

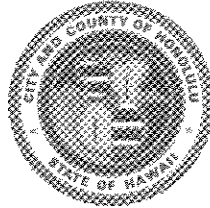
DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU

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JOHN P. WHALEN
DIRECTOR

BENJAMIN B. LEE
DEPUTY DIRECTOR

88/EIS-2(BWM)

OFC. OF ENVIRONMENTAL
QUALITY CONTROL

September 12, 1988

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

Dear Dr. Miura:

Final Supplemental Environmental Impact Statement (EIS)
Proposed Honouliuli Wastewater Treatment Plant (WWTP)
Unit 2; City and County of Honolulu
Department of Public Works
Tax Map Keys 9-1-12: 26; 9-1-13: 07

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

The Acceptance Report did not identify any unresolved issues. A copy of our Acceptance Report is attached.

If you have any questions, please contact Bennett Mark of our staff at 527-5038.

Very truly yours,

A handwritten signature in dark ink, appearing to read "John P. Whalen".

JOHN P. WHALEN
Director of Land Utilization

JPW:sl
0264N

attach.

cc: Alfred J. Thiede, DPW

September 12, 1988

ACCEPTANCE REPORT: PROPOSED HONOULIULI WASTEWATER TREATMENT
PLANT (WWTP), UNIT 2
CHAPTER 343, HRS
FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT
STATEMENT (EIS)
HONOULIULI, EWA, OAHU
CITY AND COUNTY OF HONOLULU
DEPARTMENT OF PUBLIC WORKS
TAX MAP KEYS: 9-1-12: 26; 9-1-13: 07

A. Background

The City and County of Honolulu, Department of Public Works (DPW) is proposing the construction of Unit 2 of the existing Honouliuli Wastewater Treatment Plant (WWTP) which will involve the expansion of the treatment capacity of the existing Honouliuli WWTP from 25 million gallons per day (mgd) to 51 mgd. The expansion will be constructed under one or more increments with the initial increment scheduled on or about the 1990 Fiscal Year of the current Capital Improvement Program (CIP) of the City and County.

The Honouliuli WWTP will continue to provide primary treatment under the provisions of Section 301(h) of the Clean Water Act of 1977 which allows waiver from secondary treatment requirements for deep ocean discharges. The 301(h) permit for the Honouliuli discharge is still pending, but approval from the United States Environmental Protection Agency (EPA) is anticipated in the 1988 Fiscal Year.

Unit 1 of the existing plant was designed on the basis of a secondary treatment facility in accordance with Section 301 (a)(1)(B) of the Federal Water Pollution Control Amendments of 1972. However, construction of the secondary treatment facilities was held in abeyance when the plant was found to be a qualified candidate for a 301(h) permit by EPA.

The present discharge of 21+ mgd meets applicable ambient water quality standards for West Mamala Bay according to a vigorous monitoring program which was started prior to the initial discharge date in 1981-82.

Increasing the treatment capacity of the plant will also increase the daily waste loads of biochemical oxygen demand (BOD₅) and suspended solids of domestic sewage into the receiving waters in West Mamala Bay. The present waste

loads (21 mgd) in the receiving waters are 19,616 pounds of BOD₅ and 12,435 pounds of suspended solids. If the first increment of Unit 2 is built by the year 2005, and the average daily flow approaches 38.0 mgd, the waste loads discharged in the receiving waters will be approximately 36,500 pounds of BOD₅ and 23,800 pounds of suspended solids.

There are presently no sources of toxic pollutants identified as priority toxic organic pollutants.

According to the Final Supplemental EIS, the discharge of primary effluent through a properly designed ocean disposal system does not impose an undue stress in the marine environment. Monitoring data have been collected at the existing Sand Island and Barbers Point outfall sewer to support the City and County application for a 301(h) permit; these data have confirmed that ambient water quality standards have been maintained, and that there is adequate protection for the propagation of a balanced indigenous population of shellfish, fish and wildlife. The discharge does not interfere with any recreational activities in the receiving waters.

The 301(h) permit is for a period of five years. If the conditions of the permit cannot be met or corrected when renewal of the permit is due, the City and County will be required to construct secondary treatment facilities. Part of the plant site is reserved for this purpose.

The first phase of Unit 2 has been designed to serve the wastewater disposal needs from a projected resident population of 269,400 by the year 2005 based on DBED "M-F" Series and DGP population projections by Development Plan areas. In addition to the resident population, which includes military facilities as well as their dependents, a visitor population of about 10,000 will be served. Total projected flows for the defacto population is 38 mgd.

If the plant is expanded to 51 mgd, the ultimate average daily design flow of the facility, it could accelerate developments and increase population in the tributary areas of the plant. The only additional process units which will be added are the standby units; these units will provide adequate redundancy in the event of outages due to routine maintenance or emergency repairs.

B. PROCEDURE

1. An EIS Preparation Notice (EISPN) was published in the "Office of Environmental Quality Control (OEQC) Bulletin" of August 8, 1987, under the Register of Chapter 343, HRS Documents. This Bulletin was distributed to Federal, State, and City and County agencies, as well as to interested community groups. Simultaneously, the DPW requested comments from forty-one (41) Federal, State, City and County, and private agencies.
2. The deadline for comments from consulted parties and requests to be a consulted party was set for September 8, 1987. Twenty-three (23) parties made replies to the EISPN. The DPW made responses to all substantive comments, and included these in the Final Supplemental EIS.
3. On March 18, 1988, the DPW submitted the Draft Supplemental EIS to the OEQC and the DLU, pursuant to the requirements of Chapter 343, HRS.
4. The announcement of the availability of the Draft Supplemental EIS was published in the March 23, 1988 "OEQC Bulletin". The deadline for public review was set for May 9, 1988.
5. Twenty-two (22) parties commented on the Draft Supplemental EIS before the deadline. The DPW made point-by-point responses to all substantive comments submitted before the deadline, and made changes to the text of the Final Supplemental EIS as appropriate. The DPW's letter responses to the comments are included in the appendix of the Final Supplemental EIS.
6. The Final Supplemental EIS was submitted to the OEQC and the DLU on July 1, 1988.

In conclusion, the DLU finds that the agency proposing the action complied with the EIS procedures in accordance with Chapter 200 of Title 11, EIS Rules, Sub-Chapter 7, Section 11-200-20, 21, and 22.

C. EIS Content

The Final Supplemental EIS consists of a single volume, containing the Supplemental EIS and an appendix. The

appendix contains the "Monitoring Program Off Barbers Point, Oahu," and the comments.

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

1. Section II.B., Proposed Action
 - a. The notation was deleted that a second multiple hearth incinerator would be added as part of Unit 2. This change was also noted in Section II.D.1.c., Proposed Plant Facilities.
 - b. A new Figure II-4a was added showing the location of ancillary facilities.
2. Section II.D.2., Social, Economic Characteristics
 - a. The description was expanded to indicate that the tributary areas of the WWTP were also in conformance with the City Development Plans.
3. Section III.G., Archaeological and Historic Sites
 - a. The State Department and Land and Natural Resources (DLNR) comments were incorporated into this section.
 - (1) References to familiar archaeological features were added, including those of sink holes containing remains of extinct avifaunal and evidence of occupational and agricultural uses.
 - (2) Specific site numbers of three historical sites were added.
4. Section V. A, Potential Impact at the Plant Site
 - a. The section describing the removal of suspended solids was revised.
 - (1) Estimates were added of the amount of suspended solids (sludge) produced when plant flows reach 38 mgd and 51 mgd.
 - (2) A discussion was added of the incinerator's efficiency for removal of the suspended solids.

(3) A description was added that the design of the existing incinerator (Unit 1) was based on secondary treatment which would produce twice as much sludge as primary treatment; the sludge of a 51 mgd primary plant is less than a 25 mgd secondary plant.

b. A notation was added that the statement in the Draft Supplemental EIS that another incinerator would have to be added was premature based on the current evaluation.

c. The section describing air quality of the incinerators was revised.

(1) A new section was added describing the federal and state standards for air particulate matter resulting from sludge incineration.

(2) The results of a 1983 sampling was added to demonstrate compliance with Federal and State air quality requirements on sludge incineration.

(3) A statement was added that the sludge incinerated from the 51 mgd primary plant will have considerably less air quality impact than would the 51 mgd secondary plant described in the 1975 FSEIS.

5. Section V. B.4., Impact on Water Quality

a. A section was added noting that almost all of the suspended solids discharged from the ocean disposal system remain in the water column and are eventually transported into the open ocean, and that only one percent of the suspended solids are deposited on the ocean floor near the diffuser.

6. Section V. B.7, Impact on Recreational Activities

a. This section was revised to clarify that State Department of Health (DOH) criteria for bathing in marine waters were recently adopted.

b. Data were added of a sampling taken in June 1987.

- c. A conclusion was added noting that the discharge was expected to meet the new DOH bathing criterion in the receiving waters.

7. Section V. G., Potential Energy Impact

- a. A notation was added that if secondary treatment becomes necessary, there may be adverse impacts to the City's operation and maintenance program unless sewer charges are increased. Increased sewer charges would have a financial impact on the community.

8. Section VI., Alternatives Considered for the Housing Project.

- a. A notation under the "no action alternative" was added that stated that no action would preclude housing opportunities in Ewa as proposed by State and City housing agencies.
- b. A new section was added explaining that the recommended alternative was to expand the capacity of the Honouliuli WWTP in two phases, first from 25 mgd to 38 mgd, then to 52 mgd.
- c. A new section was added explaining that if the plants' 301(h) permit (exempting the plant from secondary treatment) is renewed by EPA in 1988 and renewed at five-year intervals thereafter, the plant will continue to discharge primary effluent. If the 301(h) permit is not renewed, intermediate or secondary treatment units will be constructed.

D. Responses to Comments

The DPW made point-by-point responses to all significant environmental points raised before the deadline. These responses are reproduced in the appendix of the Final Supplemental EIS. The Final Supplemental EIS also contains changes to the text which were made in response to these comments. The Final Supplemental EIS therefore fulfills the public review requirement in accordance with Chapter 200 of Title 11, EIS Rules, Sub-Chapter 7, at Section 11-200-22.

E. Unresolved Issues

There were no unresolved issues identified in Section X of the Final Supplemental EIS.

F. Determination

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

APPROVED



JOHN P. WHALEN
Director of Land Utilization

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

FINAL
SUPPLEMENTAL
ENVIRONMENTAL IMPACT STATEMENT

FOR

THE PROPOSED HONOULIULI WWTP, UNIT 2

HONOULIULI, EWA, OAHU, HAWAII

TAX MAP KEYS: 9-1-12: 26, 9-1-13: 7

This environmental document was prepared
pursuant to Chapter 343, HRS.

Accepting Authority: Governor, State of Hawaii
Department of Land Utilization,
City and County of Honolulu

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

Responsible Official:

Alfred J. Thiede
ALFRED J. THIEDE
Director and Chief Engineer

June 14, 1988

Date

Prepared by
Chief Engineer's Office
Department of Public Works

QA
131C

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I. SUMMARY

A. Description of the Proposed Action

The proposed action involves the expansion of the treatment capacity of the existing Honouliuli wastewater treatment plant (WWTP) from 25 million gallon per day (mgd) to 51 mgd, the Unit 2 master plan capacity. The expansion will be constructed under one or more increments with the initial increment scheduled on or about the 1990 Fiscal Year of the current Capital Improvement Program (CIP) of the City and County.

The plant will continue to provide primary treatment under the provisions of Section 301(h) of the Clean Water Act of 1977 which allows waiver for deep marine discharges from secondary treatment requirements. The 301(h) permit for the Honouliuli discharge is still pending, but approval from the United States Environmental Protection Agency (EPA) is anticipated in the 1988 Fiscal Year.

Unit 1 of the existing plant was designed on the basis of a secondary treatment facility in accordance with Section 301(a)(1)(B) of the Federal Water Pollution Control Amendments of 1972. However, construction of the secondary treatment facilities was held in abeyance when the plant was found to be a qualified candidate for a 301(h) permit by EPA.

The present discharge of 21+ mgd meets applicable ambient water quality standards for West Mamala Bay according to a vigorous monitoring program which was started prior to the initial discharge date in 1981-82.

B. Significant Impacts and Proposed Mitigative Measures

Increasing the treatment capacity of the plant will also increase the daily waste loads of biochemical oxygen demand (BOD₅) and suspended solids of domestic sewage into the receiving waters in West Mamala Bay. The present waste loads (21 mgd) in the receiving waters are 19,616 pounds of BOD₅ and 12,435 pounds of suspended solids. By the year 2005, as the average daily flow approaches 38.0 mgd, the waste loads discharged in the receiving waters will be approximately 36,500 pounds of BOD₅ and 23,800 pounds of suspended solids.

There are presently no sources of toxic pollutants identified as priority toxic organic pollutants.

The discharge of primary effluent through a properly designed ocean disposal system does not impose an undue stress in the marine environment. Monitoring data, collected at the existing Sand Island and Barbers Point outfall sewer to support the City and County application for a 301(h) permit, have confirmed that ambient water quality standards have been maintained, and there is adequate protection for the propagation of a balanced indigenous population of shellfish, fish and wildlife. The discharge does not interfere with any recreational activities in the receiving waters.

The 301(h) permit is for a period of five years. If the conditions of the permit cannot be met or corrected when renewal of the permit is due, the City and County will be forced to construct secondary treatment facilities. Part of the plant site is reserved for this purpose.

The first phase of Unit 2 has been designed to serve the wastewater disposal needs from a projected resident population of 269,400 by the year 2005 based on DBED "M-F" Series and DGP population projections by Development Plan areas. In addition to the resident population which includes military facilities as well as their dependents, a visitor population of about 10,000 will be served. Total projected flows for the defacto population is 38 mgd.

If the plant is expanded to 51 mgd, the ultimate average daily design flow of the facility, it could accelerate developments and increase population in the tributary areas of the plant. The only additional process units, which will be added, are standby units to provide adequate redundancy in the event of outages due to routine maintenance or emergency repairs.

C. Alternatives Considered

The alternatives considered for the proposed project included: no action, delayed action, plant expansion to 38 mgd, and plant expansion to 51 mgd. The no action alternative would limit the capacity of the plant to fifty percent of its ultimate design capacity. Lack of capacity will result in no new sewer connections after the 25 mgd capacity is reached sometime in the 1990's. This alternative is objectionable because it is not in consonance with the City and County land use policies in the tributary areas.

