wetland environments, but are not restricted to wet areas. With the exceptions of Brachiaria and Commelina (facultative species which are ubiquitous in many locations in and around the marsh), all of the species so indicated in Appendix A occur near the proposed trunk sewer route only in the area below the end of Ahui Nani Place as discussed in a previous section (see Meadow Land).

I. Archaeological Resources

Several archaeological surveys were conducted of the project area with particular attention paid to the Punawal Trunk Sewer alignment of Alternative I (see Figure 10). The first survey was a general inspection of the area to be affected by the construction alternatives. This inspection included observations along existing roadways (Kamehameha Highway and Halaulani Street), pump station sites, and the Punawal Trunk Sewer alignment.

Investigation of the route for the Punawal Trunk Sewer began at the southern end of the alignment at the existing Crown Terrace Sewage Pump Station No. 4. The survey progressed northward following the proposed alignment except where it crossed private property (primarily lands owned by the Patacsil family). The alignment, which for the most part, runs along the bottom portion of a natural slope on the eastern edge of the marsh contained no archaeological sites.



NORTH
SCALE: 1"=400'

HEEIA FISH POND

KANE OHE KING

KAMEHAMEHA HWY.

NEW/UPGRADED ALII BLUFFS PUMP STATION

LCA 6062:4

LCA 2608:2

FILLED LAND

LCA 2608:1

BANK TERRACES

DIRT ROAD WITH RED SOIL FILL

OLD RICE MILL ROAD?

MARSH

ALTERNATE ALIGNMENT

LCA 10423:2

LCA 7736:1

CHINESE TARD

LCA 10977:1

LCA 4467:1

LCA's 4467:2/4468:1

LCA 5575:2

LCA 2161:1

LCA 2515:2

LCA 2515:1

LCA 6047:1

LCA 3372:2

LCA 3573:1

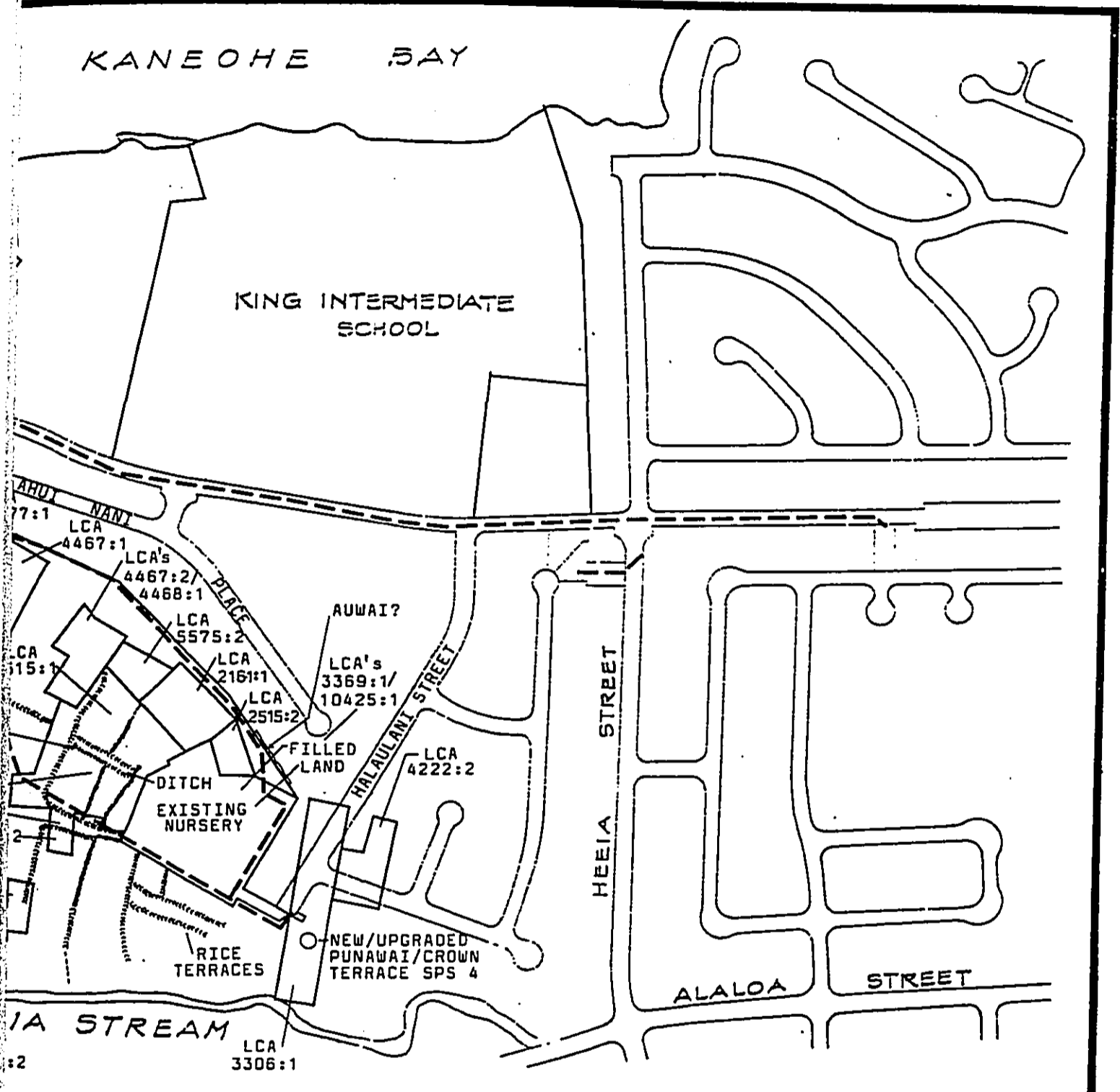
LCA 7527

HEEIA STREAM

LCA 7736:2

LCA 3306

LEGEND:
 - - - ALTERNATIVE 1, PROPOS (PUNAWAI TRUNK SEWER)
 — BASALT ROCK TERRACE
 - - - - - EARTHEN TERRACE.
 LCA LAND COURT AWARD.



- Legend:
- ALTERNATIVE 1, PROPOSED ALIGNMENT (PUNAWAI TRUNK SEWER).
 - BASALT ROCK TERRACE WALL.
 - EARTHEN TERRACE.
 - LAND COURT AWARD.

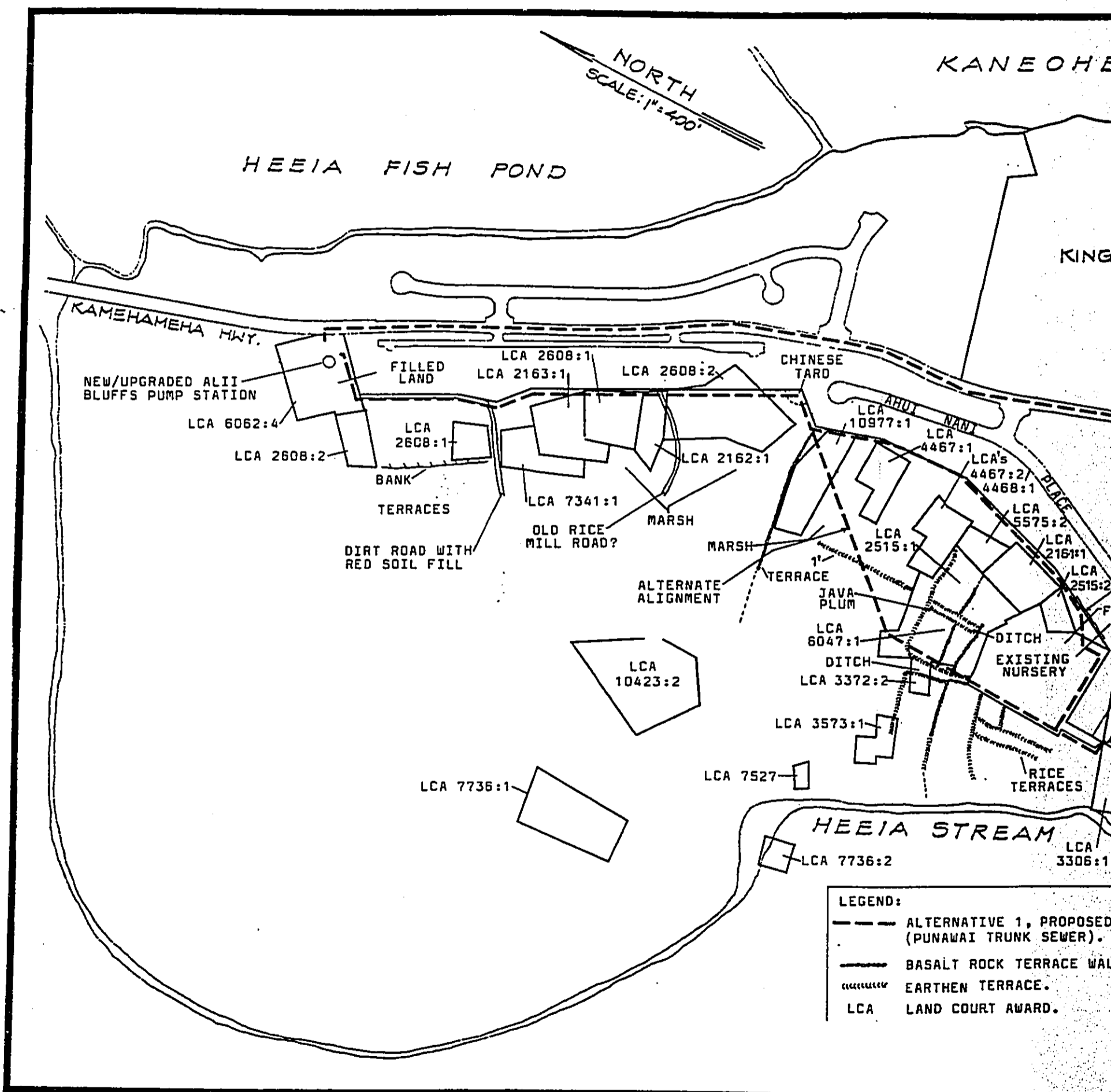
**HEEIA WASTEWATER COLLECTION SYSTEM
KOOLAUPOKO, OAHU, HAWAII**

CULTURAL SURVEYS HAWAII FIELD MAP
SHOWING ALTERNATIVE I ALIGNMENT,
FORMER RICE/TARO TERRACES, AND
SELECTED LAND COURT AWARDS.

FIG.10

CORRECTION

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



KANEOHE BAY

KING INTERMEDIATE SCHOOL

77:1 LCA 4467:1

LCA's 4467:2/ 4468:1

LCA 5575:2

LCA 2161:1

LCA 2515:2

AUWAI?

LCA's 3369:1/ 10425:1

LCA 4222:2

FILLED LAND

DITCH EXISTING NURSERY

RICE TERRACES

NEW/UPGRADED PUNAWAI/CROWN TERRACE SPS 4

HEEIA STREET

ALALOA STREET

IA STREAM LCA 3306:1

- Legend:
- ALTERNATIVE 1, PROPOSED ALIGNMENT (PUNAWAI TRUNK SEWER).
 - BASALT ROCK TERRACE WALL.
 - EARTHEN TERRACE.
 - LAND COURT AWARD.

HEEIA WASTEWATER COLLECTION SYSTEM
 KOOLAUPOKO, OAHU, HAWAII

CULTURAL SURVEYS HAWAII FIELD MAP
 SHOWING ALTERNATIVE I ALIGNMENT,
 FORMER RICE/TARO TERRACES, AND
 SELECTED LAND COURT AWARDS.

FIG. 10

An alternate route in the southern portion of the project area was also surveyed. Beginning from the end of Halaulani Street, this route extends north along an existing plant nursery then turns east into alluvial flatlands. In this area, remnant terraces (both of rock and earth) of former taro and rice fields were observed. The outline of these terraces can be seen despite the low vegetation and marshy conditions.

A meeting of "concerned parties" at the Patacsil residence enabled coverage of the previously unsurveyed portion of the Punawai Trunk Sewer alignment. This portion also contained no archaeological sites. However, at the very base of the slope adjoining a driveway from the All'i Cluster Subdivision to the Patacsil property and within a few meters of the proposed route of the Punawai Trunk Sewer, was a maintained drainage ditch, which was stone-lined in a few places. This ditch or auwai is obviously historically modified and maintained, and probably relates to both taro and rice farming in the area.

No remnants of former terraces or any other archaeological features were observed at the existing nursery where there has been significant fill soil deposited, the private residence(s) of the Patacsil family, and a modern dirt road and associated fill area near the northern terminus of Alternative 1. These modern land modifications undoubtedly were also on former taro/rice fields or associated features. However, the relatively recent soil fills have obliterated surface evidence of the terraces.

The proposed route of the Punawai Trunk Sewer was resurveyed after the alignment was flagged. Unlike the two previous inspections along the bottom portion of sloping lands, this resurvey followed along the face of steep sloped lands that physically separates the All'i Cluster Subdivision from kuleana lands on the floor of the marsh. The survey results for this third inspection corroborated the previous two.

In summary, no archaeological sites were observed along the length of the Punawai Trunk Sewer alignment which runs along the eastern slope of He'eia Marsh. An alternative alignment for a section of the Punawai Trunk Sewer cuts through remnants of former taro and rice terraces. No archaeological features were observed at the proposed wastewater pump station sites and within road rights-of-way to be affected by the proposed project.

J. Socio-Economic Characteristics

1. Population

Population growth in the Koolau-poko District boomed in the 1950s with an average annual population growth rate of 11.2 percent. Growth in Windward Oahu's population is linked to the spread of suburban residential areas. Developments in Kailua and Kaneohe accounted for substantial growth in the 1950s and 1960s. Since the 1960s however, the growth rate has slowed significantly. District population increased by 4.4 percent annually in the 1960s, 1.7 percent in the 1970s, and an estimated 0.9 percent in the 1980s. The 1985 population was estimated at 114,600 persons (Department of Business and Economic Development, 1988).

The project will service 783 existing residential units in the tributary area with an equivalent population of 3,041 persons (Kim, 1989). This amounts to about one-third of the estimated 9,448 resident population of Census Tract 105.01 (He'eia) in 1985.

2. Land Ownership

Sewer lines for all three alternatives would be installed primarily in road rights-of-way owned by the State of Hawaii (Kamehameha Highway) and the City and County of Honolulu (Halaulani Street) and existing sewer easements in favor of the City and County of Honolulu except for the Punawal Trunk Sewer of Alternative I.

The Punawal Trunk Sewer would be constructed within a 10-foot wide easement primarily on lands owned by the Bishop Estate. The northern and southern sections of the easement however crosses lands leased out by the Estate. Considered in whole, the lease lands are in residential (Alii Cluster Park) or agricultural (Tomita Nursery, Town and Country Stables) uses. Kuleana lands below Ahui Nani Place are not crossed except for a corner of TMK 4-6-16:17 (L.C. Aw. 10192).

Bishop Estate also owns the lands on which the three existing sewage pump stations have been constructed.

K. Public Facilities and Services

1. Water

Water service is provided by the City and County of Honolulu Board of Water Supply (BWS). There are no BWS operated water sources or storage facilities within the project area.

Waterlines and mains of 30, 16, 12, and 8-inch diameters are aligned with or traverse Kamehameha Highway, Halaulani Street, and He'eia Street.

2. Roads

Kamehameha Highway, a County maintained two-lane highway through the project area, is one of two major north-south thoroughfares serving this area of windward Oahu. Within its 40-foot right-of-way, it has a pavement width of 26 feet (average) and 6 to 10 foot grass or asphaltic concrete shoulders. The posted speed limit is 35 miles per hour. In 1987, daily traffic volume was recorded at 10,385 vehicles along Kamehameha Highway. Peak traffic hours occur between 0600-0700 hours (am) and 1630-1730 hours (pm). The direction of travel favors the southbound direction by a 2:1 margin. A vehicle count summary is shown in Table 3.

Halaulani Street, a County standard road, has a right-of-way width of 60-feet. Its curb to curb width measures 40 feet and a typical section includes a 6-foot wide planting strip and 4-foot width sidewalks on both sides. On-street parking is permitted.

3. Drainage

The tributary area appears to be well drained. Drainage systems in the residential subdivisions are administered and maintained by the Department of Public Works, City and County of Honolulu. There appears to be no drainage works along Kamehameha Highway between the southern end of the Mauka All Bluffs Subdivision and He'eia 'Long Bridge'. Runoff follows the natural road grade (north) and eventually discharges into He'eia Stream at the 'Long Bridge'.

TABLE 3

TRAFFIC COUNTS

KAMEHAMEHA HIGHWAY AT HE'EIA BRIDGE

11/87

<u>Time</u>	<u>Northbound</u>	<u>Southbound</u>	<u>Total</u>
0000-0100	24	21	45
0100-0200	13	6	19
0200-0300	8	11	19
0300-0400	6	10	16
0400-0500	10	43	53
0500-0600	32	360	392
* 0600-0700	68	1,724	1,792
0700-0800	148	1,033	1,181
0800-0900	138	369	507
0900-1000	183	326	509
1000-1100	188	252	440
1100-1200	216	209	425
1200-1300	196	273	469
1300-1400	239	311	550
1400-1500	215	245	460
1500-1600	252	272	524
** 1600-1700	299	301	600
1700-1800	319	297	616
1800-1900	254	328	582
1900-2000	170	191	361
2000-2100	125	155	280
2100-2200	151	136	287
2200-2300	93	75	168
2300-2400	52	38	90
Total	3,399	6,986	10,385

* AM Peak Hour

**PM Peak Hour: 1630-1730, 634 vehicles

Source: Department of Transportation, State of Hawaii

Runoff discharges into He'ela Marsh via several earthen drainage ditches (near the existing Crown Terrace Sewage Pump Station No. 4) and concrete outlets at the north end of Ahul Nani Place.

4. Utilities

Electrical power in the area is provided by Hawaiian Electric Company (HECO). Electrical lines which are aligned with Kamehameha Highway are overhead utilities; in the residential areas electrical lines are placed underground.

Telephone service is provided by Hawaiian Telephone Company. Overhead trunk lines run along Kamehameha Highway and in residential areas they are placed underground.

Gasco, Inc. the major supplier of propane gas on Oahu, has no distribution lines in the area.