The delayed action alternative would postpone the expansion to a later date after the present capacity of 25 mgd is reached. Because of the long delay which public works facility experiences, it will interrupt the planned population growth in the Ewa and Central Oahu Development Plan areas. Construction costs of the expansion could be increased fifteen to twenty percent if there were a three-year delay.

The alternative to expand the capacity to 38 mgd will enable the plant to serve the projected General Plan population for the year 2005. Hence, it will be compatible with the land use policies of the City and County for the tributary areas.

The alternatives to expand the capacity beyond 38 mgd to 51 mgd would result in excess capacity. The excess units could be used for standby purposes (redundancy) during power outages, for equipment failure or periodic maintenance. Excess capacity could also accelerate developments and population growth in the tributary areas.

D. Unresolved Issues

There are no unresolved issues.

E. Compatibility with Land Use Plans

The Honouliuli WWTP site is adjacent to the Barbers Point NAS and surrounded on two sides (north and east) by sugar cane fields of Oahu Sugar Company. The site is compatible to these uses. The cane fields serve as a buffered area between the plant and Ewa Village. Further encroachment into the buffered area is not recommended because the plant can become a nuisance under certain operational conditions.

The expansion of the plant to a capacity of 38 mgd is compatible with the land use policies of the City and County with respect to developments and population.

F. Permits or Approval Required

- | | |
|--|---|
| 1. Section 301(h) NPDES Permit (Waiver of Secondary Treatment) (operation) | U.S. Environmental Protection Agency/
State Department of Health |
| 2. Community Noise Control Permit (construction) | State Department of Health |
| 3. Water Withdrawal and Use Permit (construction) | State Board of Land and Natural Resources |
| 4. Grading Permit (construction) | Dept. of Public Works |
| 5. Air Pollution Control Permit Authority to contract (construction)
Authority to operate
.....(operation) | State Department of Health |

II. DESCRIPTION OF THE PROPOSED ACTION, STATEMENT OF OBJECTIVE,
AND PURPOSE AND NEED FOR ACTION

A. Introduction

1. Historical Perspective

Two previous environmental impact statements have been prepared for the Honouliuli WWTP and Barbers Point Ocean Outfall System. In December 1973, the U. S. Environmental Protection Agency (EPA), Region IX, completed a Federal EIS for the Mamala Bay Wastewater Treatment and Disposal System, followed in June 1975, by a Supplemental EIS prepared by the DPW to satisfy the requirements of Chapter 343, H.R.S. The Revised EIS was accepted by Governor Ariyoshi on August 6, 1975.

In addition to the Barbers Point ocean outfall system, the 1975 EIS described the impact of the ultimate capacity of the 51 mgd secondary plant which was to be built in two increments. In 1978, The Barbers Point ocean outfall was completed but not used until 1982 when preliminary treatment was provided in the interim period. In 1985, the primary treatment facilities were completed and the entire plant placed into operation. Construction of secondary treatment facilities has been held in abeyance pending a decision by the U.S. Environmental Protection Agency on the City's application for a 301(h) modified NPDES permit (waiver of secondary treatment). If the 301(h) application is not approved, construction of secondary facilities would commence upon receipt of Federal and State funds without further environmental impact analysis. In early 1988, it was learned that tentative approval for the 301(h) waiver would be granted shortly.

Primary treatment is the recommended form of treatment by the Oahu Water Quality Program (OWQP 1971) for the disposal of municipal wastewater for the Sand Island and Honouliuli discharges. However, design of secondary treatment units was included for both plants at the time because secondary treatment was a requirement of the Federal Water Pollution Control Act Amendment of 1972 (PL 92-500). The Clean Water Act of 1977 (PL 95-217) amended PL 92-500 and allowed marine waiver of secondary treatment for publicly-owned treatment works (POTW). The Clean Water Amendment of 1987 (PL 100-4) requires that a 301(h) POTW must remove at least thirty percent of the incoming BOD and suspended solids and provide disinfection where appropriate.

2. Existing Honouliuli Sewer System

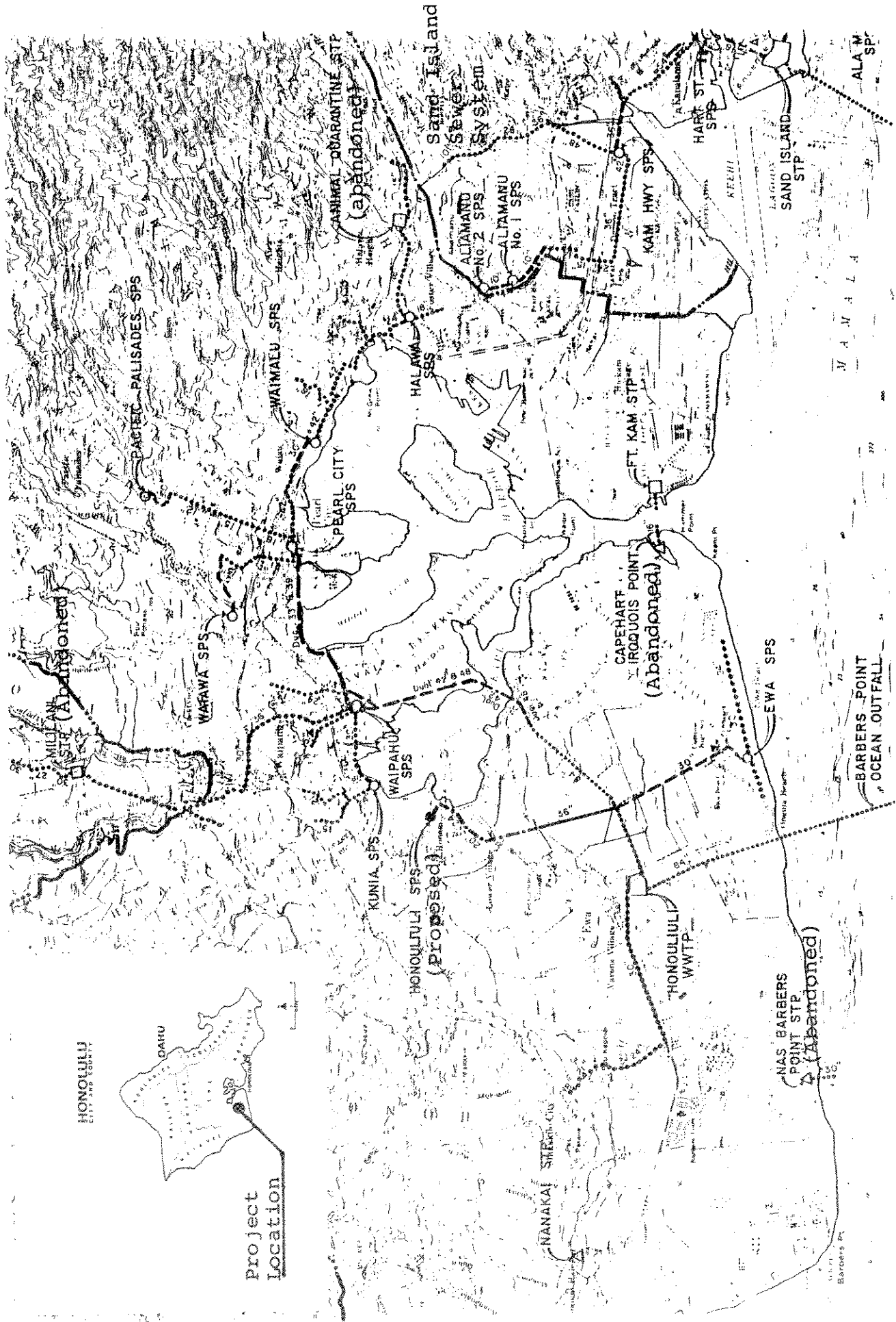
The Honouliuli sewer system is part of the Mamala Bay Sewerage District; the other component of the sewerage district is the Sand Island sewer system which serves the geographical limit of the City of Honolulu from Niu Valley-Paiko to Red Hill-Aliamanu. The original tributary areas of the Honouliuli sewer system included Pearl City-Halawa Valley, Waipahu-Crestview, Waipahu-Kunia, Honouliuli, Ewa Beach, Iroquois Point Capehart Housing, Barbers Point Naval Air Station (NAS) and Makakilo. Since June 1984, most of Mililani-Waipio Acres' wastewater flows were treated at Honouliuli. The smaller portion of the flows was treated at the Mililani WWTP and conveyed to Oahu Sugar Company's Field 215 above Waipahu for sugar cane irrigation. On November 5, 1986, the entire flows were diverted to Honouliuli WWTP. The Mililani WWTP will be abandoned.

The existing sewer system is shown in Figure II-1. The location of the treatment plant and ocean disposal system is also shown in Figure II-2.

The present tributary areas includes all urban towns and places in the Ewa, Central Oahu and the Primary Urban Center Development Plan (DP) districts west of Red Hill except Pearl Harbor Naval Base, Campbell Industrial Park, Schofield-Wheeler and Wahiawa-Whitmore Village. In the event sugar cane cultivation by furrow irrigation is eliminated or not available in the Central Oahu and North Shore DP areas, the entire flows from Wahiawa-Whitmore Village and perhaps Schofield, Wheeler Field and Helemano Military Reservation may be diverted to the Honouliuli plant for treatment and/or ocean disposal subject to the 301(h) permit waiver.

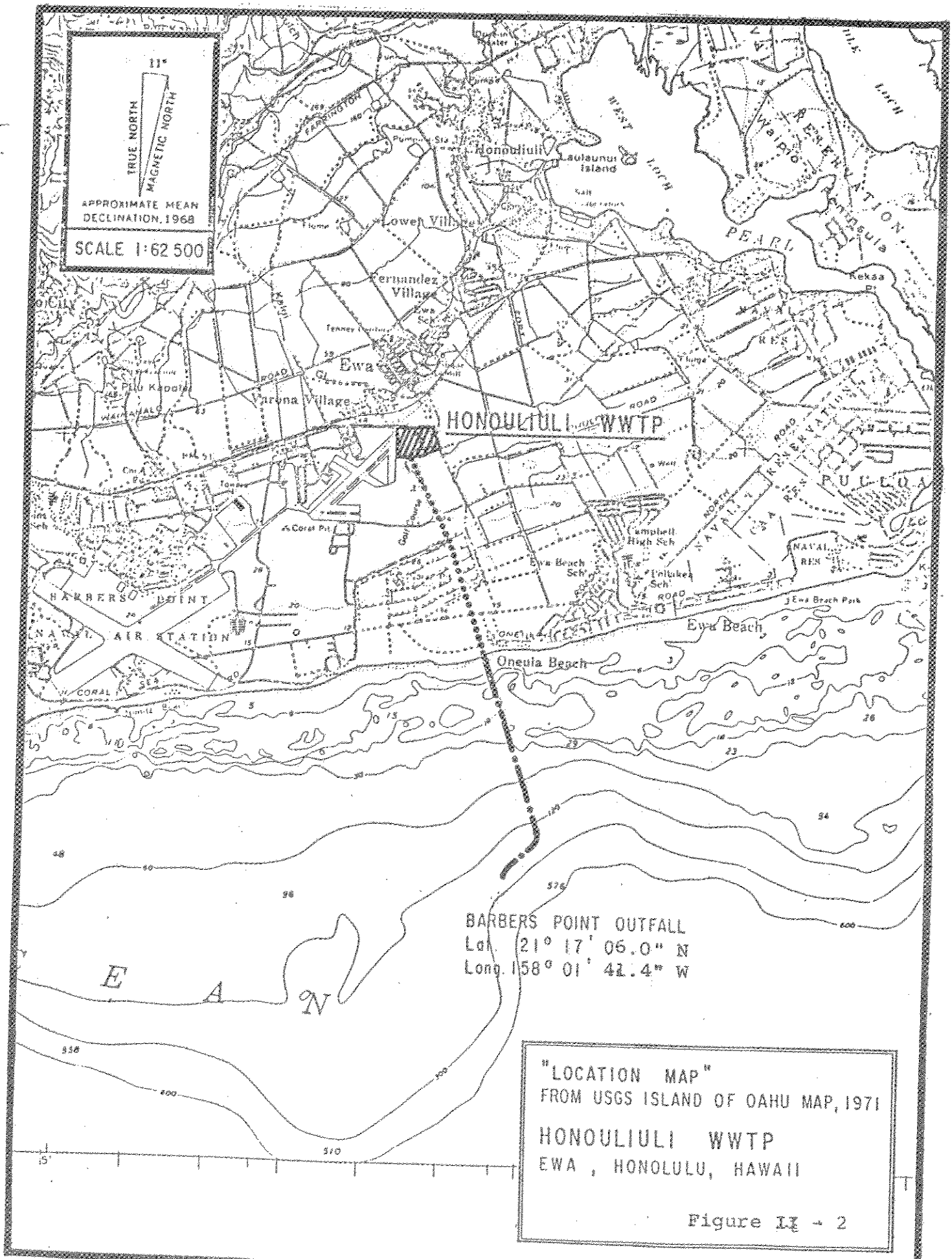
The Honouliuli system consists of a central wastewater treatment plant adjacent to Barbers Point NAS; a deep ocean outfall, 9000 feet offshore at Oneula Beach in 200-foot water depth; and gravity and force (pressure) mains and pump stations at Honouliuli, Ewa Beach, Makakilo, Waipahu and Pearl City. The major components of the treatment and disposal systems were designed for the average flow of 51 mgd based on the 1971 projected 2020 population of 387,800 people. The 2020 peak wet weather flows were used for the design of the outfall, plant hydraulic conveyance system, interception sewers, force mains and pumping stations. Pumping units (equipment) were designed for the 1990 flows.

The 2020 pumping capacity would be acquired by installing additional or larger pumping units into pre-installed in-station pipings.



EXISTING HONOLULU SEWER SYSTEM

Figure II - 1



The existing Honouliuli WWTP has the following unit process facilities: headworks with mechanical screens and influent pump station; liquid treatment with grit chambers, preaeration tanks, primary clarifiers, effluent screens and stand-by chlorinators; and solids treatment with gravity thickeners, blend tanks, decant tanks, heat treatment, centrifuge and incinerator. The present plant layout is shown in Figure II-3.