5. Public Services

Schools

King Intermediate School (grades 7-9) is the only public school in the tributary area.

6. Recreation

There are no public parks and playgrounds (except recreational facilities at King Intermediate School) located along the sewer line alignments of the various alternatives.

A segment of He'ela Stream to the south of Crown Terrace SPS No. 4 (at the end of Halaulani Street) has been identified as capable of supporting water-based recreation activities such as swimming, wading, and fishing (Wilson Okamoto, 1983).

7. Protective Services

He'ela is served by the City and County of Honolulu Police Department headquarters at the Kaneohe Civic Center and Honolulu Fire Department fire stations at Kaneohe and Kahaluu.

SECTION 4

RELATIONSHIP TO LAND USE PLANS, POLICIES, AND CONTROLS FOR THE AFFECTED AREA

A. State Land Use Districts

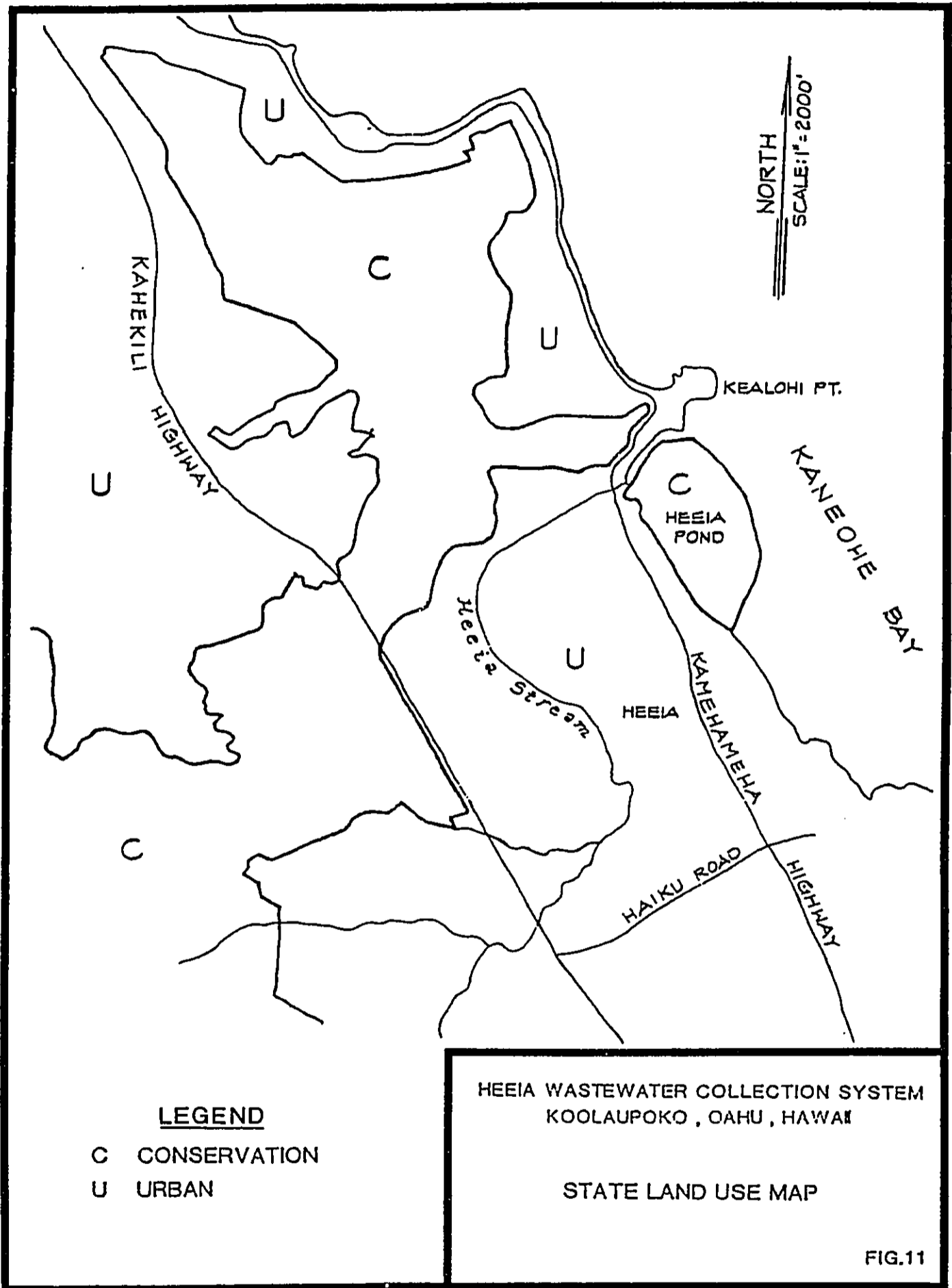
The project area is located entirely within the State Land Use Urban District (see Figure 11). Jurisdiction over land use and development in urban districts is the responsibility of the various county governments. All of He'eia Marsh between Kahekili and Kamehameha Highways is also designated Urban. He'eia Pond, a large (ca. 88 acres) fishpond with an enclosing wall some 5,000 feet long, borders on Kaneohe Bay and is in the Conservation District.

B. General Plan for the City and County of Honolulu

The General Plan for the City and County of Honolulu sets forth long-range objectives for the general welfare and prosperity of the people of Oahu and broad policies to attain those objectives.

The tributary area is within an area of the Island designated urban fringe by the Oahu General Plan (Department of General Planning, 1988). As described in the general plan, the existing suburban and agricultural character of fringe communities is to be maintained. This is to be achieved by adhering to growth management policies that (1) maintain population densities consistent with the desired character of development and environmental qualities of the area, and (2) prevent an undesirable spreading of development.

Toward this end, residential population in the Koolau-poko District has been established at 11.0 - 12.2 percent of Oahu's 2010 residential population. The 20-year (1990-2010) population forecast is based on State Department of Business and Economic Development (DBED) projections for the State (1988). The projections (M-K Series) show continued growth in both the population and economy of the State although at a reduced rate. The 2010 resident population for Oahu (including members of the armed forces and



their dependents and excluding visitors) is estimated at 994,500 persons (DBED, 1988). For the Koolaupoko District, this translates into a resident population of about 110,000 - 122,000 persons.

Given the existing residential character of the tributary area and policy directions of the general plan, the He'ela Wastewater Collection System has been designed to accommodate wastewater flow quantiles based on existing population in the tributary area. In this fashion, sewer capacity indirectly curtails development in support of land use guidance policies.

Upgrading the sewer system implements general plan policies to provide safe, efficient, and environmentally sensitive wastewater collection and waste-disposal services and provide improvements to utilities in existing neighborhoods to reduce substandard conditions. Improvements to the system furthers goals and objectives requiring that the natural environment be protected and preserved.

C. Koolaupoko Development Plan

1. Land Use Map

No new development is proposed in the tributary area. Numerous residential developments comprise the character of the area in keeping with its urban fringe delineation.

Vacant lands along He'ela Stream are designated for predominantly preservation uses with spot agricultural uses limited to kuleana lands. The preservation designation retains open space and adds to the visual and environmental character of Oahu in general and He'ela in particular. As indicated in previous sections of this Assessment, the marsh serves secondary functions such as removing nutrients and particulates carried by He'ela Stream before the water enters Kaneohe Bay, a feeding area for waterbirds, and a detention basin during periods of heavy rain.

2. Public Facilities Map

The public facilities map identifies major public facilities planned for the Development Plan areas within a 6 year budgetary time frame. The Aili Bluffs Force Main (along Kamehameha Highway) and the Punawai Trunk Sewer alignment (along the edge of He'ela Marsh) are depicted on the Public Facilities Map (see Figure 12). Additionally, only expansion of the Aili Bluffs Sewage Pump Station is shown. The wastewater system improvements depicted on the Public Facilities Map are the equivalent of Alternative I described in this Assessment.

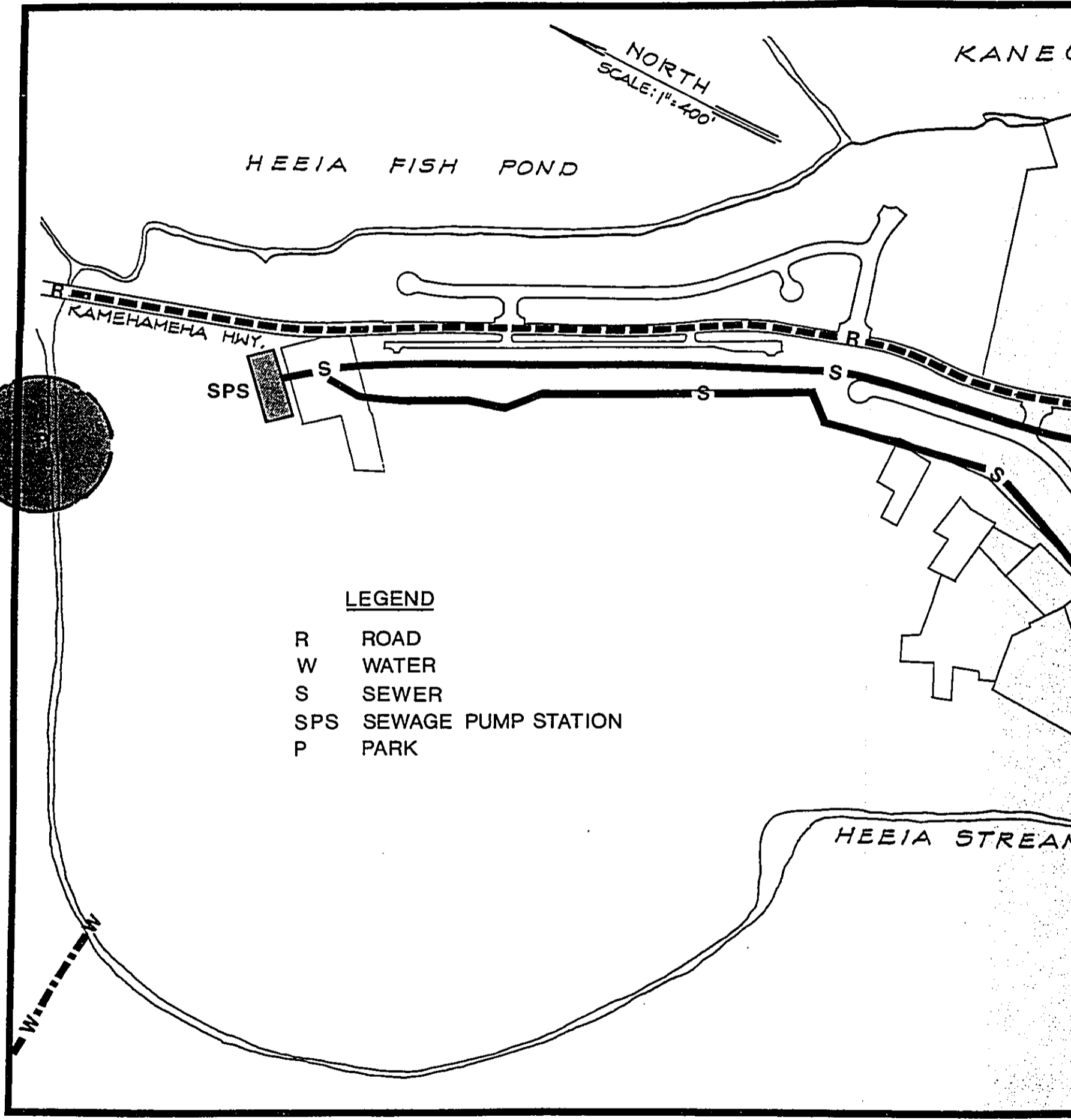
Alternatives II and III eliminate the Punawai Trunk Sewer. Instead, a new (or upgraded) permanent force main along Halaulani Street with either one or two new pump stations plus a new (or upgraded) permanent force main along Kamehameha Highway are proposed. If either Alternative II or III is selected for implementation, the Koolaupoko Development Plan Public Facilities Map would be requested to be updated.

D. Zoning

The Land Use Ordinance of the City and County of Honolulu regulates land uses to encourage orderly development in accordance with adopted land use plans of the City. The proposed project is not affected by zoning although the sewer line alignments of the different alternatives traverse different zoning districts. The Punawai Trunk Sewer alignment of Alternative I crosses lands zoned agriculture (AG-2) from Halaulani Street to Ahui Nani Place and Preservation (P-2) from the southern end of Ahui Nani Place to the Aili Bluffs Pump Station. Residential areas on both sides of Kamehameha Highway and Halaulani Street are residential (R-7.5 and R-5) zoned.

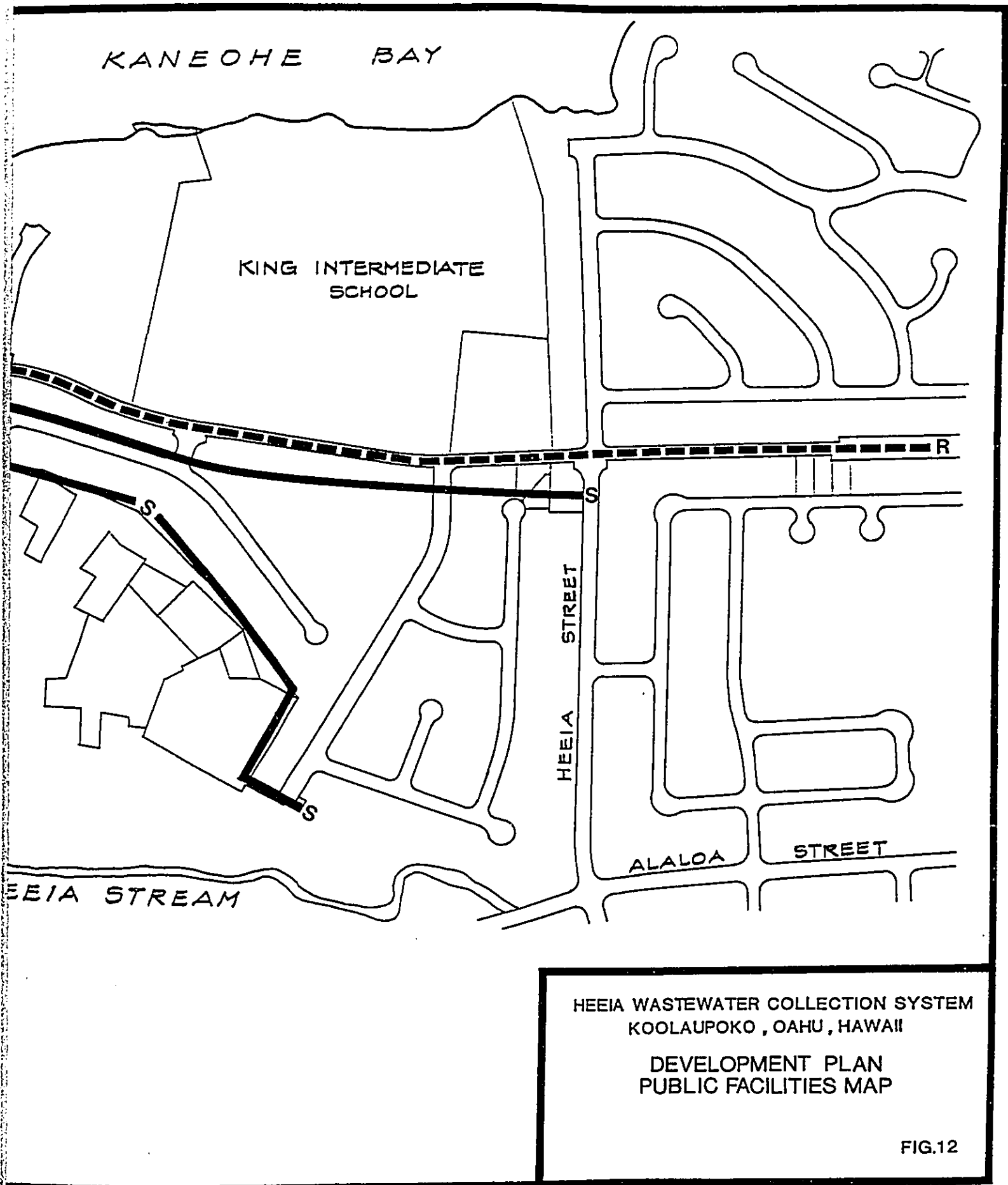
E. Special Management Area

The Special Management Area Ordinance (84-4) of the City and County of Honolulu establishes controls on land and water uses to avoid permanent loss of natural resources in areas (inland) of Oahu's shoreline. Developments proposed in the Special Management Area are regulated by permit and are subject to agency, public, and legislative review.



LEGEND

- R ROAD
- W WATER
- S SEWER
- SPS SEWAGE PUMP STATION
- P PARK



As shown in Figure 13, a substantial area where sewer improvements are proposed falls within the county delineated Special Management Area (SMA) and an SMA use permit will be required. The SMA boundary generally excludes the tributary sub-area served by Crown Terrace Sewage Pump Station No. 2 and about 24 dwellings served by Crown Terrace Sewage Pump Station No. 4. However, proposed sewer improvements in these SMA excluded areas are part of a larger action and will be subject to review and approval by permitting authorities.