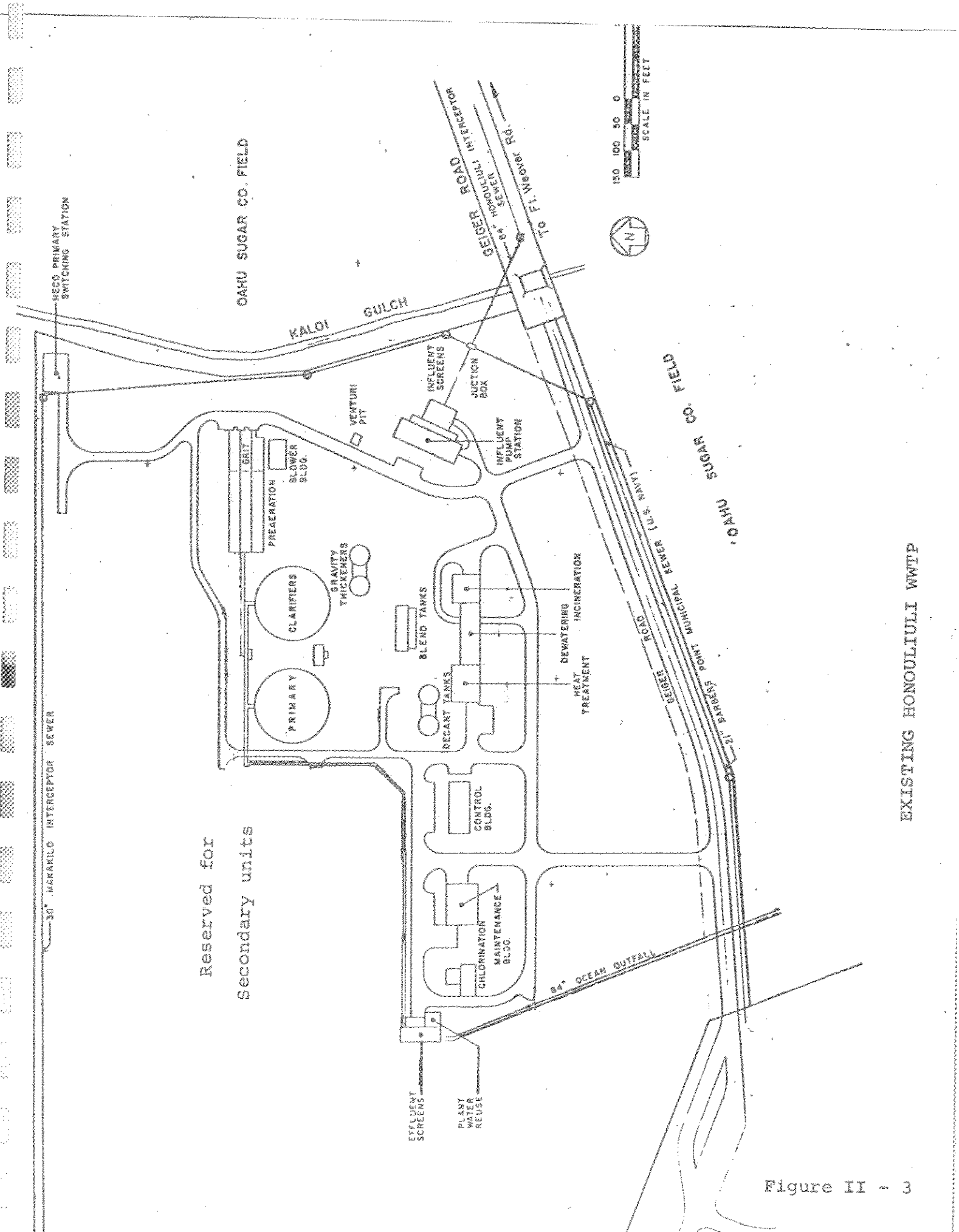
The wastewater characteristics and plant efficiency for the removal of suspended solids and biochemical oxygen demand for the year 1986 are shown in Table II-1.

The proposed construction of Unit 2 of the Honouliuli WWTP has been tentatively scheduled for the 1990 fiscal year. The preliminary estimate of the construction cost to expand the plant to 38.0 mgd is \$23.0 million. The project will involve the use of City lands and City funds. No State funds have been appropriated to assist the City in the planning and construction of the expanded facility. In addition, it is not known whether the construction can be financed by funds from a proposed State revolving loan program under Title VI of the Clean Water Act of 1987 (Public Law 100-4).

Because of the funding uncertainties, the Governor of the State of Hawaii and the City Department of Land Utilization have been designated the accepting authority for the supplemental EIS.

3. Secondary Treatment Requirement

Section 301(b)(1)(B) of the Federal Water Pollution Control Act Amendment of 1972 (PL 92-500) required publicly-owned treatment works (POTW) to have effluent limitation (quality) based upon secondary treatment. The initial regulation promulgated by the U.S. Environmental Protection Agency defined secondary treatment as any waste treatment works which remove at least eighty five percent of the incoming biochemical oxygen demand (BOD₅) and suspended solids, and limit the effluent to a concentration of 30 mg/l or less of BOD₅ and suspended solids. To meet EPA effluent requirements for secondary treatment, a treatment works had to employ processes utilizing some form of activated sludge or chemical treatment.



EXISTING HONOULIULI WWTTP

Figure II - 3

Subsequent amendments to PL 92-500 allowed treatment processes which were equivalent to secondary treatment; such as, trickling filters and oxidation ponds. The Clean Water Act of 1977 amended PL 92-500 and allowed [in Section 301(h)] modification of the secondary treatment requirements for POTW whose discharges were in marine waters provided such modification did not interfere with the attainment or maintenance of water quality standards, which assures protection of public water supplies and the protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife, and allows recreational activities in and on the water, plus other requirements.

The Water Quality Act of 1987 further amended Section 301(h) and required that such modification of the secondary treatment requirements shall include primary treatment or its equivalent which will provide treatment by screening, sedimentation, and skimming adequate to remove at least 30 percent of the incoming BOD₅ and suspended solids, and also disinfection where appropriate.

Primary treatments provide for the removal of settleable and suspended solids, grit, bone, etc., usually by sedimentation; i.e., by gravity. Little or no colloidal and dissolved matters are removed. The oxygen demanding substances; i.e., BOD₅ in the suspended solids are also removed. The organic materials that are removed by sedimentation can be incinerated or further stabilized usually by anaerobic digestion, and dewatered, then landfilled or incinerated. Several choices of sludge process units are available.

Secondary treatment usually follows primary treatment and include a biological reactor which converts the remaining suspended solids, dissolve organic matter and colloids into activated sludge or floc which can be removed by sedimentation or provide a biological media where organic materials can be oxidized. Since more solids are removed from the incoming waste stream, sludge handling process unit capacity must be larger.

TABLE II-1

Flows and Wastewater Characteristics of the
Honouliuli WWTP for the Year 1986

	Average	Range ¹	Design
Flows			
24-hour daily (mgd)	18.74	17.33-20.67	25.0
Maximum (mgd)	20.96	19.10-25.14	37.5
Biochemical Oxygen Demand			
Influent (mg/l)	199	175-223	211
Effluent (mg/l)	112	99-119	144
Efficiency (%)	44	38-52	32
Suspended Solids			
Influent (mg/l)	222	176-285	172
Effluent (mg/l)	71	53-93	89
Removal Efficiency (%)	68	59-78	48
PH			
Minimum		6.63	
Maximum		7.31	

1. Monthly range

B. Proposed Action

The proposed action is the construction and expansion of the existing Honouliuli WWTP located at the Geiger Road entrance of the Barbers Point NAS. Sufficient capacity will be provided to meet the projected General Plan population within the service area between Halawa Valley to the Waianae Coast in the east-west direction, and Mamala Bay to Mililani-Waipio in the north-south direction.

Construction will include modification of the headworks for the addition of one (1) bar screen; two (2) raw sewage pumps with rated capacity of 36 and 20 mgd; one (1) grit chamber and preaeration unit; two (2) circular sedimentation (clarifier) tanks, 145-foot by 10-foot side water depth; one (1) solid gravity thickener, 40-foot diameter by 10-foot side water depth; and associated appurtenances. One clarifier and the gravity thickener will be used as standby units in the initial phase.

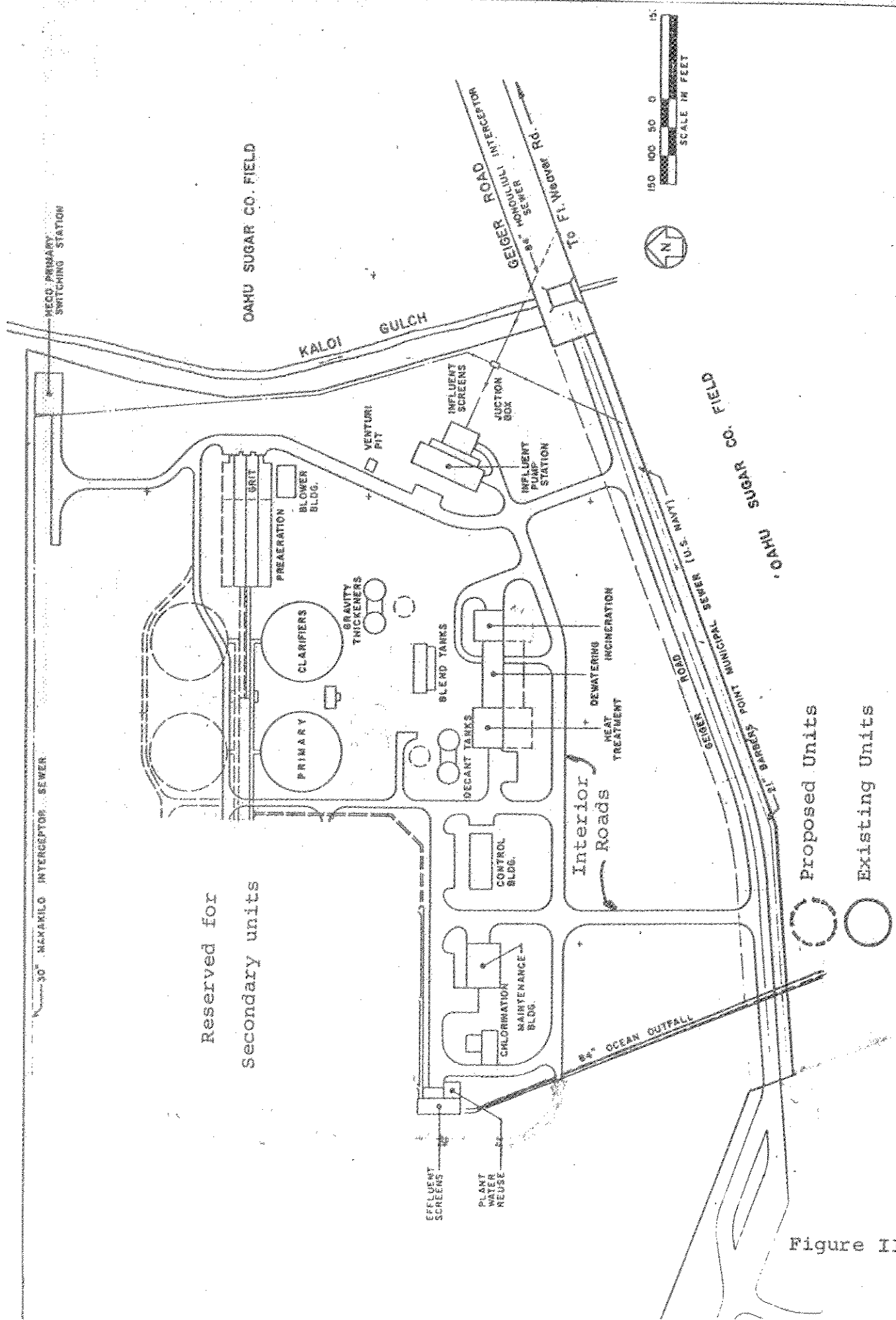
Sludge handling facilities which will be added include one (1) heat treatment unit, one (1) decant tank and centrifuges. In addition, a new cake storage area will be constructed; the grit loading area will be modified; and a well will be drilled to utilize groundwater for irrigation and other plant use.

All construction will occur within the treatment plant site. The proposed plant layout for the 51 mgd plant is shown in Figure II-4.

The treatment capacity of the plant will be increased from 25 mgd to 51.0 mgd (initially to 38.0 mgd) and will be adequate to treat the wastewater flows for the 2005 resident population of 269,400.

C. Objectives of the Proposed Action

The primary objectives of the proposed action are to serve the municipal need for sewage disposal to the year 2005 in the West Mamala sewerage district and to maintain water quality in the receiving waters off Oneula Beach. The plant is expected to reach its present capacity in the early 1990s as the result of the City's General Plan's directed growth policies in the tributary areas. A plant expansion to 38 mgd will not encourage population growth in the tributary area and will be compatible to the population growth guideline of the City land use policies. If a 51 mgd plant is built, the unit cost capacity per mgd will be the most cost-effective but there will be a surplus of treatment capacity beyond the year 2005. However, excess capacity could encourage population growth in the tributary areas.

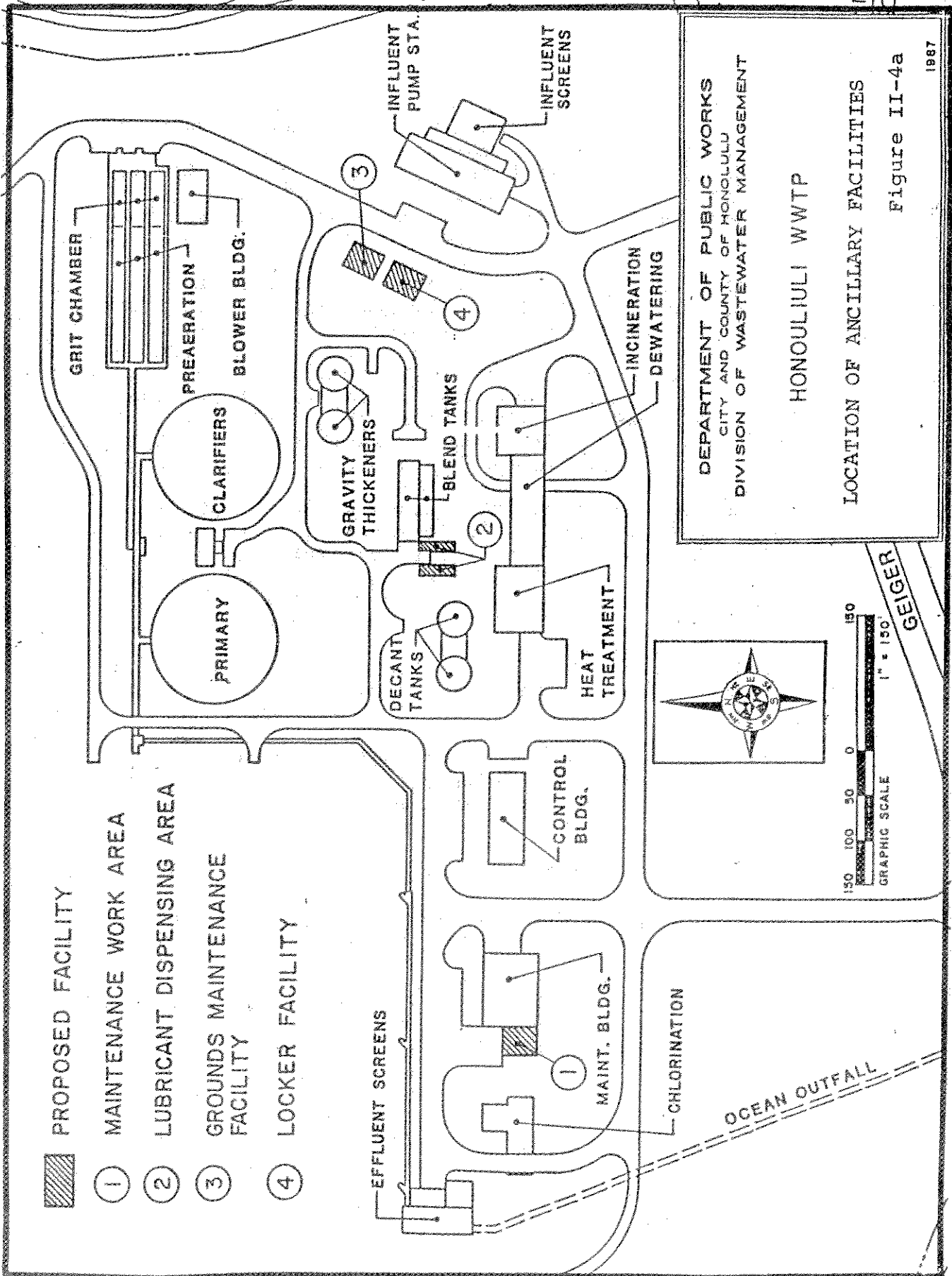


Reserved for
Secondary units

Proposed Units
Existing Units

PROPOSED LAYOUT FOR THE 51 MGD PLANT

Figure II - 4



- PROPOSED FACILITY
- MAINTENANCE WORK AREA
- LUBRICANT DISPENSING AREA
- GROUND'S MAINTENANCE FACILITY
- LOCKER FACILITY

- 1
- 2
- 3
- 4

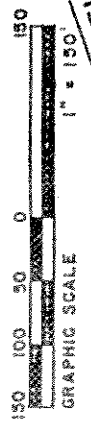
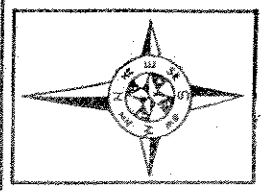
DEPARTMENT OF PUBLIC WORKS
 CITY AND COUNTY OF HONOLULU
 DIVISION OF WASTEWATER MANAGEMENT

HONOLULU WWTW

LOCATION OF ANCILLARY FACILITIES

Figure II-4a

1987



GEIGER

When the conceptual plans for the Honouliuli sewer system were developed in 1971 as part of the Water Quality Program for Oahu (WQPO), the primary objectives were to: (1) improve water quality in Pearl Harbor, (2) eliminate all municipal discharges in estuaries and embayments, and (3) provide for the treatment and disposal of primary effluent from a regional plant by way of a deep ocean outfall sewer. All of these objectives have been accomplished.

Water quality in Pearl Harbor has been improved since the cessation of municipal wastewater discharges into the estuary. However, Pearl Harbor is still ranked as a water quality limited segment by the State Department of Health. Water quality limited segments are water bodies, mostly embayments and estuaries in the State, whose waters do not meet water quality standards and will not meet applicable water quality standards even after technology-based effluent requirements for point source discharges are applied. The present major sources of pollutants in Pearl Harbor are flows from eight perennial streams which pass through agricultural, residential and highly urbanized areas; industrial wastes from power plants and the ship yard; urban stormwater runoff; and poor flushing actions within the estuary.

All municipal wastewater discharges into Pearl Harbor have been eliminated and flows redirected to the Honouliuli WWTP:

1. Flows discharging into Middle Loch from Waipahu Stabilization Pond were diverted in January 1982;
2. Flows discharging into South Halawa Stream and East Loch from Halawa Jail (State) STP and the Halawa Animal Quarantine (State) STP were diverted in January 1983 and May 1983, respectively;
3. Flows discharging into Waiawa Stream and Middle Loch from Pacific Palisades STP were diverted to Pearl City STP in November 1982;
4. In turn, Pearl City STP flows were diverted from Middle Loch in January 1983;
5. Mililani WWTP flows were diverted from Kipapa Stream and West Loch in June 1984; and
6. the Navy Iroquois Point STP flows were diverted in January 1984.

In addition, the Makakilo and Barbers Point NAS STPs flows were diverted in March 1983 and September 1983, respectively.

Primary effluent from the plant is being discharged 10,000 feet offshore at the 200-foot depth below the thermocline which prevents the effluent from surfacing most of the time. Maximum stratification occurs during the summer months resulting in lower average initial dilution; and minimum stratification occurs during the winter and spring resulting in maximum dilution and possible surfacing of the effluent. Water quality monitoring on the receiving waters indicates that ambient water quality criteria are being met.

The population projection developed by WQPO extended over a fifty-year period (1970-2020) based on the rationale that a treatment and disposal system has a normal service life of 50 years. The projection to the year 2000 was based on the General Plan (GP) and Detailed Land Use Maps of 1964, as amended. The land use designations specified in the 1964 General Plan were sufficient to accommodate a 1980 population of 820,000 living on Oahu in single-family residential lands with reserve for unforeseen growth and flexibility. WQPO's projected 1990 population of 180,000 people for Honouliuli Unit 1 could be accommodated within the 1964 GP land use designations.

However, the projected population that will be served by Unit 2 of the Honouliuli WWTP to the year 2005 will be determined by the current population projections for the Ewa, Central Oahu and Primary Urban Center Development Plans areas.

D. Technical, Economic, Social and Environmental Characteristics of the Proposed Action

1. Technical Characteristics

a. Site

The existing WWTP site is located on the northeast corner entrance to the Barbers Point NAS in Ewa. The site is a consolidation of two parcels: the larger parcel of 48.6 acres of surplus lands to the NAS was acquired in 1974; and the smaller 2.7 acres parcel was obtained from the Campbell Estate for a total of 51.3 acres. All works associated with Unit 2 facilities will be constructed within the existing treatment plant site.

About 15 acres of the 51.3 acres are presently being utilized by the 25 mgd primary plant. Compared with the Sand Island WWTP 50-acre site in Honolulu which has a 2020 design flow of 105 mgd, the existing Honouliuli plant site has ample area to accommodate 51+ mgd within the same time frame.

All of the plant acreage is usable and most of the unoccupied area is landscaped and serves as buffer zones around the plant periphery. Ground elevation at the site ranges from 32 feet at Geiger Road to 42 feet at the mauka boundary.

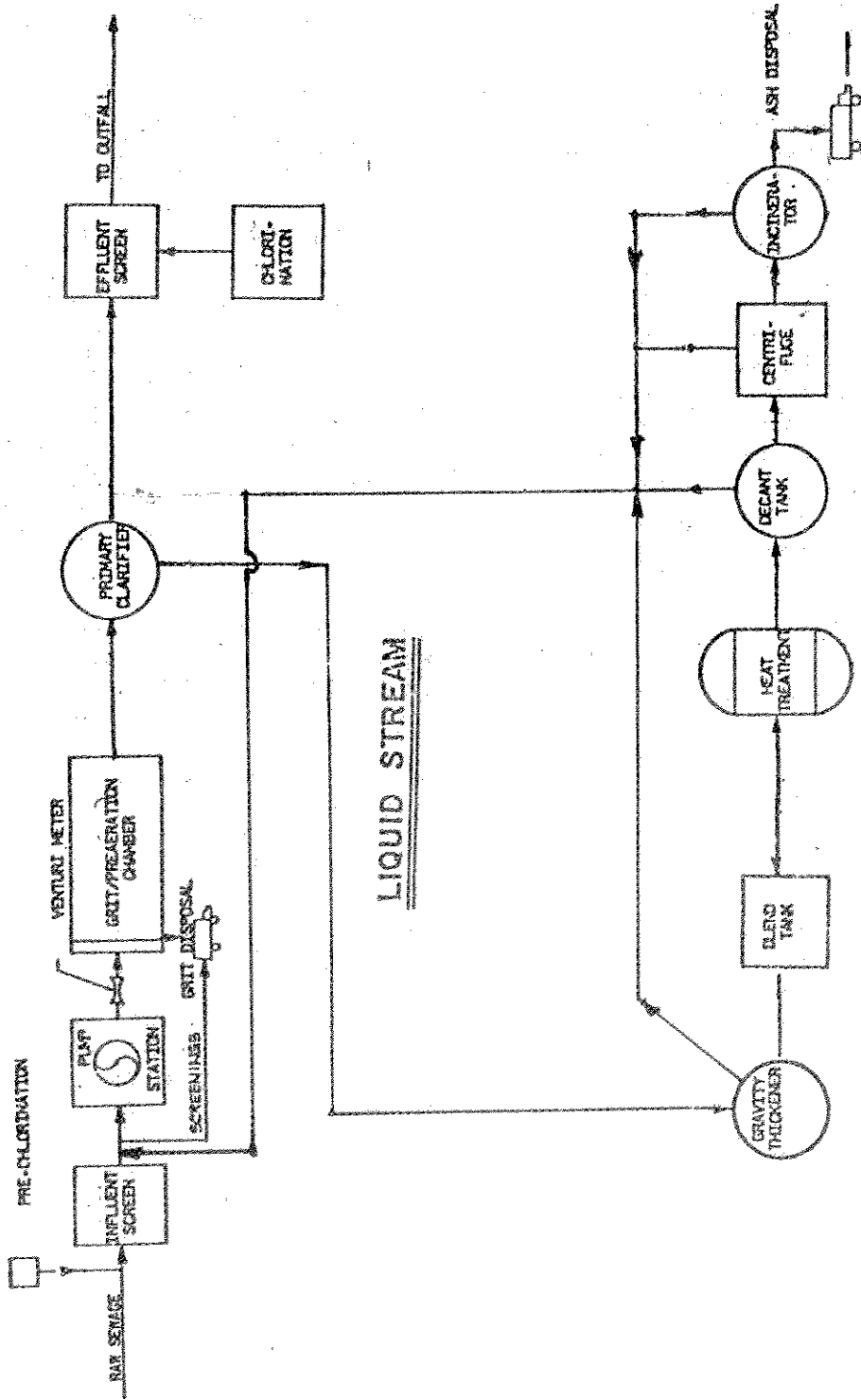
b. Existing Plant Facilities

The basic facilities at the Honouliuli WWTP provide for the physical removal of floating, suspended and settleable solids and the disposition of such solids in a sanitary, convenient and cost effective manner without adverse effects on the environment. The basic facilities used at the plant consist of sedimentation tanks or primary clarifiers for the liquid phase and the multiple hearths incinerator for the solid phase. The other appurtenant facilities assist the clarifiers and the incinerator in accomplishing their goals. The influent pump station at the head of the plant raises the water surface elevation (or hydraulic grade) at the initial process unit (grit chamber) which allows flow by gravity for the liquid phase throughout the treatment units (including secondary units) and the ocean disposal systems. Solid (sludge) transfer between units are handled by pumping.

The liquid phase consists of the influent screens, raw sewage pump station, aerated grit chambers, preaeration tanks, primary clarifier, effluent screens and chlorination. The solid phase consists of gravity thickeners, blend tanks, heat treatment, decant tanks, centrifuges and the sludge incinerator. The flow diagram of the liquid and solid streams are shown in Figure II-5.

The functions of each process unit are described below. Process units which require frequent maintenance are provided with a standby or spare unit.

FLOW DIAGRAM



SOLIDS STREAM

Figure II - 5

Influent screens are vertically inclined mechanical screens that remove large pieces of solids in the raw wastewater. The screenings are discharged on a conveyor belt to a dump truck for landfilling. There are three screens located in the forebay of the influent screens/pump station structure. A standby unit is provided.

Aerated grit chambers remove grit, bones, ashes, sands, etc., by gravity. Aerating whirl prevents organic materials from settling in the chamber. Grit is disposed of with screening and organic materials are carried over to the preaeration tanks. Two of the grit chambers are used in normal operation. A standby unit is provided.

Preaeration chambers are used to freshen septic or stale sewage by adding oxygen. They also remove dissolved gases, promote flotation of grease and assists in coagulation and sedimentation of suspended solids. Three preaeration chambers are available, but one is a standby unit.

Primary clarifiers remove (1) floatable materials by skimming the water surface, and (2) suspended solid which settled on the bottom. The semi-liquid waste of suspended solids (at least 2500 ppm), now called primary sludge, can be pumped and exhibits settling characteristics. Floatables are pumped to the scum concentrator, and suspended solids are pumped to gravity sludge thickeners, the beginning process unit of the solid phase. Each of the two clarifiers in Phase 1 is designed for an average flow of 12.5 mgd.

Effluent screens remove remaining suspended solids from the effluent before being discharged to the outfall sewer. Three screens are provided but one is a spare.

Chlorination is used to control or suppress odor and disinfect the effluent when the occasion arises. Disinfection is not normally required for deep ocean disposal.

Gravity thickener tanks concentrate the diluted sludge from the primary clarifier from less than one percent to about 3-5 percent solids by sedimentation. Two units are provided but one is a spare.