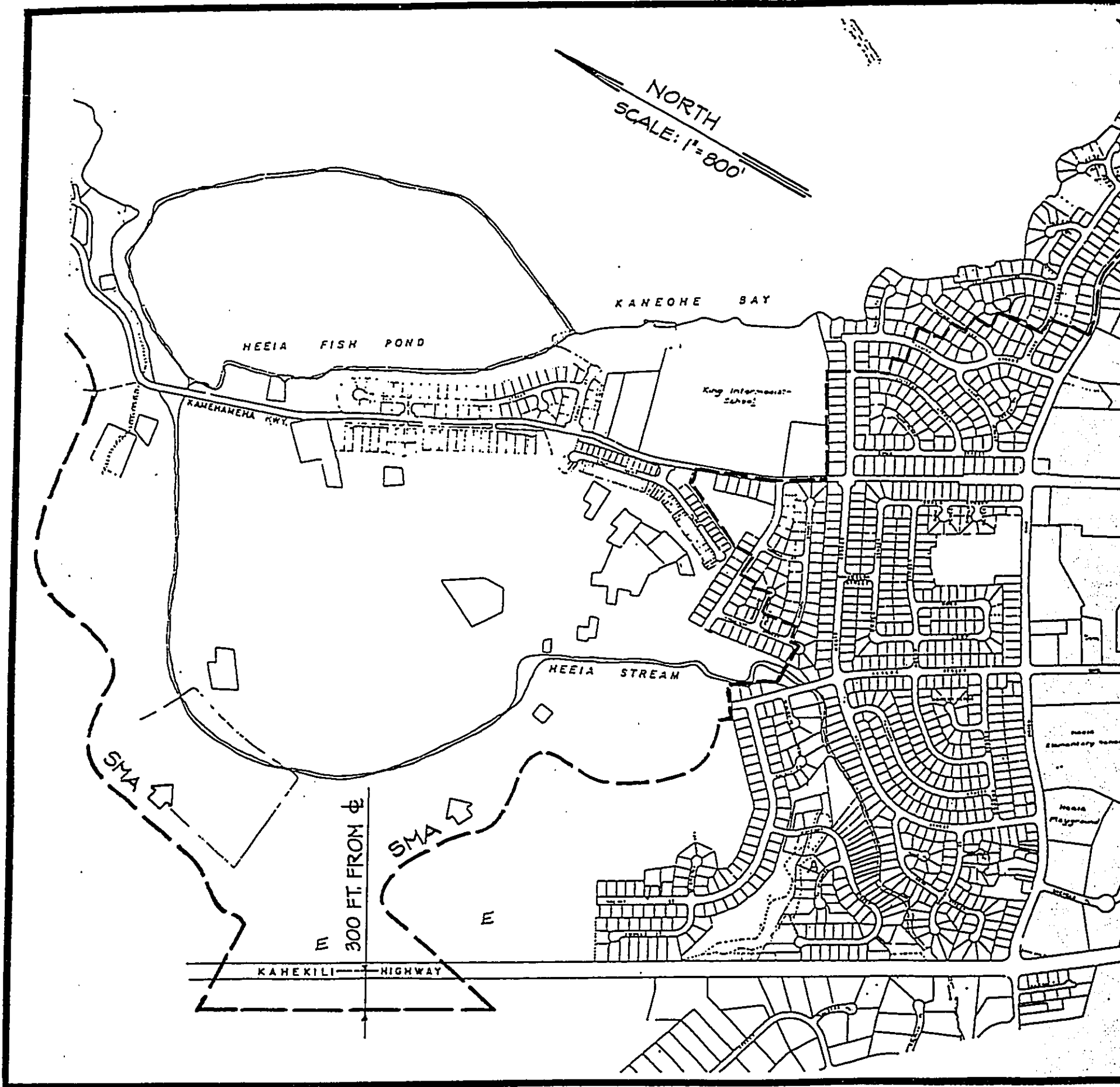
F. Department of the Army (DOA) Permit

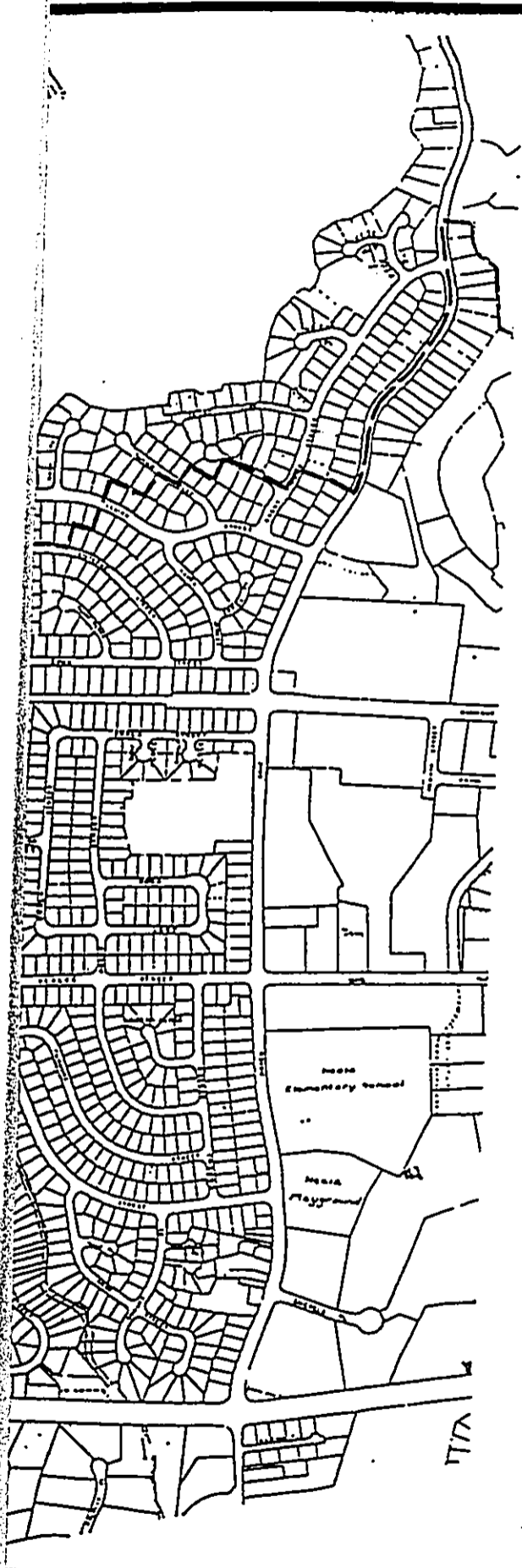
Portions of He'eia Marsh are designated wetlands by the U.S. Army Corps of Engineers. The wetland boundaries defined and mapped by the Corps of Engineers are derived from a vegetation survey of He'eia Marsh conducted by Winona Char (1988). This map was consulted in preparing Figure 9 but Figure 9 does not necessarily depict the Corps of Engineers defined wetland boundaries. On the Char map, three types of areas are indicated: wetlands, pasture, and fill. These correspond reasonably well to the marsh, wet meadow, and fill areas respectively shown on Figure 9. Included within the wetlands designation are areas indicated on Figure 9 as mangrove swamp, pond, hau, and riparian forest (AECOS, 1989). An "official" designated wetlands boundary map was obtained from the Office of State Planning (Arakaki, 1990). This map is in all particulars, identical with the Char map.

The proposed route of the Punawal Trunk Sewer and the location of the Aili Bluffs Wastewater Pump Station are entirely outside the wetlands boundary depicted on the Char map. The alternate alignment which crosses fill land and a section of the southern portion of the seasonally wet meadow (see Figure 9) is within the wetland. Selection of this alternate route will require that a Department of the Army Permit under Section 404 (of the Federal Water Pollution Control Act Amendments of 1972, P.L. 92-500) be obtained for construction.

The wetlands boundary depicted on the "official" map cannot be considered the final determination of the project's infringement or lack of infringement on the wetland as defined by the Corps of Engineers. That determination may require a field inspection by a representative of the Corps. The route as depicted in Figure 9 (exclusive of the alternate alignment) is clearly outside of the wetland boundary as presently defined, but passes very close to the boundary in the vicinity of a hau thicket just below the northern end of Ahui Nani Place.

NORTH
SCALE: 1" = 800'





LEGEND

 SMA SPECIAL MANAGEMENT AREA BOUNDARY LINE

SOURCE: DEPT. OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU

HEEIA WASTEWATER COLLECTION SYSTEM
KOOLAUPOKO, OAHU, HAWAII

SPECIAL MANAGEMENT AREA MAP

FIG. 13

SECTION 5

SUMMARY OF POTENTIAL IMPACTS AND MEASURES TO MITIGATE ADVERSE EFFECTS

The three proposed construction alternatives essentially confine sewer line improvements to existing road rights-of-way and sewer easements where the natural environment has been and continues to undergo man-made alterations. Sites for the new (or upgraded) permanent wastewater pump stations are enlargements of the areas now occupied by existing temporary stations. These sites also have been modified by man's activities. The Punawai Trunk Sewer of Alternative I generally follows the eastern edge of He'ela Marsh. With the possible exception of a short section of the alignment which passes close to the designated wetland boundary (Char, 1988), the remainder of the gravity sewer is entirely outside the wetlands. The alternate trunk sewer route crosses a seasonally wet meadow (as defined in this Assessment) comprising part of the He'ela Floodplain. This wet meadow would be the wetland environment most directly impacted by the Punawai Trunk Sewer if constructed.

Construction of new permanent force mains and gravity systems will be accomplished using cut and cover construction methods or variations thereof as determined by field conditions. In its simplest application, a trench will be dug and surface and subsurface materials removed to construction depth, pipe sections would be laid (as well as joined) in the trench so as to achieve a uniform invert, and backfill placed along or under the pipe to prevent movement off-line or off grade. The pipe would then be tested for leaks, the trench backfilled and compacted, and the ground surface restored to pre-construction condition (restoration may be done after the entire line is completed). Trenching work will be limited to 150-200 LF in advance of pipelaying. Excavated materials may be hauled either to an approved waste disposal site or stockpiled alongside the trench close to each job site. If dewatering is necessary, trench water will be pumped into the nearest municipal drain inlet or catch basin. Upon completion of the system, existing piping would be cut, plugged, and abandoned in place.

Unlike improvements which are site-specific, the pump stations for example, a sewer line is route or corridor specific. Construction progresses from one location to another along a staked alignment. Thus, over time and distance, construction impacts are generally repetitive and temporary at any one location.

Cut and cover methods are presumed to be used to construct the Punawai Trunk Sewer. Because of topographical conditions, dense vegetation, and proximity of the alignment to the wetlands, it is anticipated that construction would proceed slowly to minimize environmental impacts. Although construction methods have not been specified, it is probable that grubbing and trenching activities would be limited in advance of pipe laying and embankments constructed to prevent soil and runoff from discharging onto adjoining properties or, into the wetlands. A 30-foot wide permanent sewer easement would be required for construction of the sewer; in the long-term the easement would accommodate a service road for access to the sewer by City maintenance personnel.

A. Air Quality

Short-term direct impacts on air quality are of two types: fugitive dust and emissions from construction equipment. Similar indirect impacts result from construction equipment hauling materials and men to the job site and between job sites and storage yard; traffic delays when work areas in the highway right-of-way forces reduced speeds.

Fugitive dust will arise from trenching, stockpiling, backfilling, and dirt moving activities in general. Adequate dust control can be attained by establishing a frequent watering program to keep exposed earth areas around work sites from becoming significant dust generators. Other measures are stipulated in Chapter 60, Air Pollution Control Regulations, Title 11, State Department of Health, and will be implemented as needed.

Fugitive dust generation at work sites could also be curtailed by the limited area required for a sewer line trench and moist soils that could be encountered. The Contractor will also keep streets and nearby properties free of mud and accumulated debris.

Most construction equipment and vehicles are diesel powered and emit exhaust emissions typically high in nitrogen dioxide and low in carbon monoxide. The Federal and State nitrogen dioxide standard --100 mg/m³ per annum--which is an annual standard is not likely to be exceeded during construction. Carbon monoxide emissions should be less than that generated by vehicle emissions on nearby streets. Aldehyde odors from diesel equipment may be detected but for the most part should be quickly dispersed by the prevailing tradewinds.

B. Noise

Short-term noise impacts associated with new construction activities will occur as a result of the proposed project under all Alternatives. Noise, like fugitive dust, is unavoidable. These impacts will occur as a result of the short distances (less than 100 feet) between construction sites and noise sensitive receptors (residences). The duration of the construction period is not known, but given a pipe laying project, noise exposure from construction activities at any one receptor location is not expected to be continuous for the construction period.

Noise levels of diesel powered construction equipment typically range between 85-96 dB(A) at a distance of 50 feet. The State Department of Health currently regulates noise from construction activities on Oahu under a permit system (Chapter 43, Community Noise Control for Oahu, Title 11, Administrative Rules). Under current permitting procedures, noisy construction activities exceeding 95 dB at the project boundary lines are restricted to hours between 9:00 am - 5:30 pm, Monday through Friday, and excluding holidays. These restrictions minimize construction noise impacts on residences, schools, and churches and have generally been successful. Traffic noise from heavy vehicles hauling men and materials to and from job sites will comply with Chapter 42, Vehicle Noise Control for Oahu (Title 11, Administrative Rules). The Contractor will also ensure that construction equipment and vehicles are equipped with mufflers in good operating condition. If necessary, stationary surface equipment may be enclosed by sound attenuation barriers to comply with applicable noise standards.

C. Hydrological Characteristics

He'ela Stream, the nearest surface water source to the project, is sufficiently distant from any of the sewerline alignments of the various alternatives and should not be directly affected by construction activities.

The proposed Punawai WWPS of Alternative II or upgraded Crown Terrace Wastewater Pump Station No. 4 of Alternative III is nearest the stream but sufficient land area is available to accommodate the station. The potential for soil release into He'ela Stream cannot be dismissed and temporary soil erosion and sediment control measures should be developed as part of the station design and construction specification program. Dirt should not be stockpiled on site and control measures should follow the provisions of Chapter 23, Grading, Soil Erosion, and Sediment Control, Revised Ordinances of Honolulu (1978 as amended) and the USDA Soil Conservation Service's Erosion and Sediment Control Guide for Hawaii (1981).

D. Flooding and Flood Hazards

With the exception of the Punawai Trunk Sewer of Alternative I, the piping aspects of the three alternatives follow road rights-of-way and sewer easements which are not identified as flood hazard areas or areas prone to flooding.

The Aili Bluffs WWPS (Alternatives I, II, and III) and the Punawai WWPS (Alternatives II and III) are located in natural low spots at both ends of the system near the demarcated floodway for He'ela Stream. To mitigate against potential flooding, the finish floor elevation of both stations is set well above the estimated flood heights at their respective locations. At the Aili Bluffs WWPS, the finish floor is set at elevation 15 feet and the finish floor at the Punawai WWPS is set at 46 feet. The estimated flood height at both sites is approximately 5 and 38 feet respectively.

The Punawai Trunk Sewer alignment of Alternative I skirts the edge of the 100 year flood plain in an environment that has been identified as wetlands (COE), seasonally wet meadow (AECOS, 1990), or a bog (Cultural Surveys Hawaii, 1989). By whatever name, surface and subsurface soils are probably moist throughout the year and the ground is seasonally covered by water to depths of up to one foot.

Constructing a sewer line in this setting is not impossible—only more difficult. In this case the gravity trunk sewer would be laid using cut and cover methods and potential construction effects were previously discussed. It is not likely that below grade sewer

Improvements would affect the capacity of the floodway or increase regulatory flood elevations in the adjacent floodway. On the other hand, underground piping is not totally protected from natural forces. Mucky and unstable ground conditions may cause uplifting and lateral movement of pipeline sections with resultant joint fatigue or damage to the sewer line. The use of watertight seals and quality control in the selection of construction materials and workmanship can minimize the chances of this situation occurring.

The alternate alignment for the Punawal Trunk Sewer generally is outside the floodway of He'ela Stream but still lies within the He'ela flood plain (or flood hazard zone AE). A gravity sewer along this alignment requires the pipe to be placed below the calculated base flood elevation. And although the sewer line could be designed and constructed to protect it from differential settlement and excessive infiltration/inflow, there is no design assurance that the sewer line would not be damaged either by the regulatory flood or other causes. For this reason, permanent facilities (such as a service road) cannot be constructed and left in place. Rather, temporary roads would have to be built during construction to facilitate the movement of men and materials into and across this chronically muddy area. Similarly, temporary working platforms would be required for sewer line installation and stockpiling of construction material and excavated spoil. Construction measures and procedures also need to provide for the protection of construction personnel and equipment from the dangers of flooding.

In the long-term, maintenance of the gravity sewer would require similar temporary access roads and temporary working platforms that were required during construction. These temporary disturbances due to maintenance activity would be a recurring operation.

E. Biological Resources

1. He'ela Wetlands

A marsh environment represents a transitional stage between either a lake or an estuarine body of water and a meadowland (or forest). That is, the mouth of a stream or a valley floor will be an area of sediment deposition because of the reduction in velocity of stream flow. The accumulation of sediment results in a gradual in-filling of the lake or estuary. During this process, there will exist a mosaic

of shallow areas supporting emergent wetland vegetation (such as sedges and rushes) and deeper areas of open ponds. Over time, however, the marsh will continue to accumulate sediment and organic debris, the shallow water areas eventually becoming fast land supporting non-wetland vegetation and the open water areas being invaded by marsh vegetation. Given the resulting landform of low-slope, the stream that flows across this floodplain will tend to meander.

This natural process can be altered or accelerated by man's activities. Land-clearing on the watershed will increase the rate at which sediment is delivered to the marsh. Agricultural or other activities that increase the nutrients contributed to the marsh will encourage plant growth, resulting in a more rapid occlusion of open water areas and shoaling by accumulation of vegetative matter. In the case of the He'eia wetland, the introduction of certain exotic species, notably the mangrove and California grass, have further accelerated the conversion from perennial wetland to floodplain.

Although wetlands are ephemeral in a geological sense, the natural process of succession from lake to meadow or forest would take centuries or millennia, and during this period a variety of plants and animals will find suitable habitat in these naturally productive environments. Marshes serve to protect marine resources by acting as a buffer to filter out nutrients and sediments from upland erosion, reducing the negative impacts these might have on marine populations inhabiting nearshore areas.

In assessing the impact of any project on a marsh environment, one must look primarily at the relationship between what activities are proposed and the natural processes that are always altering the marsh ecosystem. In cases where human activities have already accelerated these natural processes, intervention could well be warranted to reverse or slow the conversion in order to maintain habitat for certain wetland species. The substantial loss of suitable wetlands throughout Oahu, mostly by filling and stream channelization, justifies such considerations as dredging or clearing of vegetation to re-establish both open water areas and other marsh habitats.

The proposed construction of trunk sewer lines and pump stations for the various alternatives at He'ela will not require any fill to be placed in existing aquatic environments. Thus, the proposed activity does not entail any loss of wetland habitat. Some minor disruption of small areas of designated wetland might occur during the construction phase along the alternate route. Disruption would be limited to seasonally wet areas (meadow) which have marginal value as wetland habitat. As indicated, disruptive activities would cease with completion of the project, and recovery to pre-construction conditions would follow. The preferred route skirts the designated wetland and would largely avoid direct impacts on the wetland.

During construction of the Punawal Trunk Sewer (trenching, local stockpiling of removed soil, back-filling) a risk of loss of some material into the wetland will exist. The exposure of graded slopes will provide at least the opportunity for soils to be washed into the wetland. Much of the route cuts across relatively steep-sloping land and uncovered or stockpiled soil will pose an erosion hazard in these areas. While suitable efforts to minimize soil loss through spillage or erosion should be taken, the nature of the soils in this area would seem to dictate a construction period during the driest part of the year when erosion is least likely to occur. Unanticipated soil losses to the wetland from this project will not have an adverse impact on any valuable biological resources, nor contribute significantly to the natural process of sedimentation. Any erosive soil loss along the Punawal Trunk Sewer route will be deposited directly in parts of the lowlands classified herein as either fill land or seasonally wet meadow.

Any long term impacts of the project on the environment would relate rather directly to the integrity of the completed system. Gravity sewer trunk lines are constructed to either not exchange transported sewage with the surrounding soil and/or water table (designed to be water tight) or to always be negative with respect to the surrounding water pressure (that is, any leakage which occurs would be leakage into the trunk line from the water table). Thus, design considerations dictate no loss of sewage to the surrounding environment and, if achieved, would result in an absence of long-term adverse impacts on the natural environment.

Significant leakage of sewage from the trunk line could produce an undesirable situation from both public health and ecological stand points. Only poor workmanship or accidental damage to the trunk line could produce this situation. It is fair to presume that massive loss would be detected and repair work instituted since public health considerations are involved.

Sewage pump stations are subject to occasional failure resulting in discharge of untreated sewage into the environment. These types of spills are usually of short duration because they are immediately evident to the system operator and can be rectified within hours or days. Presumably any failure of the Aili Bluffs Pump Station to keep up with the flow of sewage into the station could cause an overflow into the adjacent mangrove swamp. Although spills into the marsh or swamp are undesirable, these environments can assimilate the sewage without adverse consequences to the biota, assuming that the situation is rectified in a reasonable amount of time.

The ability of a wetland environment to assimilate organics and suspended solids allows for minor leakage and/or short duration spills without significant ecological consequences. At what volume either chronic leakage or spills cease to be minor in terms of ecological damage depends upon a variety of factors and probably cannot be predicted. It is prudent to assume that factors (such as soil and ground water conditions) which promote a surface expression of any leakage will produce the greatest adverse consequences. On this basis, the alternative trunk sewer route through the seasonally wet meadow would have greater potential for adverse impacts than the recommended route.

2. He'ela Stream

Construction of an enlarged pump station at the end of Halaulani Street under Alternatives II and III will not have an adverse impact on the adjacent He'ela Stream. Sufficient land area is available to avoid encroachment on the riparian (stream side) environment and still leave an adequate buffer zone between the facility and the riparian forest. The parcel slopes only gently toward the stream so erosion hazard would be minimal.

3. Rare, Threatened, or Endangered Species

The He'ela floodplain serves as potential habitat for several endangered species, including Hawaiian Gallinule, Hawaiian Coot, Hawaiian Duck, and Hawaiian Stilt. Included in the fish fauna recorded from the marsh are two native gobies which have become uncommon on Oahu: o'opu nakea (Awaous stamineus) and o'opu niniha (Awaous genivittatus). One o'opu nakea was seen during the field surveys for this project and both species have been previously reported as inhabiting this area.

Preferred waterbird habitat would be the open ponds within the perennial marsh portion of the floodplain. There are no records of any of the endangered waterbirds nesting in the He'ela wetlands in recent years. Given that the open water ponds have continued to decrease in area owing to encroaching vegetation (primarily California grass), utilization by endangered species has also probably decreased. Nonetheless, the area of open ponds is sufficiently distant from the proposed trunk sewer route that construction impacts on waterbirds would not occur.

Native o'opu (gobies) and opae (shrimp and prawn) might be found in both lentic and lotic areas of He'ela Stream. All are diadromous (having marine larval development), requiring access between the sea and stream environments. Thus, the entire length of the stream through and above the floodplain is critical habitat for these animals. Because of the diadromous lifecycles, any project or activity which produces irreversible or long-term interference with the migration patterns of these species will have an adverse impact on the populations inhabiting the stream. Neither the proposed Punawai Trunk Sewer nor the pump stations will physically alter any part of He'ela Stream or contribute to degradation of water quality, and thus the project will not adversely impact the native aquatic fauna.

F. Archaeological Resources

Based upon the literature search, field inspections, and discussions with residents of the area and others knowledgeable about He'eia in general, the consulting archaeologists concluded that no significant historic or archaeological features occur along the route of the proposed Punawai Trunk Sewer (Alternative I), the pump station sites, and road rights-of-way where sewer line construction is proposed.

Former taro and rice features (terraces, auwai) were observed along the alternate alignment for the Punawai Trunk Sewer. Historical use of these lands for agricultural purposes—wetland taro, rice, and sugarcane cultivation—is documented in historical records and Land Commission Awards testimonies (Cultural Surveys Hawaii, 1990).

Although no significant archaeological features were recorded, the consulting archaeologists recommend the following mitigative measures.

Further archaeological investigation is recommended for the Punawai Trunk Sewer alignment if Alternative I is to be implemented. In general, on-site archaeological monitoring is only recommended for areas in the former taro/rice cultivation zone of He'eia Marsh. Monitoring would also include subsequent analysis of any recovered materials. Materials to be recovered would probably just include soil and C14 samples. However, the possibility of encountering other subsurface features (i.e. habitation layers, historical dumps, etc.) cannot be excluded. Monitoring of any excavations in the marsh area may yield datable materials (C14 samples) which could add to the data base for Hawaiian pond field (lo'i) development and associated socio-economic developments.

Monitoring is not required at the proposed Aili Bluffs WWPS and Punawai WWPS locations. Construction of both pump stations would occur in areas of deep fill with sheet piling which would prevent observation of soil profiles during construction excavation. The Department of Land and Natural Resources agreed "that monitoring at the pump stations will be of no value, so no further archaeological work is needed" (see Appendix D, DLNR Letter of July 20, 1990).

No further archaeological work is necessary for excavations within Kamehameha Highway and Halaulani Street or at the existing Crown Terrace SPS No. 2 because of the high degree of land modifications associated with road and subdivision construction. The portion of Kamehameha Highway to be affected was improved to highway status in the late 1920s and 30s and subsequent improvements have been made since then. Halaulani Street was part of Crown Terrace Subdivision construction in the 1960s.

In the unlikely event that subsurface archaeological features are encountered, work in the immediate area shall cease and the State Historic Preservation Officer notified for proper disposition of the finds.

G. Public Facilities and Services

No significant adverse impacts to existing public facilities and services are anticipated as a result of implementing the proposed project. Generally, road rights-of-way serve as utility corridors for transmitting or distributing water, gas, power, and communication systems or collection systems such as storm drains and as described previously, roadways in the project area are no exception.

Overhead utilities, primarily electrical and communication systems, should not be affected. Construction operations will be coordinated with the Board of Water Supply, Hawaiian Electric Company, Hawaiian Telephone company, and CATV operators to prevent or minimize disruptions or breakages of the respective systems.

Should temporary disruption be required, residents (or businesses) in the affected areas will be notified ahead of time to minimize inconveniences associated with the disruptions. In the event of emergency (accidental breakage) repair crews will be summoned immediately and made to provide service in the event prolonged or extensive repair work is required.

1. Traffic

Construction work in road rights-of-way will inconvenience motorists and pedestrians, interrupt through traffic, and increase congestion. These impacts would be more pronounced on Kamehameha Highway rather than interior subdivision roads. In lieu of actual construction plans, it is assumed that one travel lane on affected roads will be closed. Traffic tie ups cannot be avoided and the Contractor will implement measures to maintain access at all times and minimize the inconvenience to the general public. Mitigating measures to be taken include:

- (a) publishing notice of impending construction in local newspapers or other mass media,
- (b) posting advisory signs to alert motorists of road work ahead;
- (c) using flagmen or off-duty police officers to marshal traffic around job sites;
- (d) keeping one traffic lane open at all times;
- (e) maintaining access if driveway closings cannot be avoided;
- (f) limiting construction in the right-of-way to non-peak traffic hours between 8:30 am to 3:30 pm, Monday through Friday; and
- (g) restoring the trenched area (and other areas affected by construction) to pre-construction conditions or better.

For safety purposes, trenches will be covered with traffic plates during non-working hours and safety devices (and signs) posted at all times for the duration of construction.

All work on Kamehameha Highway will be coordinated with the Department of Transportation Services, City and County of Honolulu.

H. Aesthetics

In the long term, visible evidence of the sewer line will be negligible regardless of the alternative selected. Additional land area would be committed to the new permanent pump stations which would present a different appearance than that of the existing temporary stations. All surface conditions will be restored at least to pre-construction conditions and vegetation re-established.

I. Socio-Economic

The capital cost of each alternative was presented in Section 1 of this Assessment. Of concern is the impact to one homeowner whose houselot is required for a pumping station (Alternative III); lands for the other stations are vacant and undeveloped and will be acquired as will the affected houselot. The homeowner of the affected houselot will be compensated adequately if Alternative III is selected but the economic benefit may not outweigh the social cost in surrendering one's home.

The Preliminary Engineering Report (Kim, 1989) evaluated the monetary cost of each alternative to determine their cost-effectiveness. The analysis adhered to U.S. Environmental Protection Agency Cost-Effectiveness Guidelines contained in 40 CFR 35 Appendix A. The monetary cost factors considered in the evaluation of each alternative included capital construction cost, operation and maintenance cost, and salvage values (see Appendix B). A comparison of monetary cost for each alternative is shown in Table 4.

Non-monetary values, such as social, cultural, and environmental factors, were evaluated in this Environmental Assessment. Nevertheless, these non-quantifiable factors may have a significant impact on the ultimate selection of an alternative. In general, the three alternatives would generate short-term construction related impacts such as noise, fugitive dust, and disruptions to vehicle traffic. These temporary effects are not considered significant and can be mitigated by measures described in this Assessment. There are no significant archaeological features present along the sewer line alignments proposed for each alternative. The Punawai Trunk Sewer alignment of Alternative I skirts a section of He'ela Marsh that has been designated a wetland. Construction of the Punawai Trunk Sewer would not require any fill to be placed in aquatic environments thus the proposed activity does not entail the loss of wetland habitat. Some disruption of a relatively small portion of the wetland would occur along the alternative route (to the Punawai Trunk Sewer). Disruption would be limited to seasonally wet areas (meadow) which have marginal value as wetland habitat. Disruptive activities would cease with completion of construction and recovery to pre-construction would follow quickly.

TABLE 4

COMPARISON OF ESTIMATED PRESENT-WORTH MONETARY COSTS

DESCRIPTION	ESTIMATED PRESENT-WORTH
ALTERNATIVE I (One Pump Station)	\$ 4,794,000
ALTERNATIVE II (Two Pump Stations)	\$ 3,763,000
ALTERNATIVE III (Three Pump Stations)	\$ 4,674,000

Note:

Planning Period: 20 years
Discount Rate: 8%

SECTION 6

RECOMMENDED PLAN

In consideration of the operating characteristics and economic cost of the four alternatives, environmental conditions in the tributary area, public health and safety, and City and County of Honolulu environmental goals, it is recommended that Alternative II be implemented for construction of permanent sewage facilities for the Heela Wastewater Collection System.

This plan embraces the two pump station concept. It consists of facilities that meet the Design Standards of the City and County of Honolulu. It is the most cost-effective of the construction alternatives. Whereas the No Action Alternative would avoid the major capital cost associated with each of the construction alternatives, it would prolong the exposure of City O & M personnel to safety and public health hazard potentials at the existing temporary pump stations.

In implementing Alternative II, additional land adjacent to the existing All Bluffs Sewage Pump Station and Crown Terrace Sewage Pump Station No. 4 will be provided by the Bishop Estate. Alignment corridors for the new sewer force mains have been located within existing road right-of-ways. The new sewer force main for the new All Bluffs Wastewater Pump Station has been located within the Kamehameha Highway right-of-way and the new sewer force main for the new Punawai Wastewater Pump Station has been located within the Halaulani Street and Kamehameha Highway rights-of-way. The new Punawai By-Pass Sewer, an 8-inch gravity sewer has been located within an existing sewer easement.

The estimated capital cost for Alternative II is \$4,413,000.

SECTION 7

DETERMINATION AND REASONS SUPPORTING DETERMINATION

Chapter 200 (Environmental Impact Statement Rules) of Title 11, Administrative Rules of the State Department of Health, contains criteria for determining whether an action may have significant effects on the environment (11-200-12). The relationship of the recommended sewage facility plan, Alternative II, to these criteria is discussed below:

- (1) Involves an irrevocable commitment to loss or destruction of any natural or cultural resource;

Alternative II was recommended to minimize potential long-term impacts on natural resources. Implementation of this alternative is confined to existing road rights-of-way and temporary pump station sites which are devoid of natural and cultural resources.

Construction work at the pump station sites will be monitored during land clearing and excavation activities as recommended by the consulting archaeologists.

- (2) Curtails the range of beneficial uses of the environment;

The project is proposed in an urban setting that has been and continues to be modified. Sewer lines will be confined to existing road rights-of-way which will be temporarily altered during sewer line installation and later restored to pre-construction conditions. New pump stations will be constructed on the sites of existing pump stations and a modest amount of currently unused land will be committed to station expansion. Directing construction to areas where sewer facilities are already in place, expands rather than curtails beneficial uses of the environment.

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

The proposed project supports the State's long-term environmental policies to conserve natural resources and enhance the quality of life.

- (4) Substantially affects the economic or social welfare of the community or State;

The project will not affect the economic or social welfare of the community. Public funds committed to the project are part of the City and County of Honolulu's Capital Improvements Program monies that are appropriated for upgrading, replacing, and constructing new public facilities.

- (5) Substantially affects public health;

One of the purposes of the project is to enhance public health and safety. Replacing aged, temporary facilities with permanent facilities will aid in achieving that purpose. The new facilities will be designed and constructed to Department of Public Works engineering standards. The purpose of said standards is to promote the health, safety, and welfare of the public and to provide a safer and healthier environment.

- (6) Involves substantial secondary impacts, such as population changes or effects on public facilities;

Substantial secondary impacts are not anticipated. The sewage system is designed to accommodate existing flows with the tributary area. The tributary area is suburban residential in character and available developable land has already been committed and developed for residential purposes.

- (7) Involves a substantial degradation of environmental quality;

Environmental quality will not be degraded because of this project.

- (8) Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions;

The project does not commit the City and County of Honolulu to a larger action particularly with the adequacy of the system to accommodate new developments in the He'eia area. However, the Department of Public Works proposes sewerage an existing residential development north of the He'eia long bridge and provisions have been made to accommodate wastewater flow at the proposed Alii Bluffs Wastewater Pump Station. Similar accommodations for other existing unsewered areas have not been proposed.

- (9) Substantially affects a rare, threatened or endangered species, or its habitat;

No rare, threatened, or endangered species of plant or animal occur within the sewer line alignments of Kamehameha Highway and Halaulani Street and the sites of the new Alii Bluffs and Punawai Wastewater Pump Stations.

- (10) Detrimentally affects air or water quality or ambient noise levels; or

Construction activity will raise fugitive dust and construction noise may affect residents along the sewer line route. Said impacts will be temporary at any location and can be adequately mitigated by measures prescribed in this Assessment.

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

The selected alternative places all sewer lines and pump stations outside of designated flood hazard areas. No construction is proposed within He'eia Marsh proper and the He'eia Wetlands would not be affected by the proposed project.

Based upon the relationship of the project to the above decision-criteria, it is determined that the proposed He'ela Wastewater Collection System project will not result in significant, adverse, long-term environmental, social, and economic impacts. Therefore it is recommended that an Environmental Impact Statement is not required and a Negative Declaration of environmental impact be submitted to the Office of Environmental Quality Control, State of Hawaii.

SECTION 8

LIST OF APPROVALS

<u>Permit/Approval</u>	<u>Approving Authority</u>
<u>County</u>	
Environmental Assessment	Department of Public Works
Special Management Area Permit	City Council
Development Plan Amendment (Public Facilities Map)	City Council
Grubbing, Grading, and Stockpiling	Department of Public Works
Construction Dewatering Permit (Temporary)	Department of Public Works
Discharge of Waters Permit	Department of Public Works
Street Usage Permit	Department of Transportation Services
Building Permit (Various)	Building Department

SECTION 9

AGENCIES, ORGANIZATIONS, AND INDIVIDUALS CONSULTED
IN THE PREPARATION OF THE ENVIRONMENTAL ASSESSMENT

Federal

Environmental Protection Agency
P. O. Box 50003
Honolulu, Hawaii 96850

- * Soil Conservation Service
U.S. Department of Agriculture
P. O. Box 50004
Honolulu, Hawaii 96850

- * Department of the Army
U.S. Army Engineer District, Honolulu
Building 230
Fort Shafter, Hawaii 96858-5440

Pacific Islands Office
Fish and Wildlife Service
U.S. Department of the Interior
P. O. Box 50167
Honolulu, Hawaii 96850

State

Department of Health
State of Hawaii
P. O. Box 3378
Honolulu, Hawaii 96801

Office of State Planning
Office of the Governor
State of Hawaii
State Capitol, Room 410
Honolulu, Hawaii 96813

State (cont'd)

- * Department of Land and
Natural Resources
State of Hawaii
P. O. Box 621
Honolulu, Hawaii 96809

Department of Business and
Economic Development
State of Hawaii
P. O. Box 2359
Honolulu, Hawaii 96804

- * Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Environmental Center
University of Hawaii
Crawford 317
2250 Campus Road
Honolulu, Hawaii 96822

Office of Environmental
Quality Control
State of Hawaii
465 South King St., Rm 104
Honolulu, Hawaii 96813

- * Denotes consulted parties who responded in writing.