Blend tanks mix thickened primary sludge and waste activated sludge for homogeneity. Blend tanks were built in anticipation of secondary treatment units; however, they still serve a useful purpose as storage tanks before being pumped to the heat treatment unit. Four units are provided but one is a spare.

Heat treatment reactor conditions the thickened undigested sludge by subjecting it to temperature and pressure of 380° Fahrenheit and 330 pounds per square inch, respectively. This process increases the dewaterability of the sludge and eliminates the use of chemicals.

Decant tanks concentrate heat treated sludge by removing excess water by gravity before centrifugation. Two tanks are provided but one is a spare.

Centrifuges provide mechanical dewatering of thickened heat treated sludge to a solid content in excess of 35 percent before incineration. Three units are provided and one is a standby unit.

Incineration reduces the volume of scum, and sludge cake to ash. The resulting ash is disposed of at a sanitary landfill. The exhaust gases from the incinerator is utilized to generate steam for the heat treatment reactor.

There are several ancillary units and buildings at the treatment plant site, including the maintenance and control building and odor abatement units. Odor abatement units are located at the influent screens by the pump station, gravity thickeners and blend tanks.

c. Proposed Plant Facilities

The proposed expansion of the Honouliuli WWTP will include primary process units of the plant including but not limited to the following components.

Liquid phase

(1) Two additional raw sewage pumping units with rated capacity of 20 mgd and 36 mgd will be installed to handle the average daily flow of 51 mgd and peak wet weather flow of 112 mgd. Total installed capacity of the 6 pumps will have a rated capacity of 152 mgd. One pump is on standby.

(2) The influent screens/pump station structure will be modified to add one mechanical screen chamber for a total of four (4). One screen is on standby.

(3) One additional aerated grit chamber and preaeration tank will be constructed with a capacity of 12.75 mgd for a total of four units. The grit loading area will be modified.

(4) Two additional primary clarifiers will be provided. Each of the four tanks will have a capacity of 12.75 mgd, with a two percent increase in the surface overflow rate.

(5) The two chlorinator units will be replaced with larger units or modified with a total installed capacity of 12,100 lbs. per day.

(6) A centrifugal pump and associated appurtenances will be installed to draw groundwater for irrigation and other plant uses. Withdrawal flow rate will be established at a later date. A storage tank may be required.

Solid Phase

(1) One additional gravity thickener tank will be constructed to serve as a standby unit.

(2) One additional heat treatment system will be provided with a capacity of 7,500 gallons per hour for a total of 2 units.

(3) One additional decant tank will be constructed to serve as a standby unit.

(4) Three additional centrifuges will be installed for a total of six units within the solids handling building.

Ancillary Facilities.

(1) Maintenance Work Area consists of the construction of a roof structure over an existing floor slab adjacent to the existing Maintenance Building.

(2) Lubricant Dispensing Area consists of the construction of two (2) covered drum racks and associated driveway area.

(3) Grounds Maintenance Facility consists of the construction of a floor slab and driveway area and erection of a prefabricated metal building.

(4) Locker Facility consists of the construction of a locker/dressing, shower and sanitary facility and additional parking spaces.

(5) Odor control units will be provided at preaeration and clarifier tanks.

The construction of Phase 2 units will include excavation for tanks, pipelines, ducts, removal of some of the existing landscaping improvements, and regrading the site for storm water runoff control.

2. Social, Economic Characteristics

The tributary areas of the Honouliuli WWTP extend from Halawa Valley to the Waianae coastline in the east-west direction, and from Central Oahu to Mamala Bay in the north-south direction. Some of the tributary areas, e.g., Aiea and Halawa Heights, are nearly fully developed but most of the areas are targeted for further developments in conformance with the City and County General Plan and Development Plans. Figure II-6 shows the tributary areas of the WWTP.

The tributary areas developed during the 1971 Water Quality Program for Oahu (WQPO) consisted of Halawa-Pearl City, Waipahu-Crestview, Waipahu-Kunia, Honouliuli, Ewa (Beach), Makakilo, Barbers Point NAS, and Iroquois Point Capehart Housing. The 1980 Census resident population of the original service areas was 143,915. The 1984 estimate was 159,751 based on DPED's figures given in the 1985 Data Book. Based on revised cesspool data in the City and County 208 Plan, about 14,500 people were still being served by residential cesspools and private systems in 1984. Thus the sewered population in the original service area was estimated to be approximately 145,200 people. The average per capita contribution for the service area was approximately 100-110 gallons per day including ground water infiltration.

Eighty gallons of the 100-110 gallons per day are domestic sewage and the balance are flows derived from institutions, and commercial activities, and ground water infiltration.

In 1984, the Mililani-Waipio area became one of Honouliuli's tributaries, when wastewater flows were diverted into the Waipahu sewer system for

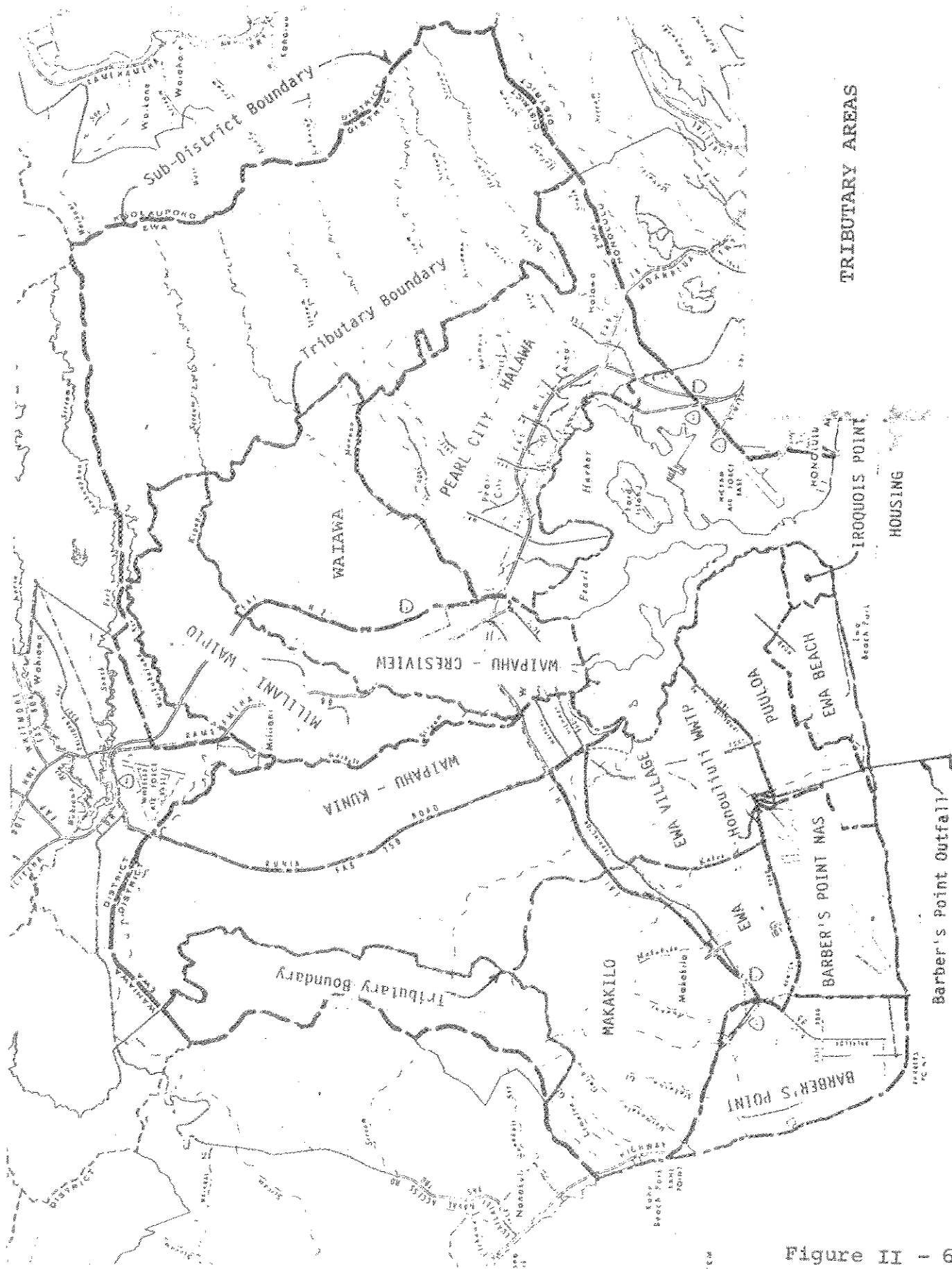


Figure II - 6

treatment and disposal at the Honouliuli WWTP. Between 1984 to 1986 when the Mililani WWTP was still in operation, it treated up to 0.5 mgd of wastewater for sugar cane irrigation at Field 215 of Oahu Sugar Company. The entire 2 mgd of the Mililani effluent were available for reuse at Field 215; however, the quantity of flows was limited by Oahu Sugar Company and discontinued in November 1986 when OSC converted from furrow to drip irrigation.

With the addition of the Mililani-Waipio area to the service area of the plant, the tributary resident population based on the 1980 census was approximately 171,300 people. The total estimated 1984 population was 190,420 and the population connected to municipal sewers was about 176,000. Overall per capita wastewater contribution was approximately 100 gpcpd.

Demographic characteristics of the tributary areas including Mililani-Waipio Acres are shown in Table II-2, by neighborhoods (DPED 1986). Aiea and Pearl City neighborhoods are part of the Pearl City-Halawa tributary area; however, Foster Village, which is served by the Halawa Pump Station, is not included since it's listed as part of the Airport neighborhood. Also, Camp H. M. Smith, which is part of the Aiea neighborhood area, is served by the U.S. Navy sewer system. Such minor inconsistencies do not alter the overall generalized demographic information.

The Waipahu neighborhood area includes the Waipahu-Crestview and Waipahu-Kunia tributary areas. Ewa neighborhood area includes the Ewa Village, Puuloa, Ewa Beach, Ewa, Barber's Point, Makakilo, Iroquois Point Housing and Barber's Point NAS tributary areas. The Honouliuli WWTP is located in the Ewa neighborhood area.

Overall composite demographic data for the entire tributary district have been derived and can be compared with Oahu's average which is also shown in Table II-1. Average district figures seem to indicate that the average household median income is higher than Oahu's average and that the percent that reside in single family units is considerably higher. On the negative side, unemployment is higher and so is gross rent.

Within the district, there are wide differences in household income and economic well being indicators. Overall economic affluence in Ewa appears to be lower than Oahu's average, perhaps

TABLE II - 2

POPULATION CHARACTERISTICS OF NEIGHBORHOODS IN THE HONOULIULI TRIBUTARY AREAS

Neighborhood &	Resident Population		Civilian Labor Force		Household Median Income Number 1979 \$	Housing Units	Single Family Units %	Average Household Size	Median Gross Rent \$	Owner Occupied Units
	1980	% Foreign Born	% Employed	% Unemployed						
Oahu Total	762,534	14.8	4.6	230,214	21,077	250,864	47.1	3.15	315	49.9
Honouliuli										
Aiea	30,084	12.2	4.6	8,925	25,393	9,236	52.5	3.28	399	58.4
Pearl City	42,577	12.2	4.1	11,140	29,345	11,362	80.2	3.78	429	76.4
Waipahu	33,927	26.1	5.9	8,261	23,865	8,519	60.4	4.03	346	54.3
Ewa	35,585	14.0	8.0	8,988	19,458	9,322	73.3	3.87	282	51.0
Millilani-Waipio	26,134	10.0	4.1	7,801	26,338	7,989	62.6	3.35	404	76.6
District	168,307	15.0	6.3	45,115	25,070	54,428	59.5	3.67	360	54.3

Source: DPED. 1986 Data Book

because of higher rate of unemployment. Residents in Pearl City, Mililani-Waipio Acres, and Aiea, have higher levels of affluence, and Waipahu is average for the district.

Many of the neighborhoods in the district were once served (or still are) by separate individual treatment and disposal systems. In the Pearl City-Halawa area, Halawa Jail and Halawa Animal Quarantine Stations were served by separate sewage treatment plants (STP) and discharged their effluent into South Halawa Stream. Halawa Heights was served by a STP which discharged at the mouth of the Halawa Stream in Southeast Loch. Aiea's sewage was discharged into Aiea Bay without treatment. McGrew Point's Navy Housing was served by a septic tank and the discharge was into East Loch. Waimalu was also served by a septic tank and the effluent was discharged into Waimalu Stream. The Pearlridge area was served by the Kalauao STP and the effluent was discharged into East Loch. Pearl City was initially served by an abandoned military septic tank discharging into Waiawa Stream. Later the Pearl City STP was built and the effluent was discharged into Middle Loch. Waimano Home was served by a septic tank, and the Navy's Manana Housing STP effluent was discharged into Waiawa Stream. Pacific Palisades STP effluent was discharged into Waiawa Stream.

Waipahu's untreated sewage was used for sugar cane irrigation at Waipio Peninsula. During non-irrigation periods, the raw sewage was diverted into West Loch. Later, an oxidation pond was constructed and the effluent was discharged into Middle Loch. Crestview was served by an STP and the effluent was discharged into a gulch. Later on, the sewers were connected to the Waipahu sewer system.

Waipio Acres was served by an STP and the effluent was discharged into Waikakalaua Stream. Later, the STP was abandoned and the flows were diverted to Mililani WWTP.

In Ewa, Makakilo was once served by an STP and the effluent was reused for sugar cane irrigation. The Nanakai WWTP is still operating and serving Nanakai Gardens and Honokai Hale. The U.S. Navy also operated STPs to serve Barber's Point NAS, Iroquois Point Housing, West Loch NAD, Waikele NAD and Waipio Inactive Fleet. Waikele NAD is still served by an STP; the others have been abandoned and connected to the City system.

From an historical perspective, the use of municipal sewers to protect the Pearl Harbor aquifer was critical to the urbanization of the Ewa judicial district. Urbanization could not have proceeded without sewer systems and temporary sewage treatment facilities, many of which were built by private developers and dedicated to the City and County for operation and maintenance. The utilization of temporary treatment facilities, initially caused localized areas of poor water quality and pollution along streams and in Pearl Harbor because of inadequately treated sewage. Primary treatment was the regulatory level of treatment if the discharge was directly into Pearl Harbor, and secondary treatment was mandated if the effluent was discharged into a stream.