City and County of Honolulu

- * Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843
- * Department of General Planning
City and County of Honolulu
650 S. King Street, 8th Floor
Honolulu, Hawaii 96813
- * Department of Land Utilization
City and County of Honolulu
650 S. King Street, 7th Floor
Honolulu, Hawaii 96813
- * Department of Transportation Services
City and County of Honolulu
650 S. King Street, 3th Floor
Honolulu, Hawaii 96813
- * Department of Parks and Recreation
City and County of Honolulu
650 S. King Street, 10th Floor
Honolulu, Hawaii 96813

Government Officials

Honorable Mike McCartney
State Senate
State Capitol, Room 218
Honolulu, Hawaii 96813

Honorable Stan Koki
State Senate
State Capitol, Room 203
Honolulu, Hawaii 96813

Government Officials (cont'd)

Honorable Terrence Tom
House of Representatives
State Capitol, Room 438
Honolulu, Hawaii 96813

Honorable Reb Bellinger
House of Representatives
State Capitol, Room 321
Honolulu, Hawaii 96813

Honorable Marshall Ige
House of Representatives
State Capitol, Room 302
Honolulu, Hawaii 96813

Honorable David Kahanu
Honolulu City Council
Honolulu Hale
Honolulu, Hawaii 96813

Organizations and Individuals

Bernice Pauahi Bishop Estate
Kawahao Plaza, Suite 200
567 S. King Street
Honolulu, Hawaii 96813

Life of the Land
2500 Pali Highway
Honolulu, Hawaii 96817

Sierra Club, Hawaii Chapter
212 Merchant Street, Suite 201
Honolulu, Hawaii 96813

Hui Malama Aina O'Koolau
c/o Charles Reppun
47-410 Lulani Street
Kaneohe, Hawaii 96744

Kahalu'u Neighborhood Board No. 29
In care of the KEY Project
47-200 Waihee Road
Kaneohe, Hawaii 96744

- * Kaneohe Neighborhood Board No. 30
In care of Satellite City Hall
46-024 Kamehameha Highway
Kaneohe, Hawaii 96744

- * Josephine Patacsil
P. O. Box 478
Kaneohe, Hawaii 96744

Tom Tomita
Tomita Nursery
46-163 Halaulani Street
Kaneohe, Hawaii 96744

Carole J. McLean
Executive Director
Friend of Heela State Park
P. O. Box 698
Kaneohe, Hawaii 96744

Utility Companies

- * Hawaiian Electric Company, Inc.
P. O. Box 2750
Honolulu, Hawaii 96840-0001

- * Hawaiian Telephone Company
P. O. Box 2200
Honolulu, Hawaii 96841

- * GASCO, Inc.
P. O. Box 3379
Honolulu, Hawaii 96842

- * Oceanic Cablevision
2669 Killhau Street
Honolulu, Hawaii 96819

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- _____. 1986. Revised Supplemental Environmental Impact Statement for Heela Kea Valley, Heela, Koolaupoko, Oahu.

Kim, Calvin & Associates, Inc. 1989. Preliminary Engineering Report for Heela Wastewater Collection System (All Bluffs WWPS and FM and Punawai WWPS and FM Construction) Heela, Koolaupoko, Oahu, Hawaii. Tax Map Key: 4-6-04, 07, 08, 15, 18, 19, 20, 22, and 33. Prepared for Division of Wastewater Management, Department of Public Works, City and County of Honolulu.

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Prepared in Cooperation with the Geological Survey, United States Department of the Interior. Honolulu, Hawaii.

United States Department of Agriculture, Soil Conservation Service: 1972.
Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii. In Cooperation with the University of Hawaii Agricultural Experiment Station. U.S. Government Printing Office, Washington, D.C.

Wilson Okamoto & Associates, Inc. 1983. Instream Use Study. Windward Oahu.
Report R68. State of Hawaii Department of Land and Natural Resources, Division of Water and Land Development.

APPENDIX A

LIST OF FLORA OBSERVED ALONG
THE PUNAWAI TRUNK SEWER ROUTE

 Appendix A. A List of the Flora Observed Along the Proposed
 Punawai Trunk Sewer Route. Obligate and facultative
 wetland plants are indicated by "O" and "F" respec-
 tively.

POLYPODIACEAE (common ferns)			
<u>Cyclosorus gongyloides</u>	swamp cyclosorus	O	exotic
ARAUCARIACEAE			
<u>Araucaria heterophylla</u>	Norfolk pine		exotic
PANDANACEAE			
<u>Pandanus odoratissimus</u>	hala		indig.
GRAMINAE (Grasses)			
<u>Bambusa vulgaris</u> var. <u>aureo-variagata</u>	bamboo		exotic
<u>Brachiaria mutica</u>	California grass	F	exotic
<u>Coix lacryma-jobi</u>	Jobs tears	F	exotic
<u>Cortaderia selloana</u>	pampas grass		exotic
<u>Saccharum officinarum</u>	sugar cane		cult.
PALMAE (palms)			
<u>Cocos nucifera</u>	coconut		indig.
ARACEAE (taros)			
<u>Alocasia cucullata</u>	Chinese taro		exotic
<u>Colocasia esculenta</u>	wetland taro	F	indig.
<u>Dieffenbachia picta</u>	dieffenbachia		exotic
<u>Syngonium "Nephtytis"</u>			exotic
<u>Philodendron selloum</u>	philodendron		exotic
<u>Xanthosoma violaceum</u>	purple stem taro		exotic
<u>Xanthosoma robustum</u>	elephant ear 'ape	F	exotic
COMMELINACEAE			
<u>Commelina diffusa</u>	wandering Jew	F	exotic
LILIACEAE			
<u>Cordyline terminalis</u>	ti		indig.
<u>Pleomele fragrans</u>	ornamental		exotic
<u>Pleomele marginata</u>	money tree		exotic
MUSACEAE (bananas)			
<u>Musa x paradisiaca</u>	banana		exotic
ZINGIBERACEAE (gingers)			
<u>Hedychium flavescens</u>	yellow ginger	F	exotic

Appendix A. (continues)

CANNACEAE

Canna indica canna exotic

MORACEAE (figs)

Artocarpus communis breadfruit exotic

Ficus retusa banyan exotic

LAURACEAE (laurel family)

Persea americana avacado exotic

LEGUMINOSAE (bean family)

Acacia confusa Formosa koa exotic

Indigofera suffruticosa indigo exotic

Leucaena leucocephala koa-haole exotic

Mimosa pudica sleeping grass exotic

Samanea saman monkeypod exotic

OXALIDACEAE (wood-sorrels)

Averrhoa carambola star fruit exotic

EUPHORBIACEAE (spurges)

Macaranga grandifolia macaranga exotic

Manihot esculenta cassava exotic

ANACARDIACEAE (mango family)

Mangifera indica mango exotic

BALSAMINACEAE (balsam)

Impatiens sultani impatiens exotic

MALVACEAE (hibiscus)

Hibiscus tiliaceus hau F indig.

PASSIFLORACEAE (passionflowers)

Passiflora foetida liliko'i exotic

CARICACEAE (papaya)

Carica papaya papaya exotic

MYRTACEAE (myrtle family)

Syzygium cumini Java plum exotic

ARALIACEAE (panax family)

Brassaia actinophylla umbrella tree exotic

Appendix A. (continues)

APOCYNACEAE (periwinkles)

Plumeria acuminata frangipani exotic

VERBENACEAE (verbenas)

Stachytarpheta jamaicensis Jamaica vervain exotic

SOLANACEAE (tomato family)

Capsicum annuum red pepper exotic

Solanum sp. nightshade exotic

BIGNONIACEAE (bignonias)

Spathodea campanulata African tulip exotic

RUBIACEAE (coffee family)

Paederia foetida maile pilau exotic

CUCURBITACEAE (cucumbers)

Momordica charantia balsam pear exotic

COMPOSITAE (daisy family)

Wedelia trilobata wedelia exotic

Xanthium sp. cocklebur exotic
=====

APPENDIX B
COST-EFFECTIVE ANALYSIS

The three construction alternatives were evaluated in terms of monetary costs to determine their cost-effectiveness. The format presented in Federal register 40 CFR 35, Appendix A, Cost-Effective Analysis Guidelines by the Environmental Protection Agency (EPA) was utilized for this evaluation. The guidelines indicate that the level of effort and sophistication used in the cost-effective analysis should reflect the project's size and importance. Since the implementation of this project will require wastewater pump stations, annual costs for operation and maintenance, in addition to capital construction costs, have been evaluated.

The cost-effective analysis procedure provide for the following considerations:

a. Method of analysis.

Monetary costs in terms of present worth values or equivalent annual values over the planning period.

b. Planning period.

20 years.

c. Elements of monetary costs.

(1) Capital construction cost.

Estimated construction costs, including contingency.

Land, relocation, and right-of-way and easement acquisition.

Design engineering, field exploration, services during construction.

Administrative and legal services.

Start-up.

Interest during construction.

(2) Annual costs for operation and maintenance.

Include routine replacement of equipment and parts.

Evaluated over the planning period.

d. Prices

Prevailing market prices at the time of analysis.

e. Interest (discount) rate.

Established annually by Water Resources Council.

f. Interest during construction.

(1) Uniform capital expenditures.

Evaluate at mid-point of construction period.

(2) Non-uniform expenditures.

Evaluate year-by-year

g. Useful life.

Land-permanent.

Wastewater conveyance structures - 50 years.

Lift-station structures - 30-50 years.

Process equipment - 15-20 years.

Auxiliary equipment - 10-15 years.

h. Salvage value.

Land - assume equal to original value.

Right-of-way easements - consider equal to original value.

Structures - straight-line depreciation.

Phased equipment additions - straight-line depreciation.

Tables 1, 2, and 3 are presented as summaries of the estimated present-worth monetary cost for Alternative I, II, and III, respectively. The present-worth values are based on a 20-year planning period and an 8% interest (discount) rate. The tables list the factors, that have been considered for the cost-effectiveness evaluation, with their associated present-worth values. The detailed calculations of the present-worth values are included in Appendix E.

Accordingly, Table 4 is presented to compare the estimated present-worth monetary costs of the three construction alternatives. On the basis of this comparison and evaluation, Alternative II (Two Pump Stations), is the cost-effective construction alternative.

TABLE 1
ESTIMATED PRESENT-WORTH MONETARY COST
ALTERNATIVE I

PLANNING PERIOD - 20 years
INTEREST RATE - 8%

FACTOR	ESTIMATED PRESENT-WORTH
I. CAPITAL COSTS	
Construction	\$ 3,815,000
Engineering	634,000
Land Acquisition and Easements	687,000
Administrative/Legal	<u>257,000</u>
SUB-TOTAL	\$5,387,000
II. OPERATION AND MAINTENANCE COSTS	
Labor	\$ 187,000
Replacement Parts and Supplies	167,000
Power (Electrical)	<u>106,000</u>
SUB-TOTAL	\$ 460,000
III. SALVAGE VALUE	
Land and Easements	\$ (687,000)
Structures	(366,000)
Equipment	<u>(0)</u>
SUB-TOTAL	<u>\$(1,053,000)</u>
TOTAL	\$ 4,794,000

TABLE 2
ESTIMATED PRESENT-WORTH MONETARY COST
ALTERNATIVE II

PLANNING PERIOD - 20 years
 INTEREST RATE - 8%

FACTOR	ESTIMATED PRESENT-WORTH
I. CAPITAL COSTS	
Construction	\$ 3,119,000
Engineering	521,000
Land Acquisition and Easements	564,000
Administrative/Legal	<u>210,000</u>
SUB-TOTAL	\$4,413,000
II. OPERATION AND MAINTENANCE COSTS	
Labor	\$ 236,000
Replacement Parts and Supplies	236,000
Power (Electrical)	<u>108,000</u>
SUB-TOTAL	\$ 580,000
III. SALVAGE VALUE	
Land and Easements	\$ (564,000)
Structures	(666,000)
Equipment	<u>-0-</u>
SUB-TOTAL	<u>\$(1,230,000)</u>
TOTAL	\$ 3,763,000

TABLE 3

ESTIMATED PRESENT-WORTH MONETARY COST

ALTERNATIVE III

PLANNING PERIOD - 20 years
 INTEREST RATE - 8%

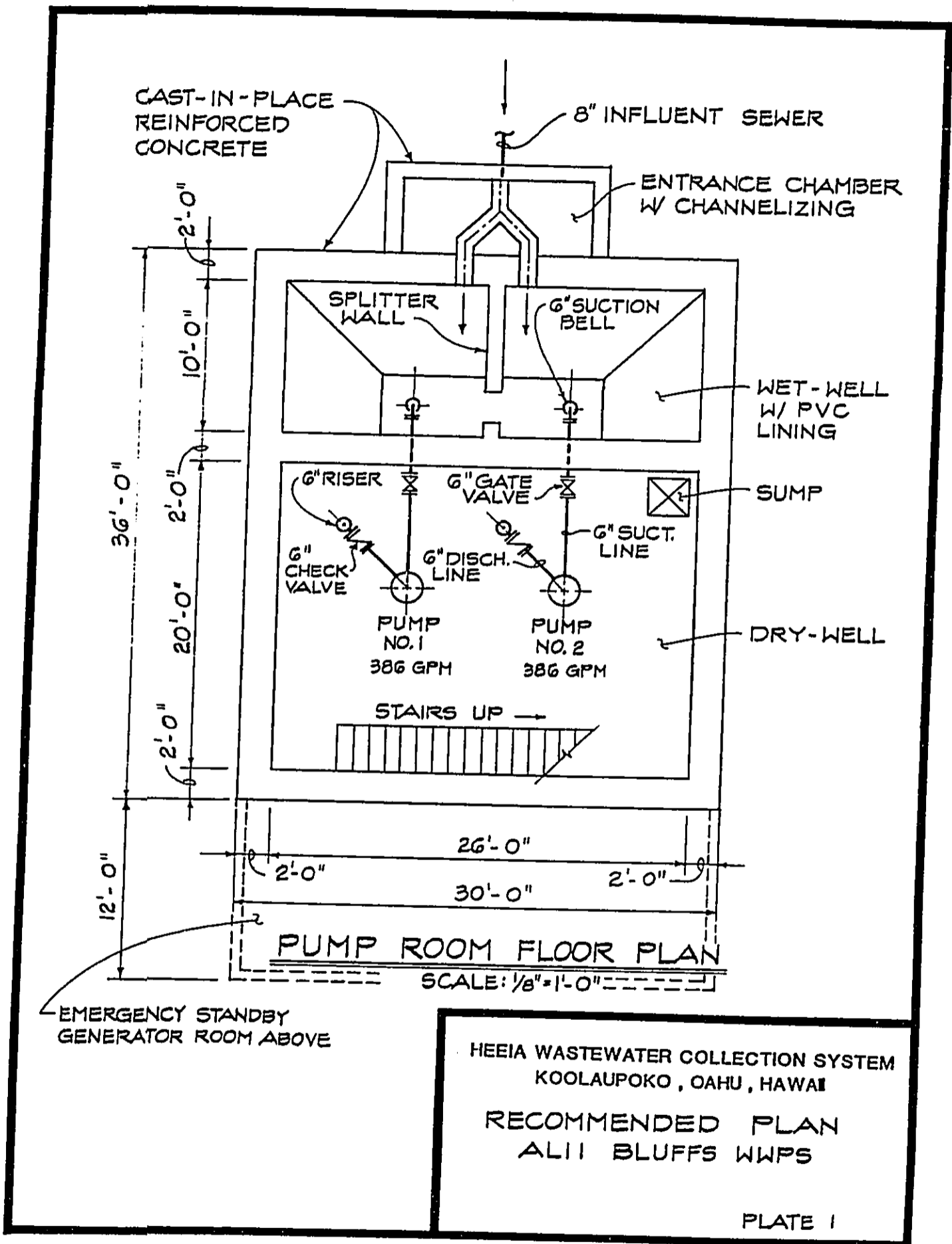
FACTOR	ESTIMATED PRESENT-WORTH
I. CAPITAL COSTS	
Construction	\$ 3,994,000
Engineering	661,000
Land Acquisition and Easements	864,000
Administrative/Legal	<u>276,000</u>
SUB-TOTAL	\$5,795,000
II. OPERATION AND MAINTENANCE COSTS	
Labor	\$ 354,000
Replacement Parts and Supplies	315,000
Power (Electrical)	<u>98,000</u>
SUB-TOTAL	\$ 767,000
III. SALVAGE VALUE	
Land and Easements	\$ (864,000)
Structures	(1,024,000)
Equipment	<u>-0-</u>
SUB-TOTAL	<u>\$(1,888,000)</u>
TOTAL	\$ 4,674,000

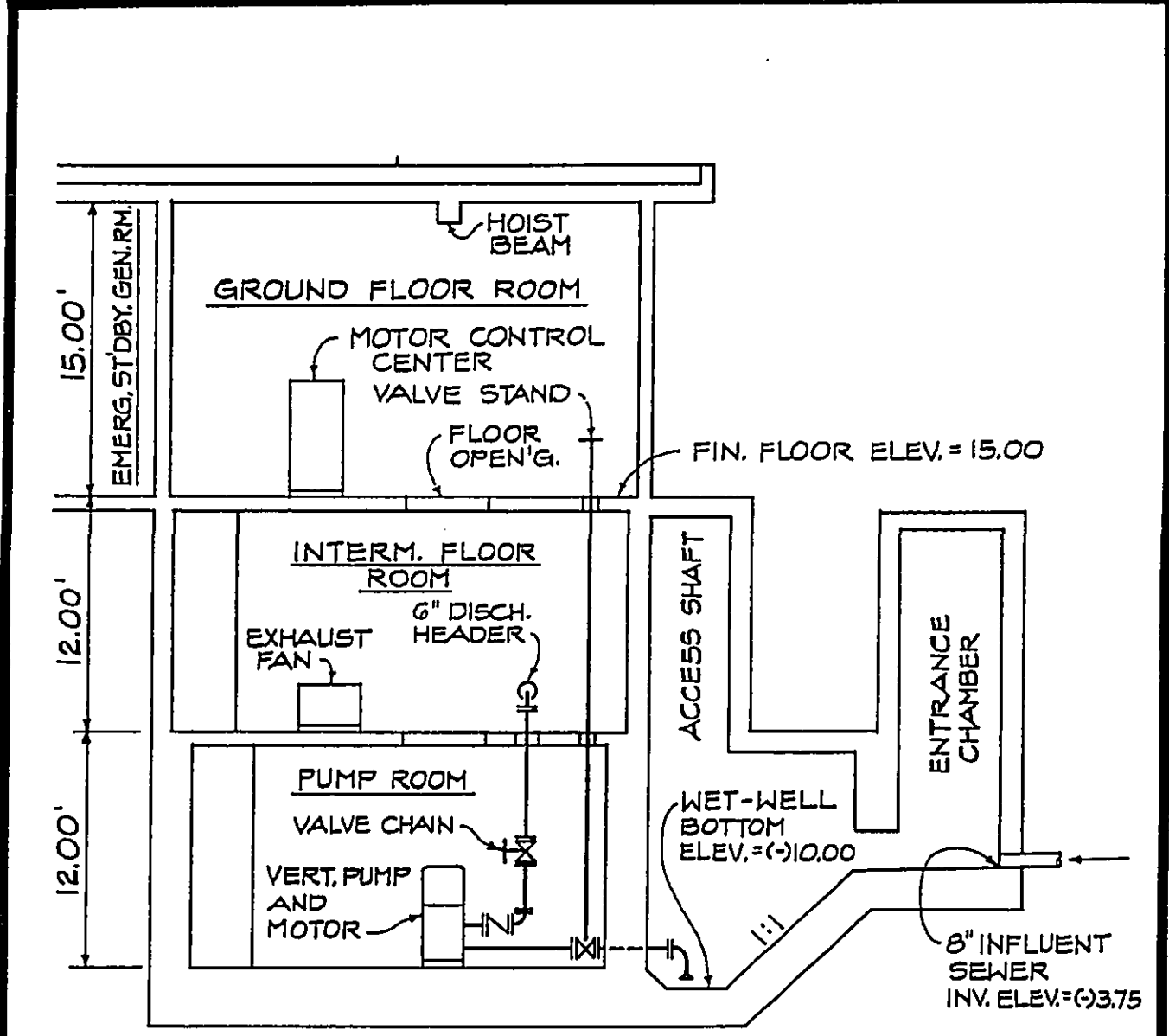
TABLE 4
COMPARISON OF ESTIMATED PRESENT-WORTH
MONETARY COSTS

DESCRIPTION	ESTIMATED PRESENT-WORTH
ALTERNATIVE I (One Pump Station)	\$ 4,794,000
ALTERNATIVE II (Two Pump Stations)	\$ 3,763,000
ALTERNATIVE III (Three Pump Stations)	\$ 4,674,000

APPENDIX C

PROPOSED WASTEWATER
PUMP STATION SITE PLANS



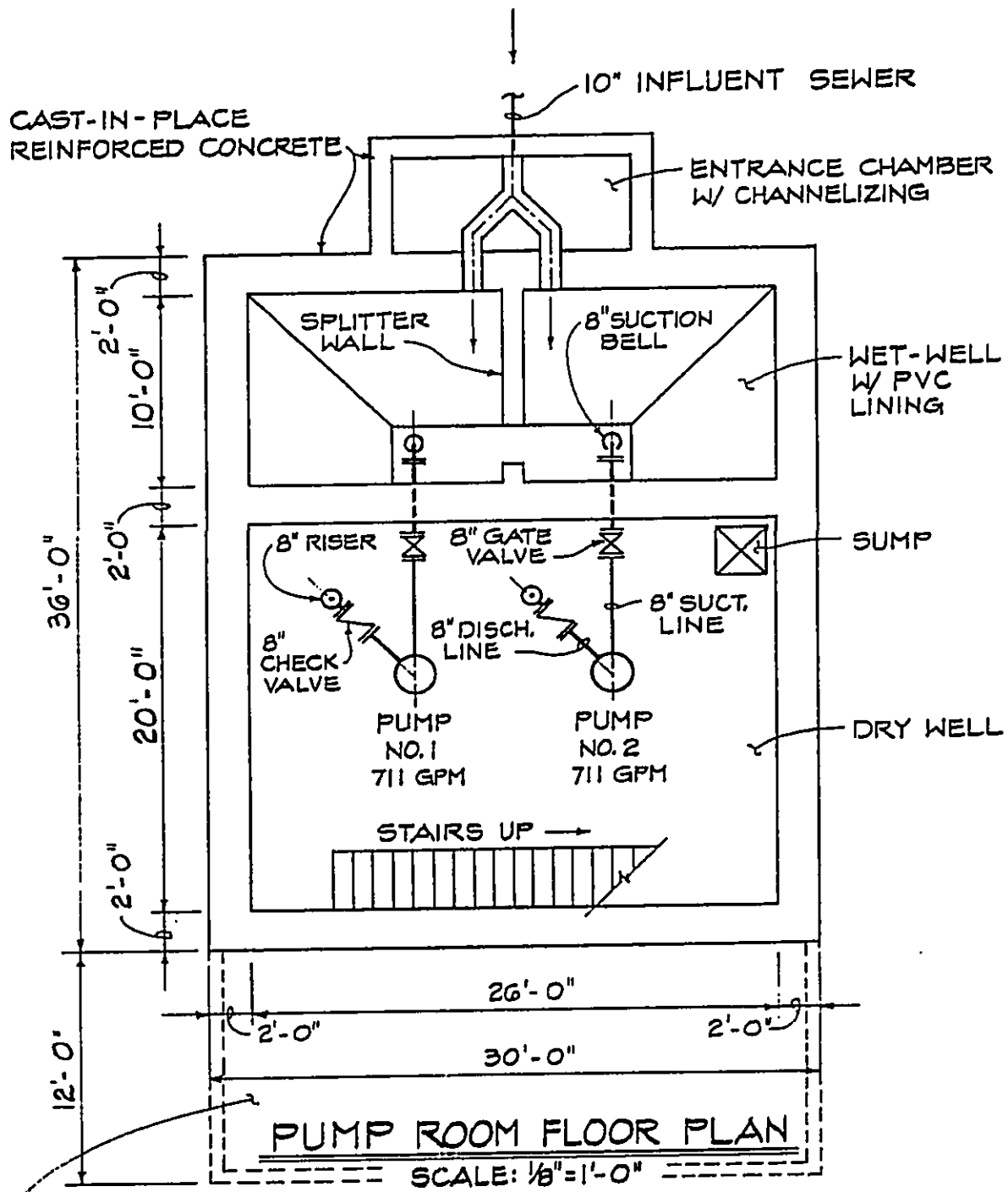


PUMP STATION SECTION
 SCALE: 1/8" = 1'-0"

HEEIA WASTEWATER COLLECTION SYSTEM
 KOOLAUPOKO, OAHU, HAWAII

RECOMMENDED PLAN
 ALII BLUFFS WWPS

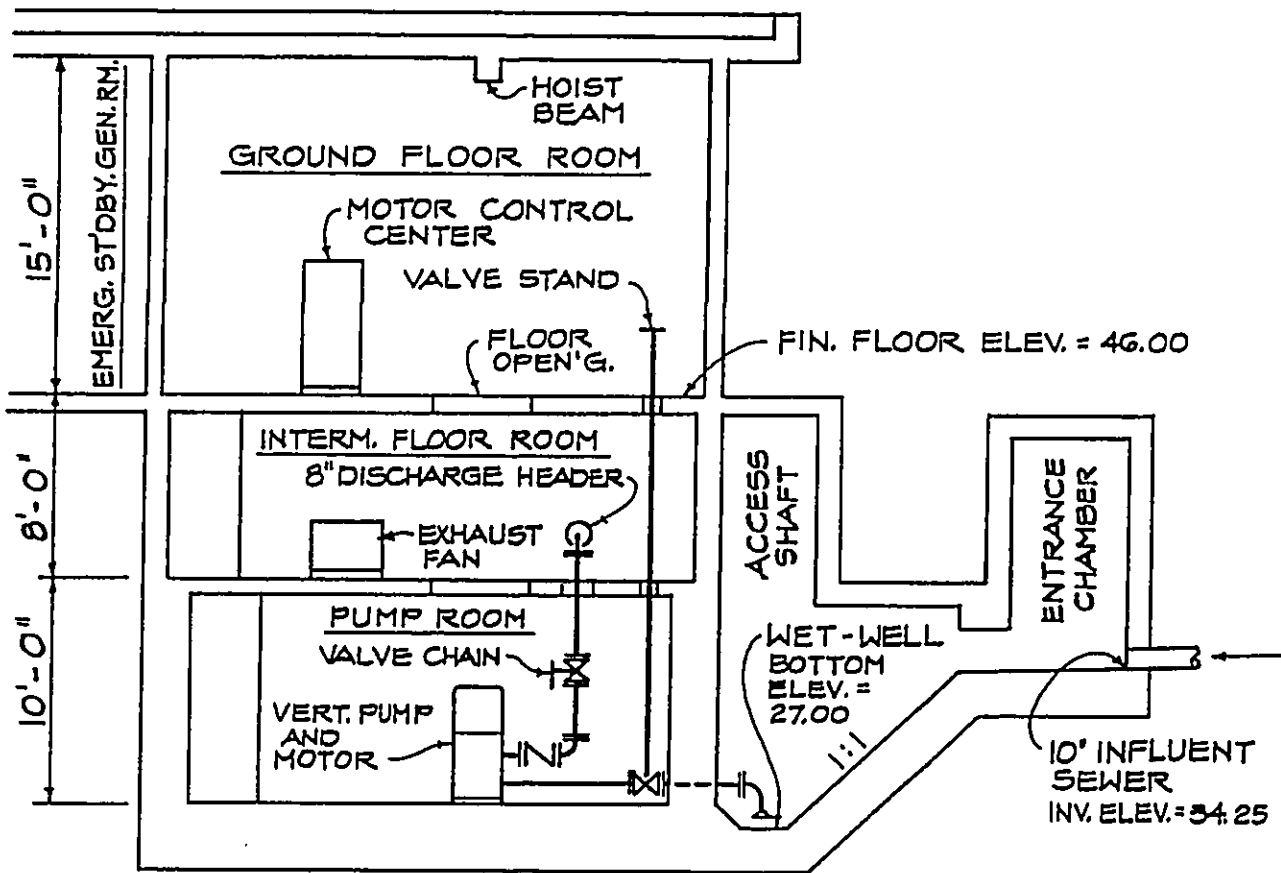
PLATE 2



EMERGENCY STANDBY GENERATOR ROOM ABOVE

HEEIA WASTEWATER COLLECTION SYSTEM
 KOOLAUPOKO, OAHU, HAWAII
RECOMMENDED PLAN
 PUNAWAI WWPS

PLATE 3



PUMP STATION SECTION
 SCALE: 1/8" = 1'-0"

HEEIA WASTEWATER COLLECTION SYSTEM
 KOOLAUPOKO, OAHU, HAWAII

RECOMMENDED PLAN
 PUNAWAI WWPS

PLATE 4

APPENDIX D
CONSULTATION PERIOD
COMMENTS AND RESPONSES



Oceanic
Waste Water Treatment Systems, Inc.
2525 Kamehame Street • Honolulu, Hawaii 96819-2021 • Telephone: (808) 836-2888

Geoeco, Inc.
1111 Kalia Road, Suite 100
Honolulu, HI 96813
Tel: 331-7890

515 Kamehame Street
PO Box 3379 Honolulu, Hawaii 96842
Telephone: (808) 543-3333 Telex: (877) 7432222

ENVL
90-254
Ltr 5-8-90

Ltr 5-8-90
ENVL

May 8, 1990

Department of Public Works
City and County of Honolulu
650 South King Street
Honolulu, HI 96813

May 8, 1990

City and County of Honolulu
Department of Public Works
650 South King Street
Honolulu, Hawaii 96813

Attention: Mr. Sam Callejo
Director and Chief Engineer

Subject: Draft Environmental Assessment for He'eia
Wastewater Collection System
Ma'ala-Koalaunoko, Oahu, Hawaii

Attention: Mr. Sam Callejo
Director and Chief Engineer

Dear Mr. Callejo:

Gentlemen:

Concerning your letter of April 30, 1990 (WPW-90-255), Oceanic should not be affected by this project. Our facilities within the project scope are aerial along Kam Hwy., and in leased Hawaiian Telephone conduits and according to the drawings furnished, does not appear to be affected.

Subject: Draft Environmental Assessment for He'eia
Wastewater Collection Systems

In response to your letter WPW 90-254 dated April 30, 1990, it has been determined that the proposed project is currently clear of gas utility facilities. We have no comments on the subject project.

Should there be any questions regarding our facilities, I can be reached at 834-4145.

Thank you for your consideration in providing us the opportunity to review the draft environmental assessment.

Sincerely,

Don Camacho

Don Camacho
Director of Administration

DC:bs

Very truly yours,

Edwin N. Sava

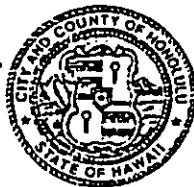
Edwin N. Sava
Manager, Engineering

ENS:dlc

DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU

DEPT. OF PUBLIC WORKS
1650 SOUTH KING STREET
HONOLULU, HAWAII 96813

MAY 10 10 22 AM '90



*WWM
90-2306*

FRANK F. FASI
MAYOR

WALTER M. OZAWA
DIRECTOR

HIROAKI MORITA
DEPUTY DIRECTOR

May 9, 1990

TO: SAM CALLEJO, DIRECTOR AND CHIEF ENGINEER
DEPARTMENT OF PUBLIC WORKS

FROM: WALTER M. OZAWA, DIRECTOR

SUBJECT: DRAFT EA FOR HE'EIA WASTEWATER COLLECTION SYSTEM

Proposed wastewater collection improvements will not affect any property under the jurisdiction of the Department of Parks and Recreation. Based on your consultant's Environmental Assessment, a Negative Declaration appears justified.

Walter M. Ozawa
WALTER M. OZAWA, Director
K

WMO:11

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
130 SOUTH BERETAMA STREET
HONOLULU, HAWAII 96813



FRANK F. ASH, Mayor
DONNA E. GOIN, Chairman
SISTER M. MARY ANN CHICK, O.S.F.
SAM CALLEJO
EDWARD T. HARTZ
WALTERO WATSON, JR.
MAURICE H. YAMASATO
KAZU HAYASHIDA
Manager and Chief Engineer

May 11, 1990

527-6138
527-6138

TO: SAM CALLEJO, DIRECTOR AND CHIEF ENGINEER
DEPARTMENT OF PUBLIC WORKS

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

SUBJECT: YOUR MEMORANDUM OF APRIL 30, 1990 REGARDING THE DRAFT
ENVIRONMENTAL ASSESSMENT FOR HEIEA WASTEWATER
COLLECTION SYSTEM, HEIEA, KOOLAUPOKO, OAHU, HAWAII

We have no objections to the proposed project. We request that the construction plans be submitted to us for our review and approval to assure the protection of our mains in the area.

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

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
480 SOUTH KING STREET
HONOLULU, HAWAII 96813



SAM CALLEJO
DIRECTOR AND CHIEF ENGINEER
C. MICHAEL STREET
DEPUTY DIRECTOR

In reply refer to:
WPP 90-444

July 31, 1990

MEMORANDUM

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

FROM: SAM CALLEJO, DIRECTOR AND CHIEF ENGINEER
DEPARTMENT OF PUBLIC WORKS

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT
HEIEA WASTEWATER COLLECTION SYSTEM
HEIEA, KOOLAUPOKO, OAHU, HAWAII

Thank you for your review and comments on the subject Assessment. We will submit construction plans to your Engineering Branch for review and approval prior to construction. If you have any questions, please call Richard Leong of my staff at 527-5863.

R. Leong
SAM CALLEJO
Director and Chief Engineer

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



FRANK P. EASE
 1988

BENJAMIN B. LEE
 Chief Planning Officer
 DEPARTMENT OF GENERAL PLANNING



SAM CALLEJO
 Director and Chief Engineer
 210 MICHAEL STREET
 DEPARTMENT OF PUBLIC WORKS

101 11 0 20 11 90

Let's go with this

May 17, 1990

HM 5/90-1406

July 31, 1990

In reply refer to
 WPP 90-445

MEMORANDUM

TO: SAM CALLEJO, DIRECTOR AND CHIEF ENGINEER
 DEPARTMENT OF PUBLIC WORKS

FROM: ROLAND D. LIBBY, JR., ACTING CHIEF PLANNING OFFICER
 DEPARTMENT OF GENERAL PLANNING

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR HE'EIA WASTEWATER COLLECTION SYSTEM, HE'EIA, KOOLAUPOKO, OAHU, HAWAII

We are fully supportive of the intent of the project to improve the wastewater system in the He'eia area.

The planned project is conceptually consistent with the Koolaupoko Development Plan Public Facilities Map. The assessment is correct in indicating that an amendment to the Development Plan Public Facilities Map will be necessary if the alternative selected is not that which is presently shown on the Public Facilities Map.

While the assessment is generally adequate, it may be necessary to provide further details as to accommodation of the tributary area situated north of the He'eia "long bridge." As you may know, this area is the subject of a Land Use amendment in the 1990 Annual Amendment Review which would relocate a planned residential area and establish a substantial golf and recreational complex. Aside from clarification of this issue, we have no objections to the filing of a Negative Declaration for the project.

Thank you for the opportunity to comment on this matter.

R. D. Libby, Jr.
 ROLAND D. LIBBY, JR.
 Acting Chief Planning Officer

RDL:lh

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
 190 SOUTH KING STREET
 HONOLULU, HAWAII 96813

FRANK P. EASE
 1988



SAM CALLEJO
 Director and Chief Engineer
 210 MICHAEL STREET
 DEPARTMENT OF PUBLIC WORKS

MEMORANDUM

TO: MR. BENJAMIN B. LEE, CHIEF PLANNING OFFICER
 DEPARTMENT OF GENERAL PLANNING

FROM: SAM CALLEJO, DIRECTOR AND CHIEF ENGINEER
 DEPARTMENT OF PUBLIC WORKS

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT HE'EIA WASTEWATER COLLECTION SYSTEM (REFERENCE: HM 5/90-1406)

Thank you for your review and comments on the subject Assessment.

Alternative II has been selected for implementation. We will be requesting an update to the Koolaupoko Development Plan Public Facilities Map to place the selected alignment on the Public Facilities Map.

Our plans to accommodate wastewater flow from the 14-acre sub-tributary area were developed independently of wastewater plans prepared by the developer of the planned Maluani Sports Complex. We understand that they plan to collect and treat project generated wastewater with an on-site Wastewater treatment plant. Treated effluent would then be used for irrigation purposes. Approval of this plan must be obtained from the State Department of Health.