As urbanization increased, localized pockets of polluted waters became regional problems. Pearl Harbor was recognized as one of the focal areas where clean waters should be restored. In October 1969, the Federal Water Pollution Control Administration (FWPCA) of the Department of Interior concluded that Pearl Harbor was being polluted by municipal, Federal and industrial sources and recommended an abatement program to protect the natural resources of Pearl Harbor including the oysters in West Loch.

In the WQPO report of 1971, it was recommended that all municipal effluent discharges into Pearl Harbor be eliminated including some Federal sources and that wastewater be transported to a new plant in Honouliuli that would provide primary treatment and disposal through a deep ocean outfall off Barbers Point. With the completion of the Honouliuli WWTP and the diversion of Mililani-Waipio wastewater, the number of interim WWTPs in the district has been reduced to the Nanakai WWTP.

Since the Mililani plant flows have been diverted, a capacity of 3.5 mgd, equal to the present capacity of the WWTP, will be set aside for the Mililani-Waipio tributary area. The Mililani plant was built by its developers; however, the effluent line to Waipahu was constructed with Section 201 Federal grant funds. The 3.5 mgd flows represent an equivalent residential population of 35,000 people.

The communities which were served by individual STPs have benefited when their plants were eliminated. Water quality in the receiving waters along Pearl Harbor has improved, and potential nuisance and odor problems were eliminated. In

addition to social benefits, a regional WWTP is able to treat and dispose of its effluent at less cost than small STPs serving individual communities.

Centralized and regional wastewater treatment and disposal facilities usually have economies of scale. This means that a regional plant can have lower unit cost as more wastewater is treated. "Economies of scale" usually apply to both construction, and operation and maintenance costs. The Sand Island WWTP (82 mgd) and outfall constructed between 1974 and 1981 cost \$64.3 million. The construction cost per gallon of sewage was \$0.78. The cost of the Honouliuli WWTP (25 mgd) and outfall, constructed between 1977 and 1985, was \$51.1 million. The unit cost was \$2.04 per gallon. Although there was a construction cost escalation between the periods when the plants were built, the difference of economies of scale is the logical explanation why the construction cost at Honouliuli is over twice the unit cost at Sand Island.

In 1984-85, the operating cost of treatment including overhead at the Honouliuli WWTP (17.25 mgd) was \$344 per million gallons compared with \$194 for the Sand Island WWTP (70.97 mgd). Hence, the cost of construction, and operation and maintenance cost between two similar primary plants except in design capacities show difference attributable to economies of scale.

The Ewa area, where the Honouliuli WWTP is located, will be most affected by the operation and maintenance activities at the treatment plant. However, increasing the plant capacity from 25 mgd to 51 mgd will not necessarily increase the nuisance potential levels at the plant site when adequate facilities and manpower are provided.

When the Honouliuli plant site was acquired in 1974, the Ewa area consisted of scattered communities with a population of 24,087 residents, including 7,946 military personnel and their dependents living at Barbers Point NAS and Iroquois Point Housing. By 1980, the resident population in the neighborhood increased to 35,585, including 6,857 people at Barbers Point NAS and Iroquois Housing. Community population increased by 12,587 people from 1970 to 1980.

Almost all of the increase in population in the 1970s have occurred at Ewa Beach (6604) and Makakilo (4192). The population at Ewa, the community closest to the treatment plant, decreased slightly from 2,906 to 2,637 between 1970 to 1980.

During the 1970s, the areas bordering three sides of the plant were Oahu Sugar Company's cane fields. The fourth side was adjacent to the Barbers Point NAS golf course and the unused runways of the NAS. The main residential area of Ewa Village was about 2,000 feet away. Urbanization proposed during the next 20 years could transform agricultural lands surrounding the plant to urban uses, thereby, reducing the buffer distance at the plant periphery to about 500 feet.

Locating residential developments next to WWTPs, as has happened at Kailua and Wahiawa where back yards were constructed adjacent to the plant fence, is not advisable. No residential development should be permitted within 1000 feet from the WWTP boundary. Light industry and agriculture are the recommended land uses surrounding wastewater treatment plants.

Future growth plans for the urbanization in the Honouliuli tributary areas will be guided by the General Plan Population Guidelines established by the Department of General Planning by Development Plan (DP) area. The population projection in each of the tributary areas is affected by one of three guidelines of the DP areas.

The Pearl City-Halawa tributary area is part of the Primary Urban Center (PUC) DP area. A small segment of the Central Oahu DP area between Pearl City and Waipahu, makai of Kamehameha Highway, is also served by the Pearl City sewer system.

The Pearl City-Halawa tributary area extends from Halawa Valley to Waiawa Stream. The area is served by the existing East Loch interceptor sewer, extending from the Pearl City WWPS to Halawa WWPS, and major trunk sewers extending into the upper valleys and plateaus. The Ewa Branch trunk sewer extends westerly from Pearl City WWPS towards Waipahu and serves lower Waiawa including Leeward Community College. Wastewater collected at the pump station is conveyed to the Honouliuli WWTP via the Pearl City WWPS dual force mains and the Honouliuli interceptor sewer. Flows from the proposed developments in the Waiawa tributary area should be discharged into the Pearl City WWPS instead of the Waipahu sewer system.

The population of PUC DP area is projected to increase from 436,400 in 1984 to 480,000 by the year 2005. Most of the 43,600 population increase in the PUC will take place in the Sand Island tributary area. The population in the Pearl City-Halawa tributary area is projected to increase from 83,100 in 1985 to 91,100 in the year 2005 through increased density, and the expansion of the urban areas. Two ongoing developments in the Halawa-Pearl City tributary area as shown in Table II-3 are adding 760 housing units for a proposed population of 1,800 people in the Pearl City neighborhood.

The Central Oahu DP area includes Waipahu-Crestview, Waiawa, Waipahu-Kunia, Mililani-Waipio tributary areas, and Wahiawa-Whitmore and Schofield-Wheeler. Wahiawa-Whitmore is part of the Central Oahu sewerage district; however, as stated previously, if the Waiialua Sugar Company were to cease operation, flows from the district may be diverted to Honouliuli WWTP for treatment and disposal. There is also the possibility of diverting the flow from Helemano Military Reservation located in the North Shore DP area, together with the Schofield-Wheeler flows to the Honouliuli sewer system.

The Waipahu neighborhood area is served by an interceptor sewer located in the old OR&L railroad right-of-way. Waipahu-Crestview area is served by the eastern component of the interceptor and other trunk lines which are connected to the Waipahu WWPS located on lower Depot Road. Waipahu-Kunia is served by the western leg of the interceptor sewer which terminates at the Kunia WWPS. Flows from both segments of the interceptor are pumped from the Waipahu WWPS to the Honouliuli WWTP via the Pearl City force main and Honouliuli interceptor sewer.

Mililani-Waipio and Waiawa are newly designated tributary areas of the Honouliuli sewer system. The Mililani sewer system is connected to the Waipahu sewer system by the Mililani WWTP effluent line and the Waipio Gentry trunk sewer. At the present time, the Waipio Gentry trunk sewer is on stand-by status and the Mililani effluent line is used to convey raw sewage directly into the Waipahu WWPS. The effluent line can also be used to convey wastewater from adjoining developments to Waipahu WWPS.

TABLE II - 3

WASTEWATER FLOWS GENERATED BY ONGOING, APPROVED AND PROPOSED DEVELOPMENTS
BY TRIBUTARY AREAS

(Source: DGP 1986, DPW Files)

Developments Tributary Area	Year Start	Area (ACS)	No. of		Wastewater Generation (mgd)		
			Housing Units	Resident- Population	1985-1990	1990-1995	1995-2000 2000-2005
Royal Summit	Ongoing	45	260	800	0.08002		
Mailuna	Ongoing	45	500	1,000	0.10002		
Alea Hts Sewers I.D. Section 4	Existing	54	132	446		0.04462	
Misc. Sewer I.D.	Existing	N.A.	119	437		0	0.04372
TOTAL FOR TRIBUTARY AREA			1,011	2,683	0.1800	0.0446	0.0437

1. Data not available (NA).
2. Based on 100 gpcpd and include normal infiltration and commercial establishment flows when not otherwise known.
3. Proposed Developments not designated on Development Plans.

TABLE II - 3 (Cont'd.)

WASTEWATER FLOWS GENERATED BY ONGOING, APPROVED AND PROPOSED DEVELOPMENTS
BY TRIBUTARY AREAS
(Source: DGP 1986, DPW Files)

Developments	Year Start	Area (ACS)	No. of		Wastewater Generation (mgd)		
			Housing Units	Resident Population	1985-1990	1990-1995	1995-2000 2000-2005
<u>Millilani-Waipio</u>							
<u>Tributary Area</u>							
Hawaii Technology Park	1987	256	-	-	0.1328	0.3320	0.3320 0.0532
Millilani (Various)	1987	228	2,500	8,600	0.1720 ²	0.4300 ²	0.1580 ²
Millilani (Mauka) ³	1992	1,200	6,600	21,000		1.3800	1.3800
TOTAL FOR TRIBUTARY AREA					0.3048	0.7620	1.8700 1.4332

1. Data not available (NA).
2. Based on 100 gpcpd and include normal infiltration and commercial establishment flows when not otherwise known.
3. Proposed Developments not designated on Development Plans.

TABLE II - 3 (Cont'd.)

WASTEWATER FLOWS GENERATED BY ONGOING, APPROVED AND PROPOSED DEVELOPMENTS
BY TRIBUTARY AREAS

(Source: DGP 1986, DPW Files)

Developments Tributary Area	Year Start	Area (ACS)	No. of		Wastewater Generation (mgd)		
			Housing Units	Resident Population	1985-1990	1990-1995	1995-2000 2000-2005
Ewa Marina, Unit 1 & Portion of Unit 2	1990	180	1,272	4,900		0.4900 ²	
Ewa Beach (Various)	Ongoing	51	400	1,100	0.1100 ²		
Lusk, Hawaii (Future) ³	1996	75	425	1,700			0.1700 ²
Ewa Beach Sewer I.D.	Existing	882	N.A.	14,369	1.8700		
TOTAL FOR TRIBUTARY AREA				22,069	1.9700	0.4900	0.1700

1. Data not available (NA).
2. Based on 100 gpcpd and include normal infiltration and commercial establishment flows when not otherwise known.
3. Proposed Developments not designated on Development Plans.

TABLE II - 3 (Cont'd.)

WASTEWATER FLOWS GENERATED BY ONGOING, APPROVED AND PROPOSED DEVELOPMENTS
BY TRIBUTARY AREAS

(Source: DGP 1986, DPW Files)

Developments	Year Start	Area (Acs)	No. Of		Resident- Population	Wastewater Generation (mgd)		
			Housing Units	Population		1985-1990	1990-1995	1995-2000 2000-2005
<u>Ewa Village</u> <u>Tributary Area</u>								
Fernandez Village	Ongoing	23	135	400	0.0400 ²			
Hoakea Expandable/ Elderly	Ongoing	22	241	700	0.0700 ²			
Honouliuli	Ongoing	55	350	1,000	0.1000 ²			
Gentry Ewa (Aloha State)	1988	223	3,300	8,900	0.5220 ²	0.3680 ²		
Gentry Ewa (Future) ³	1993	N.A.	4,481	18,333		0.5070 ²	0.8750 ²	0.4484 ²
Ewa Village	1991	351.9	1,825	7,300		.1820 ²	0.4040 ²	0.1440 ²
Honouliuli	Existing	N.A.	N.A.	729		.0729		
West Loch Hsg. Phase II ³	1995	163	900	3,420			0.3420 ²	
Golf Course Residential ³	1989	109	600	2,400		0.2400 ²		
TOTAL FOR TRIBUTARY AREA			11,832	43,182	0.7320	1.3699	1.6210	0.5924

1. Data not available (NA).
2. Based on 100 gpcpd and include normal infiltration and commercial establishment flows when not otherwise known.
3. Proposed Developments not designated on Development Plans.

TABLE II - 3 (Cont'd.)

WASTEWATER FLOWS GENERATED BY ONGOING, APPROVED AND PROPOSED DEVELOPMENTS
BY TRIBUTARY AREAS
(Source: DGP 1986, DPW Files)

Developments	Year Start	Area (Acs)	No. of Housing Units	Resident Population	Wastewater Generation (mgd)		
					1985-1990	1990-1995	1995-2000 2000-2005
<u>Ewa Tributary Area</u>							
Kapolei Town Center (A)	1989						
Commercial/Industrial		110.9	-	-	0.5950	0.5950	0.1297
Residential		143.0	1,200	4,800		0.0884 ⁴	0.3196 ⁴
Kapolei Town Center (B)	1989						
Commercial		65.3	-	-	0.3570	0.3570	0.0631
Residential		.85.0	750	3,000		0.2550 ⁴	
City-HHA							
Kapolei Village ³	1988						
Residential		521	4,006	16,024	0.1938 ⁴	0.6810 ⁴	0.4872 ⁴
Commercial, etc.		81	-	-		0.1403	
TOTAL FOR TRIBUTARY AREA				23,824	0.1938	1.7733	0.5124

1. Data not available (NA).
2. Based on 100 gpcpd and include normal infiltration and commercial establishments flows when not otherwise known.
3. Proposed Developments not designated on Development Plans.
4. Based on 85 gpcpd and include normal infiltration.

TABLE II - 3 (Cont'd.)

WASTEWATER FLOWS GENERATED BY ONGOING, APPROVED AND PROPOSED DEVELOPMENTS
BY TRIBUTARY AREAS

(Source: DGP 1986, DPW Files)

Developments	Year Start	Area (ACS)	No. of		Wastewater Generation (mgd)		
			Housing Units	Resident-Population	1985-1990	1990-1995	1995-2000 2000-2005
<u>Barbers Point</u>							
<u>Tributary Area</u>							
West Beach							
Residential	1989	187	5,200	14,560	0.1700 ⁴	0.8476 ⁴	0.2200 ⁴
Commercial/Resort	1987	455	-	-	0.4400	0.5351	
Nanakai-Honokai	Existing	53	286	1,287		0.1094 ⁴	
TOTAL FOR TRIBUTARY AREA			5,486	15,847	0.6100	1.4921	0.2200

1. Data not available (NA).
2. Based on 100 gpcpd and include normal infiltration and commercial establishment flows when not otherwise known.
3. Proposed Developments not designated on Development Plans.
4. Based on 85 gpcpd and include normal infiltration.