This project will not extend collection lines to service the 14-acre area. Rather, we are only providing additional capacity at the proposed Alif Bluffs Wastewater Pump Station to accommodate flows from the existing unsewered, but residential zoned area. The estimated design average wastewater flow (52,000 gpd) is based on a design equivalent population of 453 persons (112 dwelling units) for the 14-acre area.

If you have any questions, please call Richard Leong of my staff at 527-5863.

S. Callejo
 SAM CALLEJO
 Director and Chief Engineer

DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
 830 SOUTH KING STREET
 HONOLULU, HAWAII 96813



*ENVY
 6/17/90
 90-243*

FRANK FARR
 DIRECTOR

May 17, 1990

MEMORANDUM

TO: SAM CALLEJO, DIRECTOR AND CHIEF ENGINEER
 DEPARTMENT OF PUBLIC WORKS

FROM: DONALD A. CLEGG, DIRECTOR

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR HE'EIA WASTEWATER
 COLLECTION SYSTEM, HE'EIA, KOOLAUPOKO, OAHU, HAWAII

We have reviewed the EA and have the following comments:

1. The EA should state the relationship between the "Design Equivalent Population" and the number of dwelling units to be serviced in each sub-tributary area. With regard to Table 1, how many units does the system now serve, and how many units are represented by the population figures given? What assumptions have entered these calculations?
2. The EA should include a map of the additional 14-acre sub-tributary area mentioned on page 13. It should also state the design equivalent population and dwelling units assumed for this area. How do these planning assumptions relate to the proposed Malulani Sports Complex at Keela Kea, as described in the Environmental Impact Statement Preparation Notice for that project?
3. We concur with the selection of Alternative II. Alternative I has greater potential impact on wetlands and archaeological resources and could require a Federal Section 404 permit.
4. Construction of any of the alternatives would require a Special Management Area Use Permit (SMP).

Thank you for the opportunity to comment. If you have any questions, please contact Mr. Robin Foster of our staff at 527-5027.

Donald A. Clegg
 DONALD A. CLEGG
 Director of Land Utilization

DAC:sj
 0332H/32

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
 830 SOUTH KING STREET
 HONOLULU, HAWAII 96813



FRANK FARR
 DIRECTOR

July 31, 1990

MEMORANDUM

TO: MR. DONALD A. CLEGG, DIRECTOR
 DEPARTMENT OF LAND UTILIZATION

FROM: SAM CALLEJO, DIRECTOR AND CHIEF ENGINEER
 DEPARTMENT OF PUBLIC WORKS

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT
 HE'EIA WASTEWATER COLLECTION SYSTEM
 (REFERENCE: LUS/90-3019(RP))

Thank you for your review and comments on the subject Assessment. We offer the following in response to your concerns:

1. Design Equivalent Population is an estimate of the population served (or to be served) by an existing (or proposed) wastewater collection system. It is calculated by multiplying residential density standards by the number of dwelling units served by a wastewater system. Densities used by the Division of Wastewater Management are 4.0 persons per unit for residential dwellings and 2.8 persons per unit for apartments.
 The design equivalent population for the Heeia Wastewater Collection System is 3,041 persons based on a count of 783 existing dwelling units (507 residential, 76 apartments) in the tributary area. Design Equivalent Population and other wastewater engineering variables are used to determine wastewater pipe and pump sizes for the system.
 The design equivalent population and number of dwelling units for the 14-acre sub-tributary area is calculated at 453 persons and 112 dwellings respectively. Density is assumed at 8 units per acre based on the existing R-5 zoning for the area. These assumptions were developed independently of wastewater plans the developer of the Malulani Sports Complex may have prepared. We understand the the developer is proposing to collect and treat wastewater generated by the project with an on-site wastewater treatment plant. This project will not extend collection lines to service the 14-acre area.
- 2.

Mr. Donald A. Clegg

- 2 -

July 31, 1950

Rather, we are only providing additional capacity at the proposed Allii Bluffs Wastewater Pump Station to accommodate flows from the existing unsewered, but residential zoned area.

3. Thank you for confirming the need to obtain a Special Management Area Use Permit (SMA).

If you have any questions, please call Richard Laong of my staff at 527-5863.

J. C. Callejo
J. C. CALLEJO
Director and Chief Engineer

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
 440 SOUTH KING STREET
 HONOLULU, HAWAII 96813

SAM CALLEJO
 DIRECTOR AND CHIEF ENGINEER
 C. MICHAEL STREET
 DEPT. DIRECTOR



In reply refer to:
 app 90-443

July 31, 1990

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
 HONOLULU MUNICIPAL BUILDING
 510 SOUTH KING STREET
 HONOLULU, HAWAII 96813

ALFRED J. THIEDE
 DIRECTOR
 JOSEPH W. WAGLAND, JR.
 DEPT. DIRECTOR



TE-2394
 PL90.1.147

May 18, 1990

MEMORANDUM

TO: MR. ALFRED J. THIEDE, DIRECTOR
 DEPARTMENT OF TRANSPORTATION SERVICES

FROM: SAM CALLEJO, DIRECTOR AND CHIEF ENGINEER
 DEPARTMENT OF PUBLIC WORKS

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT
 HEEHA WASTEWATER COLLECTION SYSTEM
 HEEHA, KOOLAUPONO, OAHU, HAWAII

Thank you for your review and comments on the subject Assessment. We have revised the Assessment to indicate that construction work within road rights-of-way will be limited to non-peak traffic hours between 8:30 a.m. to 3:30 p.m., Monday thru Friday (page 66, item 1. (f)). In addition, we will note that all work on Kamehameha Highway will be coordinated with the Department of Transportation Services, City and County of Honolulu rather than the State Department of Transportation.

If you have any questions, please call Richard Leong of my staff at 527-5863.

[Signature]
 SAM CALLEJO
 Director and Chief Engineer

MEMORANDUM

TO: SAM CALLEJO, DIRECTOR AND CHIEF ENGINEER
 DEPARTMENT OF PUBLIC WORKS

FROM: ALFRED J. THIEDE, DIRECTOR

SUBJECT: HEEHA WASTEWATER COLLECTION SYSTEM
 DRAFT ENVIRONMENTAL ASSESSMENT
 TMK: 4-6-04, 07, 08, 16, 18-20, 22, 23

This is in response to your memorandum of April 30, 1990 requesting our review on the above project.

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

1. On page 66, item 1(f), "8:00 a.m." should be changed to "8:30 a.m."
2. Kamehameha Highway in this vicinity is under the jurisdiction of the City and County of Honolulu.

Should you have any questions, please contact Wayne Nakamoto of my staff at 523-4190.

[Signature]
 ALFRED J. THIEDE

JOHN WARREN
DIRECTOR



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
808 KUAHOLOA STREET
HONOLULU, HAWAII 96813
May 18, 1990

EDWARD Y. HIRATA
DIRECTOR
DEPT. DIRECTOR
DAN T. KOOP (PHILADIN)
RONALD R. HANAU
JENNIE K. SCHULTZ
CALVINIA TSUBO

IN REPLY REFER TO:
HWY-PS
2.1872

LOG 2-06 WMM

GTE Hawaiian Tel

Beyond the call

GTE Hawaiian Telephone Company Incorporated
905 South Street, Honolulu, HI 96813 • (808) 548-5111

May 22 2 13 PM '90

May 18, 1990

Log 2-06 WMM

Mr. Sam Callejo
Director and Chief Engineer
Department of Public Works
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Callejo:

Draft Environmental Assessment for He'eia Wastewater Collection System Improvements, He'eia, Oahu
TRK: 4-6-84, 07, 08, 16, 18-20, 22, and 33

Thank you for your letter of April 30, 1990, requesting our comments on the subject draft Environmental Assessment.

We have no objection to the proposed improvements for He'eia Wastewater Collection System.

Very truly yours,

Edward Y. Hirata
Edward Y. Hirata
Director of Transportation

Mr. Sam Callejo, Director and Chief Engineer
Department of Public Works
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Callejo:

Draft Environmental Assessment for
He'eia Wastewater Collection System
He'eia, Koolaupoko, Oahu, Hawaii

In response to your memo of April 30, 1990, the same subject as above, we have reviewed the Draft Environmental Assessment for He'eia Wastewater Collection System, and have no substantive comments to offer at this time.

Thank you very much for an opportunity to review the draft impact assessment. Should you have any question, please contact Mr. Lester Kodama, Supervising Engineer, at 834-6262.

Sincerely,

Walter H. Matsumoto
Walter H. Matsumoto
Operations Manager
OSP Engineering

6x Div 11/28/90
Sam Callejo
me to
John
John

May 20, 1990

Mr. Sam Callejo, Director and Chief Engineer
 Department of Public Works
 City and County of Honolulu
 650 S. King Street
 Honolulu, Hawaii 96813

Dear Mr. Callejo:

I received your letter dated April 30, 1990 and the Draft Environmental Assessment for He'eia Wastewater Collection System. As a matter of record, I actually received them May 10 in the afternoon which gives me just 11 days to respond. It is much too short a time to read, understand, digest, analyze and respond to your 90 page book.

My suggestion is for you to send a representative to explain the issue to the Kaneohe and Kahaluu Neighborhood Boards at their meetings in June. This will give all the interested and concerned people a better chance to understand and comment on this issue.

Sincerely,
Josephine Patacsil

- cc: Representative Henry Peters
 Senator Mike McCartney
 Representative Terrance Tom
 Mr. Ray Sweeney
 Ms. Lola Hensch
 Ms. Marion Kelly
 Dr. Krish Kumar
 Mr. Jim Schwenker
 Ms. Carole McLean
 Mr. Tom Tomita

J. Patacsil
 P. O. Box 478
 Kaneohe, Hawaii 96744

DEPARTMENT OF PUBLIC WORKS
 CITY AND COUNTY OF HONOLULU

645 SOUTH KING STREET
 HONOLULU, HAWAII 96813



SAM CALLEJO
 DIRECTOR AND CHIEF ENGINEER
 C. MICHAEL STREET
 SUITE 1100

In reply refer to:
 WPP 90-336

June 5, 1990

Mrs. Josephine Patacsil
 P.O. Box 478
 Kaneohe, Hawaii 96744
 Dear Mrs. Patacsil:

Subject: Draft Environmental Assessment for He'eia Wastewater Collection System
 He'eia, Koolaupoko, Oahu, Hawaii

Thank you for your letter of concern pertaining to the subject of the draft EA to you and Mr. Jim Schwenker on May 18, 1990 by Messrs. Uyema and Leong of my staff was satisfactory. As a result of your suggestion that a City representative brief the Kaneohe/Kahaluu Neighborhood Boards on the draft EA, please be advised that Mr. Leong has contacted both Mr. Ray Sweeney, Chairman, Kaneohe Neighborhood Board No. 30, and Dr. Ron Hales, Chairman, Kahaluu Neighborhood Board No. 29. Presently, we are waiting for their agenda to confirm the date, time and place for the briefing.

If you have any further questions on the subject, please call Mr. Richard Leong at 527-5863.

Very truly yours,

Sam Callejo
 SAM CALLEJO
 Director and Chief Engineer

- cc: Mr. Ray Sweeney
 Dr. Ron Hales
 Ms. C. McLean
 Senator Mike McCartney



DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFER, HAWAII 96858-5440

May 23, 1990

OPERATIONS DIVISION

Mr. Sam Callejo
Director and Chief Engineer
Department of Public Works
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Callejo:

In response to your April 30, 1990 request, we have reviewed the Draft Environmental Assessment (EA) for He'eia Wastewater Collection System, He'eia, Koolaupoko, Oahu, Hawaii, and offer the following comments:

a. It is our understanding that Alternative II, Figure 6, represents the City's proposed plan. The work does not involve any work in waters of the United States, including wetlands; therefore, a Department of the Army permit is not required.

b. If the proposal changes to one of the alternative routes, wetlands under Corps jurisdiction may be affected. Any revised plans should be re-coordinated with the Operations Division. My staff will be available to assist with any field verification of boundaries that may be required at that time.

Thank you for the opportunity to review the draft EA. If there are any questions on these comments, please contact Ruby Mizue at 438-9258.

Sincerely,

Stanley T. Arakaki
for STANLEY T. ARAKAKI
Chief, Operations Division

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
400 SOUTH KING STREET
HONOLULU, HAWAII 96813



SAM CALLEJO
DIRECTOR AND CHIEF ENGINEER
C. MICHAEL STREET
HONOLULU, HAWAII

In reply refer to:
YPP 90-442

July 31, 1990

Mr. Stanley T. Arakaki
Chief, Operations Division
Department of the Army
US Army Engineer District, Honolulu
Fort Shafter, Hawaii 96858-5440

Dear Mr. Arakaki:

Subject: Draft Environmental Assessment
He'eia Wastewater Collection System
He'eia, Koolaupoko, Oahu, Hawaii

Thank you for your review and comments on the subject Assessment. Alternative II has been selected as the desired alternative for providing permanent wastewater facilities for the sewage tributary area. Thank you for apprising us that a Department of the Army Permit is not required for Alternative II.

We will apprise you and your staff of any changes in the subject wastewater project that may affect wetlands under the Corps of Engineer's jurisdiction.

If you have any questions, please call Richard Lanna of my staff at 527-5863.

Very truly yours,

Sam Callejo
SAM CALLEJO
Director and Chief Engineer



KAHALU'U NEIGHBORHOOD BOARD NO. 29

(He'eia Kela/Kahala'u, Kaha'i'a, Wehe'e, Ke'eia, Wehe'e, Wehe'e, He'eia N. Kaha'i'a)

29 SET PROJECT - 41-100 WAIHEE ROAD - KAHALU'U, HAWAII 96744

"Let us not ever have an unhappy minority; rather, let us build a community consensus."

*90 copies
to be
given
to
the
community*

May 24, 1990

Mr. Sam Callejo
Director and Chief Engineer
Dept. of Public Works
City and County of Honolulu
650 S. King St.
Honolulu, HI. 96813

SUBJECT: DRAFT EA FOR HE'EIA WASTEWATER COLLECTION SYSTEM

Dear Mr. Callejo:

Thank you for providing us with a copy of the subject EA. Although He'eia Uli is technically out of our Board's area, we have always shared concerns about He'eia between Kaha'i'a and Kahala'u Neighborhood Boards. We did not have time to review the EA or list this project on our May agenda and, therefore, could not meet your comment deadline of May 21, 1990. We would, however, like to review and make comments about the project and will, therefore, be placing on the June agenda for discussion.

If possible, we would appreciate a brief presentation from the Department with regard to this project. The Environmental Assessment is presently being reviewed by our board.

Mahalo,

John Lewis Reppun
John Lewis Reppun, Chairman
Land Use & Planning Committee
Kaha'i'a Neighborhood Board #29
(239-5777)

per phone conversation with Mr. Richard Leong, 5-24-90, someone from our HB will attend Kaha'i'a briefing; HB #29 will review EA and submit comments as soon as possible. Please disregard request for separate presentation.



Oahu's Neighborhood Board System - Established 1977

KANEHOE NEIGHBORHOOD BOARD NO. 30

44 KANEHOE SATELLITE CITY HALL
44-024 SAAM HIGHWAY
KANEHOE, HAWAII 96744



**MINUTES OF REGULAR MEETING
KANEHOE REGIONAL LIBRARY
JUNE 21, 1990**

CALL TO ORDER: Chair Ray Sweeney called the meeting to order at 7:05 p.m.

ROLL CALL: Roll call was taken by Neighborhood Assistant Chiquita B. Travis, a quorum was present.

MEMBERS PRESENT: Peter Ahuja, Betty Jo Barris, Ken Ito, Bob Kenney, John Kanesa, Leonard Peters, Doris Resnick, Tomas Rosser, Ray Sweeney, Ed Taylor, Theodore Tallbot, Pauletta Tam, Dean Yoshida.

MEMBERS ABSENT: Ka'ua Meyer (excused), Robert Peppy (excused).

GUESTS: Capt. Lemmy Ryan (JMO WCS), George Fujita (Small Landowners), George and Rita Lauhana, Major Richard Fuji (HPO), Marya Veggie (Small Landowners), George Aho, Ed Aho (Department of Parks and Recreation), Michael Yamaguchi (C. Kono and Assoc.), Richard Leong (City and County Public Works), Lt. Lloyd Faulkner (HPO), Jo Paveselli, Gary K. Roberts, Phyllis Zerba (Small Landowners), Gertrude Zerba (Small Landowners), Sam Gilbert III (Small Landowners), Opene H. Wang (Small Landowners), Richard Ushijima (City and County Parks and Recreation), Capt. Dennis Yee (HFD), Gary Babour (DEED), Dawn Farn-Bessy, Keana Verdunbury, Zachery Laber (Mayor's Representative), Tom Wog (Councilmember Kahama Staff), Lorettita T. Schaller (Kona Council), Paul Chaney (Neighborhood Commissioner), Frances Wright, Kamehameha Meertens (Small Landowners), George Tubertus (Small Landowners), Fred B.H. Meertens (Small Landowners), Peter Savio (Small Landowners), Steve Holmes (Kailua Neighborhood Board), Rocky Kaluhiva, Penny K. Fernandez (Council Residents of Kailua-Halekuanui), Yolanda P. Peters (COWM), Diana S. Ota (COWM), Laverne Tokunaga (COWM), Betty Fernandez (COWM), Judy Tsutsui (COWM), and Chiquita B. Travis (Neighborhood Commission Office).

INFORMATIONAL SESSION:

- A. **HONOLULU POLICE DEPARTMENT (HPD)** - Lt. Lloyd Faulkner reported 350 various arrests made in the District. Since April, 93 persons have been arrested for Driving Under the Influence (DUI) and 48 arrested for burglaries in Kanehoe.
- B. **HONOLULU FIRE DEPARTMENT (HFD)** - Captain Dennis Yee reported that 28 alarms were received in May, none were major. While a new Kanehoe Fire Station is being built, Kanehoe HFD will be housed at the State Hospital.
- C. **KANEHOE MARINE CORPS AIR STATION (KMCAS)** - Captain L. Ryan reported the following:
 - KMC Air Station will extend its airfield operations during the next two weeks. They will be testing the capabilities of the airfield to support a large-scale air movement.

KANEHOE NEIGHBORHOOD BOARD NO. 30
MINUTES OF REGULAR MEETING
JUNE 21, 1990
PAGE 2

- A Family Fair is planned at Castle Medical Center and will be open to the public. Check your local newspaper for time and date.

Board members Kerney and Rewick arrived at 7:15 p.m.

At this time Chair Sweeney welcomed 8 1/2 lbs., Tess Akabale, daughter of Donna Rewick.

Board member Harris arrived at 7:16 p.m.

D. STATE LEGISLATURE:

Representative Terrance Tom - Chair Sweeney announced that Representative Tom was unable to attend tonight's meeting. Representative Tom reported that Governor John Waihee will be at his Community Meeting, Wednesday, June 27, 1990 at 7:00 p.m. in Room D-6 at Ben Parker Elementary School.

Senator Mike McCartney - Sweeney noted he will be arriving later this evening.

E. CITY ADMINISTRATION:

1. Department of Parks and Recreation - Ed King of the Kaneohe Recreation Complex asked that the Kaneohe Neighborhood Board support the Capital Improvement Projects for various parks in Kaneohe (Kapuwahala, Kaneohe Playground, Kapihulu and Kaneohe Recreation Center). A Master Plan is still in the planning process and will take about two years before the projects begin. Questions, answers and comments on Kaneohe District Park followed:

- The construction of the baseball field at Kaneohe District Park has begun.
- Drainage seems to be one of the problems at the field.
- Currently, the project is being delayed because the project has no specifications as yet.

2. Wastewater Management - Richard Leary, from the Wastewater Management Division of the Department of Public Works, informed the Board of Beala Wastewater Collection System project being proposed by the City and County of Honolulu. The project will provide permanent sewage facilities to replace the three existing temporary pump stations and force mains at Alii Bluffs and Puna-ai Stations and estimated to cost \$1.8 million.

Design plans for the project are expected to start this year, the city submitted a document to the Board on drafts of an Environmental Impact Assessment (EIA) to be presented to the Public.

According to Leary, the plans are to pump the effluent to the Kaneohe sewage plant for secondary treatment and then pumped through Mokepu outfall.

The Primary concern of the City is the health and safety of the public and of City employees maintaining these facilities.

KANEHOE NEIGHBORHOOD BOARD NO. 30
MINUTES OF REGULAR MEETING
JUNE 21, 1990
PAGE 3

Kemney moved and Aduja seconded that the Kaneohe Neighborhood Board supports the planning of Beala Wastewater Collection System Project. The motion carried unanimously.

COUNCILMEMBER DAVID KEBANU - Tom Woo, Councilmember Kabanui's Staff, reported the following:

- The application for a 24 unit cluster development has been approved by the Department of Land Utilization for Waikaliu Bayside Estates. An Environmental Impact Statement (EIS) has to be done for the project.
- The City Council will take action on the development before July 23, 1990.

Dean Yoshida questioned Woo on why certain projects need to have approval by the Board and others do not. A lengthy discussion followed. Sweeney suggested that Yoshida get information from the Department of Land Utilization and report back to the Board at the July meeting.

- A Street paving program for 1990-91 was discussed.

PUBLIC INPUT:

Loretta Schuler reported the following 1) the bench fronting Rowan Memorial Park's bus stop has not been replaced; 2) A platform was laid over a drainage ditch, that was being repaired in the Keapuka subdivision; and 3) Schuler received complaints from residents recommending that no left turn be made from Keapuka into Luluku Road and Kanehaha Highway, between 6:00 to 10:30 a.m. for safety reasons.

FILLING OF VACANCY IN SUBDISTRICT 7 AND 11, ONE SEAT EACH, NO CANDIDATES.

APPROVAL OF MAY 17, 1990 REGULAR MEETING MINUTES - The following corrections to the minutes are as follows:

Page 1, under MEMBERS PRESENT, delete names of John Kamea and Theodore Talbot, both were excused absent.

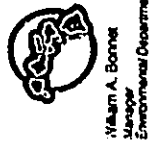
Page 3, first paragraph, after overruling, add during "5:00 - 5:30 p.m."

under PRESENTATIONS, seventh paragraph first sentence, after Rick Chan, delete (President) and add "Vice-Chair".

The minutes were approved as corrected.

FINANCIAL REPORT

	Operating Account	Central Account
Previous Balance	\$ 851.20	\$ - 0 -
Current expense	\$ 41.66	\$ - 0 -
Balance to-date	\$ 809.54	\$ - 0 -



William A. Bonnet
Manager
Environmental Department

FILED
MAY 31 1990
ENV 2-1
JA/G

Mr. Sam Callejo
May 31, 1990
Page 2

May 31, 1990

Mr. Sam Callejo
Director and Chief Engineer
Department of Public Works
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Callejo:

Subject: Draft Environmental Impact Statement (EIS) for He'eia
Wastewater Collection System, He'eia, Koolauoko, Oahu,
Hawaii

We have reviewed the subject EIS and have several comments. HECO has existing overhead and underground facilities within the proposed limits of construction. As a result, we recommend that the following HECO notes be included as part of the final construction plans:

1. The Contractor is to exercise extreme caution when the excavation and construction crosses or is in close proximity to HECO's facilities.
2. The Contractor is to comply with the directions of the State of Hawaii Occupational Safety and Health Law (DOSH).
3. When excavation is adjacent to or under existing facilities, the Contractor is responsible for properly sheeting and bracing the excavation and stabilizing the existing ground to render it safe and secure from possible slides, cave-ins, and settlement, and for properly supporting existing facilities with beams, struts or underpinning to fully protect these from damages.
4. Should it become necessary, any work required to relocate HECO facilities shall be done by HECO. The Contractor shall be responsible for all costs and coordination.

An HEC Company

5. The Contractor shall be liable for any damages to HECO's facilities.

6. The Contractor shall report any damages to HECO's Trouble Dispatch at phone number 543-7874.

Sincerely,



DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

610 SOUTH KING STREET
HONOLULU, HAWAII 96813



FRANK P. FAH
CLERK

SAM CALLEJO
DIRECTOR AND CHIEF ENGINEER
C. MICHAEL STRAY
DEPUTY DIRECTOR

In reply refer to:
WPP 90-441

July 31, 1990

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

Dear Mr. Bonnet:


Subject: Draft Environmental Assessment
Heia Wastewater Collection System
Heia, Koolauoko, Oahu, Hawaii

Thank you for your review and comments on the subject Assessment.

We will include the HECO notes you provided as part of the final construction plans. We will also submit construction plans to HECO's Engineering Department for review and approval prior to construction.

If you have any questions, please call Richard Leong of my staff at 537-5863.

Very truly yours,


SAM CALLEJO
Director and Chief Engineer

JOHN WILLIAMS
DIRECTOR OF WORKS



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

RECEIVED
DEPT. OF LAND AND NATURAL RESOURCES

JUN 17 11 48 AM '90
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE OF HAWAII
P. O. BOX 621
HONOLULU, HAWAII 96809

HONOLULU RETURN NAME

REF:OCEA-CT

Honorable Sam Callejo
Director and Chief Engineer
Department of Public Works
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Callejo:

SUBJECT: Draft Environmental Assessment for Heeia Wastewater
Collection System Heeia, Koolauapoko, Oahu, Hawaii

Thank you for giving our Department the opportunity to comment on
this matter. We have reviewed the materials you submitted and have
the following comments.

The Environmental Assessment (EA) was well done and allayed
concerns about the possible impact of the project in this
environmentally sensitive area. Heeia Stream is too distant to be
affected. Heeia Marsh will not be used as a dumping site for waste
materials from the project. The real long term environmental
benefits far outweigh the minimal risks. From the aquatic
resources standpoint, we have no objection to the proposal.

Additionally, our Historic Preservation Program is unable to review
this EA adequately. They have yet to receive the archaeological
inventory survey report that was referenced in Section 3 (i). As
such, they recommend no action be taken on the proposed project
until we review and approve the archaeological inventory survey.

If you have any questions, please call me or Cathy Tilton at our
Office of Conservation and Environmental Affairs at 548-7837.

Very truly yours,

William W. Paty
WILLIAM W. PATY,
Director and Chief Engineer

cc: Historic Preservation Program, DAR

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96809



SAM CALLEJO
DIRECTOR AND CHIEF ENGINEER
C. MICHAEL STREET
SECURITY BUILDING

In reply refer to:
APP 90-378

June 25, 1990

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

Dear Mr. Paty:

Subject: Draft Environmental Assessment (EA) for
Heeia Wastewater Collection System
Heeia, Koolauapoko, Oahu, Hawaii

Thank you for your review and comments on the subject assessment.
You indicate that your Historic Preservation Program is unable to
review the Assessment adequately since they have not received the
archaeological inventory survey report associated with this EA.

A copy of the Archaeological Reconnaissance Survey and Literature
Search for the Proposed Improvements to a Portion of the Heeia
Wastewater Collection System: Heeia, Koolauapoko, Oahu, and a
Biological Reconnaissance Survey and Environmental Assessment for
the Heeia Wastewater Collection System, Heeia, Oahu, are enclosed
as requested.

We would appreciate your review and comment of the subject
assessment as it may affect the Archaeological and Biological
aspects of this project by July 16, 1990. The information we
have obtained indicates that the project does not have any
significant impacts and a Negative Declaration will be filed.

If you should have any questions, please contact Richard Leong at
577-5863.

Very truly yours,

Sam Callejo
SAM CALLEJO
Director and Chief Engineer

Attachments

JOHN HARRIS
DIRECTOR OF LAND

RECEIVED

AUG 15 PM 4 19

9524W WWH
90
WILLIAM W. PATY, CHAIRMAN
BOARD OF LAND AND NATURAL RESOURCES



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

P. O. BOX 421
HONOLULU, HAWAII 96813

REP:OCEA:JN

ADMINISTRATIVE SERVICES
PLANNING AND DEVELOPMENT
AGRICULTURE
CONSERVATION AND RECREATION
CIVIL ENGINEERING
COMMUNITY DEVELOPMENT
CONSTRUCTION
ENERGY AND UTILITIES
ENVIRONMENTAL AFFAIRS
GENERAL INVESTIGATION
LAND MANAGEMENT
PLANNING AND DEVELOPMENT
PUBLIC AFFAIRS
RESEARCH AND ANALYSIS
SPECIAL SERVICES
STATE AND LOCAL DEVELOPMENT

FILE NO.: 90-830
DOC. NO.: 8876E

RECEIVED
DEPT. OF PUBLIC WORKS
AUG 15 8 05 AM '90

The Honorable Sam Callejo
Director and Chief Engineer
Department of Public Works
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Callejo:

Subject: Draft Environmental Assessment (EA) for Heaia Wastewater Collection System, "WPP 90-378" Heaia, Oahu

Thank you for giving our Department the opportunity to comment on this matter. We have reviewed the materials you submitted and have the following comments:

We have no objections to the preferred route but oppose the alternate route through the wetlands as being too disruptive to the ecosystem, possibly damaging endangered waterbird habitats.

However, as indicated to you by copy of Don Hibbard's letter to Dr. Hammett, dated July 20, 1990, Cultural Surveys of Hawaii submitted an additional letter clarifying that Alternative II was chosen for the pipeline (location under existing streets), and the upgrading of the pump stations will be done in deep fill areas with sheet piling (which prevents observation of stratigraphy). Given this information, although they found historic sites in Alternative I, there was no need to better inventory these sites and evaluate their significance, because Alternative I was no longer being considered as part of the project area.

Honorable Sam Callejo -2- Doc. No.: 8876E

With the project area being Alternative II and the fill areas of the existing pump stations, we agree that the project will likely have "no effect" on significant historic sites. We also agree that monitoring at the pump stations will be of no value, so no further archaeological work is needed. If the project areas change, then a new historic preservation review would have to occur.

Thank you again for your cooperation in this matter. Please feel free to call me, or Jay Lembeck at our Office of Conservation and Environmental Affairs (at 548-7837), if you have any questions.

Very truly yours,

William W. Paty

cc: DAR, DOFAW, DLM, DSP, HPP, DONALD



FRIENDS OF HEIEIA STATE PARK

POST OFFICE BOX 688
HAIEOHE, HAWAII 96744
TELEPHONE (808) 247-3155



STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 2175
HONOLULU, HAWAII 96811

City & County of Honolulu
Mr. Sam Callejo
Dept. of Public Works
650 S. King St.
Honolulu, Hawaii 96813

Dear Mr. Callejo:

I represent an organization called the Friends of Heieia. We are a non-profit conservation group. We teach children and all park visitors the value and necessity of conserving our precious natural resources.

We are most interested in your Environmental Assessment regarding the Heieia Wastewater Collection System. The report was brought to my attention by Mrs. Jo Palacsai, member and neighbor.

In your letter to Mrs. Palacsai, you indicated a May 21 deadline for response. This date is too soon for us to intelligently comment on the Environmental Assessment. I would like to suggest that a representative from your staff or the preparer explain the details of the system and answer questions at the regular meetings of the Kaneohe and Kahalaui Neighborhood Boards at their regular meetings in June. This would allow all interested community members a forum to gain a better understanding of your proposed system.

Your attention to this matter of community interest is greatly appreciated.

Sincerely,

Carole J. McLean
Executive Director

Educational & Cultural Programs • Heieia State Park located at 45-465 Kamehameha Highway, Kaneohe, Hawaii

Official Report
Approved by
Sam Callejo
Director

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

IN REPLY, PLEASE REFER TO
098

July 13, 1990

MEMORANDUM

To: Sam Callejo, Director & Chief Engineer
Department of Public Works
City & County of Honolulu

From: Deputy Director for Environmental Health

Subject: Draft Environmental Assessment for Heieia
Wastewater Collection System
Heieia, Koolauopoko, Oahu, Hawaii

The Department of Health appreciates the opportunity to review and comment on the subject project. The assessment makes a second presentation and analysis for the selection of Alternative II: Permanent All Bursts Wastewater Pump Station and Force Main; and New Punawai Wastewater Pump Station and Force Main (Two pump Stations).

Section 4 of the report addresses the relationship of the project to land use plans, policies and controls for the immediately affected area. In the absence of a master sewer plan for the greater windward side, the proposed design appears to be adequate.

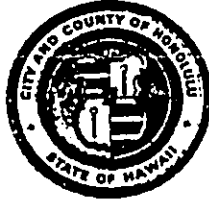
cc: Wastewater Branch

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

APPENDIX E
NEGATIVE DECLARATION
OF ENVIRONMENTAL IMPACT

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR



SAM CALLEJO
DIRECTOR AND CHIEF ENGINEER
C. MICHAEL STREET
DEPUTY DIRECTOR

In reply refer to:
WPP 90-462

August 13, 1990

Office of Environmental Quality Control
State of Hawaii
465 S. King Street, Room 104
Honolulu, Hawaii 96813

Attention: Mr. Abdul Salau

Gentlemen:

Subject: Heeia Wastewater Collection System
Heeia, Koolaupoko, Oahu, Hawaii
TMK 4-6-04: 07, 08, 16, 18, 19, 20, 22, 23

Pursuant to Chapter 343, HRS, the Department of Public Works, City and County of Honolulu is submitting a Notice of Negative Declaration for Heeia Wastewater Collection System (Alii Bluff WWPS and FM and Punawai WWPS and FM). The construction of the proposed project will involve the use of City land and funds. This notice of determination was based on findings reported in an Environmental Assessment prepared by Calvin Kim & Associates, Inc. and Gerald Park Urban Planner for the Division of Wastewater Management and after consulting with other government agencies, community organizations, and individuals. Four (4) copies of the Notice of Negative Declaration/Environmental Assessment are attached. The pertinent data for this notice are as follows:

1. Proposing Agency - Department of Public Works, City and County of Honolulu.
2. Proposed Action - The primary objective of the project is to enhance the health and safety of the public by providing permanent wastewater facilities to effectively handle existing and planned wastewater flows from the Heeia Tributary Area. Three temporary sewage pump stations and their respective force mains will be replaced by permanent wastewater facilities. Two new wastewater pump stations will be constructed on sites now occupied by the Crown Terrace SPS No. 2 at the end of Halaulani Street and the Alii Bluffs SPS adjacent to Kamehameha Highway near Heeia Bridge.

August 13, 1990

Land required for expansion at the existing pump station sites will be provided by the Bishop Estate. The new pump stations will be constructed on previously filled land and will not affect the adjacent Hee'ia Marsh. Alignment corridors for new force mains will be located within the right-of-way of Kamehameha Highway and Halaulani Street. The cost of the project is estimated at \$4,413,000.

Environmental impacts are primarily short-term relating to construction activities. Air quality, ambient noise levels, and traffic circulation along Kamehameha Highway and Halaulani Street may be affected during construction. Construction activities also may affect underground utilities. However, construction plans will be submitted for review by utility companies and coordination during construction with these companies will be required to minimize any utility disruptions.

The contractor will be required to mitigate impacts during construction by adhering to State and County regulations for controlling noise and dust, posting warning signs to alert motorists and pedestrians of roadwork, covering or barricading trenches during non-working hours, and posting safety devices (and signs) at all times.

The primary long-term impact will be the provision of adequate sewer capacity to accommodate existing and planned sewage flows within the Hee'ia Tributary Area.

3. Determination - After reviewing the Environmental Assessment prepared for the project and consulting with other government agencies, community organizations, and individuals, we have determined that the proposed project will not have a significant impact on the environment, and an Environmental Impact Statement is not required.
4. Reasons Supporting Determination - Reasons and conclusion supporting the determination are based on the following criteria. The proposed project will not:
 - destroy any archaeological, historical or cultural resources;
 - affect any rare or endangered flora or fauna species and its habitat;
 - conflict with the State's environmental policies and goals expressed in Chapter 344, HRS;
 - adversely affect the economic or social welfare of the community or state;
 - affect an environmentally sensitive area;
 - degrade environmental quality;
 - involve a commitment for a larger action.

Office of Environmental
Quality Control

- 3 -

August 13, 1990

5. Contact Person - Richard Leong
Division of Wastewater Management
Department of Public Works
Honolulu Municipal Building, 14th Floor
650 S. King Street
Honolulu, Hawaii 96813
Telephone No. 527-5863

Very truly yours,

C. Michael Street
for SAM CALLEJO
Director and Chief Engineer

Attach. (4 copies)

cc: Department of General Planning
Department of Land Utilization