TABLE II - 3 (Cont'd.)

WASTEWATER FLOWS GENERATED BY ONGOING, APPROVED AND PROPOSED DEVELOPMENTS
BY TRIBUTARY AREAS

(Source: DGP 1986, DPW Files)

Developments	Year Start	Area (Acs)	No. of		Wastewater Generation (mgd)			
			Housing Units	Resident- Population	1985-1990	1990-1995	1995-2000	2000-2005
<u>Makakilo City</u>								
<u>Tributary Area</u>								
Makakilo Expansion	Ongoing	490	3,700	9,900	0.2475	0.24752	0.24752	0.24752
<u>Puuloa Tributary Area</u>								
Ewa Marina, Unit 2	1990	555	3,578	10,100		0.4130	0.7630	
Ewa Marina (Future) ³	2001	N.A.	500	2,000			0.2000 ²	
TOTAL FOR TRIBUTARY AREA			4,078	12,100		0.4130	0.7630	0.2000

1. Data not available (NA).
2. Based on 100 gpcpd and include normal infiltration and commercial establishment flows when not otherwise known.
3. Proposed Developments not designated on Development Plans.

TABLE II - 3 (Cont'd.)

WASTEWATER FLOWS GENERATED BY ONGOING, APPROVED AND PROPOSED DEVELOPMENTS
BY TRIBUTARY AREAS
(Source: DGF 1986, DPW Files)

Developments	Year Start	Area (ACS)	No. of		Wastewater Generation (mgd)		
			Housing Units	Resident-Population	1985-1990	1990-1995	1995-2000 2000-2005
<u>Waiala Tributary Area</u>							
Waiala	1995	62	300	1,000		0.10002	
Waiala (Future) ³	1996	1,395	7,900	18,900			3.500
TOTAL FOR TRIBUTARY AREA					19,900	0.1000	3.500

1. Data not available (NA).
2. Based on 100 gpcpd and include normal infiltration and commercial establishment flows when not otherwise known.
3. Proposed Developments not designated on Development Plans.

There are no municipal sewers in the (upper) Waiawa tributary area. If any development occurs in the area, the developers will be required to construct a subdivision sewer system that will be connected to the Pearl City WWPS.

Based on recent amendments to the Central Oahu DP area, approved developments will add 10,200 housing units to the market with a potential population of 33,700 people. Within the Waipahu-Crestview tributary area, the proposed Waikele development and the ongoing Gentry/Crestview and Waipahu projects will add 5,100 units to house an estimated population of 15,900 people. Ongoing and proposed projects in Waipahu-Kunia will add 2,300 units with a potential population of 8,200 residents.

The other tributary areas are projected to experience growth also. Various projects in Mililani will provide 2,500 units capable of housing 8,600 people. The proposed Hawaii Technology Park is expected to stimulate high-technology activities and commercial enterprises. If the proposed expansion of Mililani Town is approved, Mililani (Mauka) may add up to 6,600 units capable of housing 21,000 people.

An approved development in upper Waiawa will consist of 300 housing units with a potential population of 1,000 people. Still pending is a proposal to construct 7,900 additional units that could result in a population of 18,900.

The General Plan 2005 population guideline for the Central Oahu DP area is for a limiting population of 139,800 residents. This is an increase of 25,400 people to the 1984 population of 114,400. If the population of the Wahiawa-Whitmore Village area is assumed to increase at a nominal rate (42,200 to 44,300), and all tributary areas were to increase at an equal rate from their present population, the projected tributary population to the year 2005 will be as follows: Waipahu-Crestview, 38,000; Waipahu-Kunia, 17,500; Waiawa, 1,200; and Mililani-Waipio, 38,500.

The Ewa DP area consists of the following tributary areas: Ewa Beach, Puuloa, Ewa Village, Ewa, Makakilo, Barbers Point, Barbers Point NAS and Iroquois Point Housing. The original tributary areas included Honouliuli (redesignated Ewa Village), Ewa Beach, Makakilo, Barbers Point NAS and Iroquois Point Housing. Puuloa, Ewa and Barbers Point are newly created tributary areas which have been added because of approved developments in the DP area.

The Ewa Beach tributary area includes the existing housing tracts between the makai end of Papipi Road on the west and Ewa Beach Park on the east. Two proposed developments are expected to be constructed in the near future. On the western portion of the tributary, Unit 1 and portions of Unit 2 of the Ewa Marina (Ewa Marina-Makai) will be connected to the existing 24-inch interceptor sewer for conveyance to the Ewa Beach pump station. The projected population from this sector that will be connected to the Ewa Beach system is 4,900. The other ongoing development is located between North Road and Kauiki Street in the northeast section of the area. A proposed Lusk Hawaii project in the same area may add another 1,700 people. Municipal sewers are not available in this area; however, "dry" sewers should be installed as recommended in the 208 Plan for Oahu. The estimated population for these developments is 2,800 people. The three proposed developments will be capable of adding another 7,700 people to an existing population estimated to be 14,369 people in 1984.

The Puuloa tributary area includes the U. S. Navy West Loch Ammunition Facility and the major portion of Unit 2 of Ewa Marina (Ewa Marina Mauka). The ammunition facility is served by the 84-inch Honouliuli interceptor which traverses the facility. The major portion of the proposed Unit 2 of Ewa Marina is located in the tributary area and will provide 3,528 units capable of housing a projected population of 10,100 people. By the year 2000, another 500 units may be constructed with an estimated population of 2,000 people for a total of 12,100. Since no municipal sewer is available for the Ewa Marina Mauka, the developer will be required to construct a subdivision sewer system that will deliver sewage directly to the Honouliuli WWTP.

The Iroquois Point Housing and Barbers Point Naval Air Station are U. S. Navy tributary areas that were incorporated into the Honouliuli sewer system. Two (2) mgd of treatment capacity of Unit 1 of the Honouliuli WWTP were set aside for the two naval facilities in the initial design. The actual capacity reserved for the U. S. Navy was 2.66 mgd, including: Barbers Point NAS, 1.50 mgd; Iroquois Point Housing, 0.65 mgd; West Loch NAD, 0.02 mgd; Waialeale NAD, 0.02 mgd; Pearl City Peninsula Housing, 0.30 mgd; Manana Housing, 0.11 mgd; and McGrew Point Housing, 0.06 mgd.

The 1980 population at the two naval facilities decreased from 4,572 in 1970 to 3,915 for Iroquois Point and from 3,187 to 2,942 for Barbers Point. For the purpose of population projection to the year 2005, the 1980 population for military facilities are assumed to remain constant.

The Ewa Village tributary area extends from West Loch to Kaloi Gulch in the east-west direction, and from H-1 freeway to Geiger Road/Iroquois Road in the north-south direction. The existing plantation housings that constitute Ewa Village had a population of 2,637 in 1980 compared to 2,906 in 1970. Developments under construction within the tributary area include Fernandez Village and Hoakea Elderly Expandable which will add 520 housing units for approximately 1,760 people. Some of the occupants in the new developments were former residents living in older quarters in Ewa Village.

The Estate of James Campbell also has plans to develop Tenney and Renton Villages, and other parts of Ewa Village beginning in 1991. A total of 1,825 units may be constructed with an estimated population of 7,300 people.

The proposed Honouliuli development will provide 350 housing units between Fernandez Village and Farrington Highway for 1,000 people. This area has no nearby sewers.

Gentry-Ewa formerly known as the Aloha State development makai of Ewa Village is constructing 3,300 units for 8,900 people. Gentry-Ewa plans to construct a total of 7,781 units with an estimated population of 27,233 people.

The existing Makakilo community had a 1980 population of 7,691 people, more than double compared to 3,499 in 1970. New developments proposed in the tributary area include 3,700 housing

units with a projected population of 9,900 people. Additional apartment and commercial units are proposed between the existing community and H-1 freeway as part of Ewa Town Center. Wastewater from Makakilo is presently treated at Honouliuli WWTP by way of the Makakilo interceptor sewer.

Kapolei Town Center formerly known as Ewa Town Center is an approved development extending from Barbers Point Access Road to Nanakai Tract and between the OR&L R.O.W. to Farrington Highway and Makakilo. The tentative date when the development may start is 1989 and includes 1,950 housing units and about 176 acres of commercial and industrial developments for a population of 7,800 people. Most of the proposed development will be located in the Ewa tributary area.

Kapolei Village, a City-Hawaii Housing Authority project, is a proposed development located adjacent to Kapolei Town Center in the Ewa tributary area. Preliminary plans for this development include 4,006 housing units on about 850 acres with a projected population of 16,024 people.

The Barbers Point tributary area includes the existing Honokai-Nanakai Tract with a 1980 population of 1,287 people. Proposed developments include West Beach (Ko'Oolina Resort) and the portion of Ewa Town Center, west of Kalaeloa Boulevard. West Beach Resort consists of almost 900 acres with a potential resident and visitor population of 14,560 and 7,800 people, respectively. Construction on the site was started in 1987.

The James Campbell Industrial Park (JCIP) expansion consisting of 375 acres is located within the Barbers Point tributary area. Associated with the JCIP are the Barbers Point Deep Draft Harbor (144 acres), and the Camp Malakole Industrial Subdivision (40 acres). There are no plans to provide municipal sewers for the new Barbers Point Harbor and the existing and expanded Campbell Estate Industrial Park. The status of the proposed Amfac visitor attraction on 120 acres near Makakilo is not known.

Honokai-Nanakai Tract is served by municipal sewers and the Nanakai WWTP. Disposal of the effluent is by injection wells within the USDW. The flows in 1985-86 were 0.0847 mgd. Flows will be diverted to the Honouliuli WWTP when the West Beach interceptor sewer is completed and the plant will be abandoned.

The 1984 population within the Ewa DP area was estimated by DGP to be 36,000. The General Plan population guideline for the Ewa DP area for the year 2005 is 83,100. The WQPO projected population in the same area was much lower, 45,059 and 80,659, respectively, for the years 1990 and 2020.

In summary, as shown in Table II-3, planned, approved and proposed developments in the Ewa DP area will add 11,832 units in Ewa Village (Honouliuli) capable of housing a resident population of 42,453; 2,097 units in Ewa Beach for a population of 7,700; 3,700 units in Makakilo for a population of 9,900; 5,956 units in Ewa and portions of Makakilo and Barbers Point (Kapolei Village and Kapolei Town Center) for a population of 23,824; 4,078 units in Puuloa (Ewa Marina-Mauka) for a population of 12,100; and 5,200 units at Barbers Point (West Beach) for a population of 14,560. The total number of housing units proposed is 32,863 with a population of 110,537. If the assumption is made that the entire 32,863 housing units will be completed by the year 2005 and occupied by new residents except Ewa Village, the estimated population at 2005 could exceed 140,000 within the Ewa DP area.

Considering only approved developments, the total number of units proposed in the Ewa DP area is 21,951 with an estimated population of 66,660.

If we assume that the population in the present area were to increase at an equal rate from their present population, but limited to the availability and timing of housing units, the projected tributary population to the year 2005 would be as follows: Barbers Point NAS, 2,900; Iroquois Point Housing, 3,900; Ewa Beach, 20,400; Puuloa, 11,900; Ewa Village, 13,300; Makakilo, 18,300; Ewa, 6,100; and Barbers Point, 6,300.

The effect of wastewater generation by ongoing, approved and proposed developments within the Honouliuli tributaries on the capacity of the Honouliuli WWTP is shown in Table II-3. Flows from unsewered urbanized areas are also included as part of the sewer improvement district programs of the City. Approved developments have been designated on the Development Plans (map) (as of July 25, 1986), while proposed developments have not.

Table II-4 shows the projected population and average wastewater flow of the entire tributary areas of the Honouliuli WWTP to the year 2005. The

projected population is based on the Department of General Planning's population projections by Development Plan area, and does not necessarily include the entire projected population from developments, designated on Development Plans. Population from proposed developments not designated on Development Plans are not specified in the table.

The population and average wastewater flows from the Central Oahu sewerage district are shown in Table II-5. The district includes Wahiawa-Whitmore, Schofield-Wheeler and Helemano Military Reservation which may become tributary areas if their wastewater flows are diverted to the Honouliuli sewer system.

The construction of the initial phase of Unit 2 of the Honouliuli WWTP is estimated to cost \$23.0 million in 1987 dollars including engineering, construction supervision and contingency costs.

Since the passage of the Federal Water Pollution Control Act in 1957, Federal participation in the construction grant program for publicly owned treatment works (POTW) increased and peaked upon the passage of the Federal Water Pollution Control Amendment Act of 1972. The 1972 Act specified that the Federal grant shall be increased from 50 percent to 75 percent of the eligible cost of construction. The remaining 25 percent was shared between the State and the Counties on a 40:60 ratio, 10 percent for the State and 15 percent for the Counties.

In 1982, the Clean Water Act was amended by the Municipal Wastewater Treatment Construction Grant Amendment which reduced the Federal share to 55 percent of the construction cost for project beginning on or after October 1, 1984. The remaining 45 percent was shared by the State and the Counties on the same 40:60 ratio, 18 percent for the State and 27 percent for the Counties.

Levels of Federal funding authorization for the 201 program for POTW have decreased from a high of \$5 billion per year to \$2.4 billion for fiscal year 1986. In February 1987, the Water Quality Act of 1987 (P.L. 100-4) was passed over a presidential veto. The 1987 Act continued the authorization of \$2.4 billion for 1986, 1987, and 1988; then a reduction to \$1.2 billion for 1989 and 1990. The Act also created a new Title VI program to provide grants to capitalize state revolving loan funds in the amount of \$1.2 billion for 1989 and 1990; then \$2.4 billion for 1991, \$1.2 billion for 1993, and \$0.6 billion for 1994.

TABLE II - 4
 TRIBUTARY POPULATION AND AVERAGE FLOWS
 HONOULIULI WWTP

Tributary Area	Population ¹		Average Flows ^{1,2}	
	1984	2005	1984	2005
Pearl City-Halawa	82,830	91,100	11.21 ⁴	12.30 ⁴
Waipahu-Crestview	29,100	38,000	3.04 ⁴	3.98 ⁴
Waipahu-Kunia	13,350	17,500	1.42	1.86
Barbers Point NAS	2,940	2,900	0.72	1.50 ³
Iroquois Point Housing	3,920	3,900	0.73	0.65 ³
Ewa Beach	14,390	20,400	1.87	2.65
Puuloa	1,800	11,900	0.01	1.33 ⁴
Ewa Village (Honouliuli)	3,370	13,300	0.33	1.33
Makakilo	8,420	18,300	0.84	1.83
Ewa	-	6,100	-	1.66
Barbers Point	1,290	6,300	.08	1.51
Waiawa	-	1,200	-	.12
Mililani-Waipio	29,010	38,500	2.90	4.70
	190,420	269,400	23.15	35.42

1. Rounded. May not agree with population and flows shown in Table II-3.

2. Assumed all service areas are sewerred and connected to the plant. Average per capita flows vary because of infiltration and land use. Average flows are given in million gallons per day (mgd).

3. Capacity reserved for U. S. Navy Facilities.

4. U. S. Navy facilities flows included.

TABLE II - 5
 TRIBUTARY POPULATION AND AVERAGE FLOWS
 CENTRAL OAHU TRIBUTARY AREAS

Tributary Area	Population		Average Flows (mgd)	
	1984	2005	1984	2005
Wahiawa	17,184	18,900	1.44	1.59
Whitmore Village	2,691	3,100	0.17	0.21
Schofield Barracks*	18,899	18,899	3.20	3.20
Wheeler*	2,413	2,413	N.A.	N.A.
Helamano Military Reservation*	N.A.	N.A.	0.05	0.60

*Based on 1980 census and assumed to remain constant to the year 2005.

N.A. - Not available

Under the State revolving loan program, the State must provide at least 20 percent matching funds. The use of Federal money has been prioritized: first it must be used for the enforceable requirements of the Act including municipal compliance deadline; followed by other publicly-owned treatment works; corrective action under nonpoint sources; and the national estuary program. Types of assistance include loans; refinancing local debt obligations incurred after March 7, 1985; guaranties or insurance for local obligation; and as a source of revenue, a security for payment of principal and interest in State bonds where proceeds go into revolving funds.

Present EPA regulations (40 CFR 35.925-7, Appendix A) prohibit the use of Federal funds to finance future plant expansion for future population growth. Consequently, Unit 2 of the WWTP will not be eligible to receive Federal funds under Section 201 of the Clean Water Act.

Funds to finance future plant expansion or modification could be obtained by increasing existing monthly sewer service charges and/or the ad valorem (property) tax. However, this method does not seem equitable because present homeowners will be asked to finance facilities for which they will not receive any direct benefits. The other alternative of financing future wastewater facilities is to impose facility connection charges similar to the Honolulu Board of Water Supply's water system facilities charges for source-transmission and daily storage.

Proposed facility connection charges have been developed from the unit costs, incurred from the construction of the Sand Island sewer system. The Sand Island system was selected because its unit construction cost would be the least based on the concept of "economies of scale". The charges were derived for a typical single family household discharging 305 gallons of wastewater per day. This unit charge was called an equivalent single dwelling unit (ESDU). Multi-family units (five units or more) in condominiums and town houses will be assessed 0.7 ESDUs units.

Nonresidential charges would be based on water meter size of the premise. Charges for extra-strength wastewater would be higher.

The proposed facility connection charges would be paid by new residential applicants or developer prior to the issuance of a construction permit based on the number and type of dwelling units to be constructed. Payment of charges for non-residential applicants will be made prior to the issuance of a construction permit based on multiples of ESDU units.

All existing structures, residential and non-residential that are connected to the municipal sewers or to private wastewater systems, will be exempt from the facility connection charges. Enlargement of existing residential and non-residential structures would be subject to the proposed facility connection charge.

The proposed facility connection charges will take effect when a City ordinance is adopted. No date has been proposed when such an ordinance should be adopted, and the current proposal may be revised or not adopted by the City Council.

3. Environmental Characteristics

a. Plant Site

A wastewater treatment plant is an analogous light-industrial processing plant treating domestic sewage from residential dwellings, commercial enterprises and institutions and some industrial wastewater from manufacturing processing or other commercial operations. The wastewater being treated at the Honouliuli Plant is primarily domestic

sewage. The discharge of brewery process water into the Pearl City sewer system at one time has been discontinued and presently there are no major discharges of industrial wastewater into the entire system.

Organic wastes in domestic sewage undergo decomposition and emit foul air to the atmosphere at plant structures which are exposed to the elements. If left uncontrolled, plant odor can adversely affect nearby residents. Major sources of odor are enclosed and air that is withdrawn is treated by activated carbon scrubbers. Odor within the solid handling building is destroyed by incineration.

Organic wastes in the nonsoluble (solid) state are removed from the wastewater by primary treatment. Solids (sludges) removed by the process units are incinerated by a multiple hearth incinerator located in the solid handling building. The volatile solid in the sludges are destroyed by incineration and the remaining ash is transported to the municipal landfill.

Particulate matters from the incinerator stack are removed from the exhaust gases by a wet type venturi scrubber. The exhaust gases after treatment by the scrubber are monitored by an opacity analyzer to determine compliance with the requirements of the Department of Health air quality permit.

Noise disturbing sources are housed within structures or buildings. Only low noise level equipment such as low capacity centrifugal pumps are not enclosed. Since the plant site is adjacent to the Barbers Point NAS, general noise level is influenced by base activities.

The process units are located within the inner service roads of the plant with generous buffer distance to the fence line. Rows of trees are planted and maintained along the fence. Interior areas are landscaped. The plant irrigation system, using potable water, maintains the vegetation. Other housekeeping activities keep the plant in orderly conditions which negates the negative perspective of a wastewater treatment plant.

b. Receiving Waters

The ocean disposal system consists of a sewer outfall and a diffuser section where the effluent is discharged through small diameter ports into receiving water at the 200-foot iso-bath. The effluent is hydraulically distributed almost equally throughout the length of the diffuser section. A plume is emitted from each port which rises because of its bouyancy and merges with plumes from other ports to form an enlarged single plume at a depth determined by the existing thermocline.

The mixing of each individual plume of effluent with seawater in its upward movement is called "initial dilution." The initial dilution is determined by the discharge per unit length and depth. The initial dilution provided for the Barbers Point diffuser section is a minimum of 200:1. Maximum initial dilution occurs when the effluent plume reaches the ocean surface. Additional dilution of the effluent is obtained after initial dilution through diffusion and eddy flows in the receiving waters.

Based on data obtained from the City Monitoring Program, ambient water quality standards are being met.

The recreational areas along the West Mamala coast include Barbers Point Park, Ewa Beach Park, Oneula Beach, Iroquois Beach and Nimitz Beach. The latest available microbiological data as based on fecal coliform density indicated that bathing standards are being met. The Ewa Beach Park data analyzed by the Department of Health between 1981 to 1986 ranged from a geometric mean of 4.4 to 6.3 most probable number (MPN) per 100 milliliter (ml). Mean densities of fecal coliform counts at Onuela Beach and Nimitz Beach were 3.5 MPN/100 ml and 2.9 MPN/100 ml, respectively, between 1982 to 1983. The DOH monitoring status at Oneula Beach and Nimitz have been inactive since 1984. The present bathing standards (1987) in Chapter 11-54 for fecal coliform specify a geometric mean of 200/100 ml for recreational areas which indicates that the sanitary condition at the Ewa Beach Park, Oneula Beach and Nimitz Beach recreational areas was good.

Fecal coliform density within the zone of immediate dilution (ZID) in the immediate discharge area ranged from 1/100 ml to 37/100 ml between October 1986 to July 1987. Monitoring of enterococcus bacteria commenced during the April 1987 sampling period. Densities ranged from 1/100 ml to 9/100 ml within the ZID. The overall sanitary condition in West Mamala Bay is good.

West Mamala Bay is an open coastal water area and is classified Class A marine waters. According to Chapter 11-54, Water Quality Standards of the Department of Health, the uses of these waters that are to be protected are for recreational purposes, and aesthetic enjoyment. Other "use shall be permitted as long as it is compatible with the protection and propagation of fish, shellfish, and wildlife and with recreation in and on these waters". Class A waters "shall not act as receiving waters for any discharge which has not received the best degree of treatment or control compatible with the criteria established for this class". The DOH has determined that the Barbers Point discharge is a permitted use and the Honouliuli WWTP is providing the best degree of treatment compatible with established Class A water quality criteria.

There are two different criteria in Table II-6 applicable to open coastal waters. The "wet" criteria is applicable when the open coastal waters receive more than three million gallons per day (mgd) of fresh water discharge per shoreline mile. The "dry" criteria apply when less than 3 mgd of fresh water is discharged into the open coastal water per shoreline mile. The applicability of the criteria is based on field studies, none of which is known to have been done. The "dry" criteria is more stringent.

TABLE II-6
WATER QUALITY CRITERIA FOR CLASS A OPEN COASTAL WATERS¹

<u>Parameter</u>	<u>Geometric mean not to exceed the given value</u>	<u>Not to Exceed the given value more than ten percent of the time</u>	<u>Not to exceed the given value more than two percent of the time</u>
Total Nitrogen (ug N/L)	150.00* 110.00**	250.00* 180.00**	350.00* 250.00**
Ammonia Nitrogen (ug NH ₄ -N/L)	3.50* 2.00**	8.50* 5.00**	15.00* 9.00**
Nitrate + Nitrite Nitrogen (ug [NO ₃ +NO ₂]-N/L)	5.00* 3.50**	14.00* 10.00**	25.00* 20.00**
Total Phosphorus (ug P/L)	20.00* 16.00**	40.00* 30.00**	60.00* 45.00**
Light Extinction ² Coefficient (k units)	0.20* 0.10**	0.50* 0.30**	0.85* 0.55**
Chlorophyll <u>a</u> (ug/L)	0.30* 0.15**	0.90* 0.50**	1.75* 1.00**
Turbidity (N.T.U.)	0.50* 0.20**	1.25* 0.50**	2.00* 1.00**

* "Wet" criteria apply when the open coastal waters receive more than three million gallons per day of fresh water discharge per shoreline mile.

** "Dry" criteria apply when the open coastal waters receive less than three million gallons per day of fresh water discharge per shoreline mile. Applicable to both "wet" and "dry" conditions: pH Units - shall not deviate more than 0.5 units from a value of 8.1.

Dissolved Oxygen - Not less than seventy-five percent saturation.

Temperature - Shall not vary more than one degree Celsius from ambient conditions.

Salinity - Shall not vary more than ten percent from natural or seasonal changes considering hydrologic input and oceanographic factors.

1. Effective as of April 14, 1988.
2. Only required for 301(h) discharge.

III. DESCRIPTION OF THE AFFECTED AREA

A. Location

The existing wastewater treatment plant is located adjacent to Barbers Point NAS, identified by Tax Map Key: 9-1-12: 26 and 9-1-13: 7. The land is owned in fee by the City and County of Honolulu and has an area of 51.3 acres. One (1) acre of the plant site along the southwest corner is being used as the location of the Ewa Refuse Convenience Center. The nearest urban area which might be affected by the plant's operation is Varona Village, part of Ewa Village. Varona Village is about 1000 feet away from the mauka property line of the plant, separated by Oahu Sugar Company field. Barbers Point (military) housing is located 2.2 miles to the west of the plant. Access to the plant is by Geiger Road and Fort Weaver Road. Geiger Road is owned and maintained by the City and County.

There are no business and other economic activities outside of the plant area. Barbers Point NAS golf course, located in the south is the only recreational area nearby.

B. Population

Ewa Village is a Census Tract (CT) designated Place and has an area of 627 acres. The population in 1980 was 2,637, a decline of 10 percent from the 1970 population of 2,986. Ewa Village is part of CT 86.02, which also includes Honouliuli and Honokai Hale. For 1980, average household size was 4.07 persons, median age was 28.5 years, percent of foreign born was 32.5, percent of high school graduates was 44.8, percent unemployed was 6.4, and median family income was \$20,280.

Median family income is higher than the Ewa Neighborhood (\$19,458), and unemployment is also less (6%). However, compared with the average for the City and County, the resident of Ewa Village could be considered below the average in family income and education, had over twice the percent of foreign born, and had little less than twice the percent of unemployed in the civilian labor force. Other population characteristics are shown in Table II-2.

The Ewa Village tributary area where the plant is located had an estimated 1984 population of 3,370. The projected population in the year 2005 could potentially reach 13,300 based on currently approved developments on the City DP Land Use Map for Ewa. This projection, if it occurs, is a 400 percent increase of the current population.

C. Climate

The average temperature at Honolulu International Airport during the summer is 80.2 degrees Fahrenheit ($^{\circ}$ F) and 72.6 $^{\circ}$ F during the winter. The lowest and highest recorded temperatures were 53 $^{\circ}$ F and 94 $^{\circ}$ F, respectively. Average annual precipitation at the airport was 22.68 inches. Average relative humidity ranged from 72 percent in the morning to 56 percent in the afternoon.

The mean annual temperature at Barbers Point during the summer is 79 $^{\circ}$ F and 72 $^{\circ}$ F during the winter. The area is slightly dryer and the average rainfall is about 20 inches a year.

Northeasterly trade winds prevail at Barbers Point during most of the year. The mean speed is 9 knots (10.4 mph). Southerly or kona winds occur usually during the winter months. Wind direction and velocity at Barbers Point are shown in Figure III-1.

D. Soils

The plant site is located on part of the Ewa Plain, created during the later stages of the island's geologic history. Stream sediments from the Waianae and Koolau volcano ranges were deposited on the plain as the region sank. Coral reef formations were formed during the warmer, interglacial stages of the Ice Age when the sea level rose above its present height. Sea level declined during the glacial stage.

Soil borings taken in 1974 indicated that groundwater was approximately 35 feet below ground elevation throughout the plant site. The groundwater was slightly acidic. The underlying caprock aquifer consists of relatively brackish water prior to developmental stage. The caprock aquifer at most places is 100 to 200 feet thick.

The soils at the plant site consist of soils of the Lualualei-Fill land-Ewa association. Most of the overlying relatively thin soil are Mamala stony, silty, clay loam overlying coral rocks and consolidated coral sands. At the eastern boundary, soils are Ewa silty loam and Waialua silty clay. Soil borings taken during construction of Unit 1 showed that most of the area is underlain by at least 45 feet of moderately hard to soft coral reef and some stiff clay. The USDA, SCS Soil Map is shown in Figure III-2.

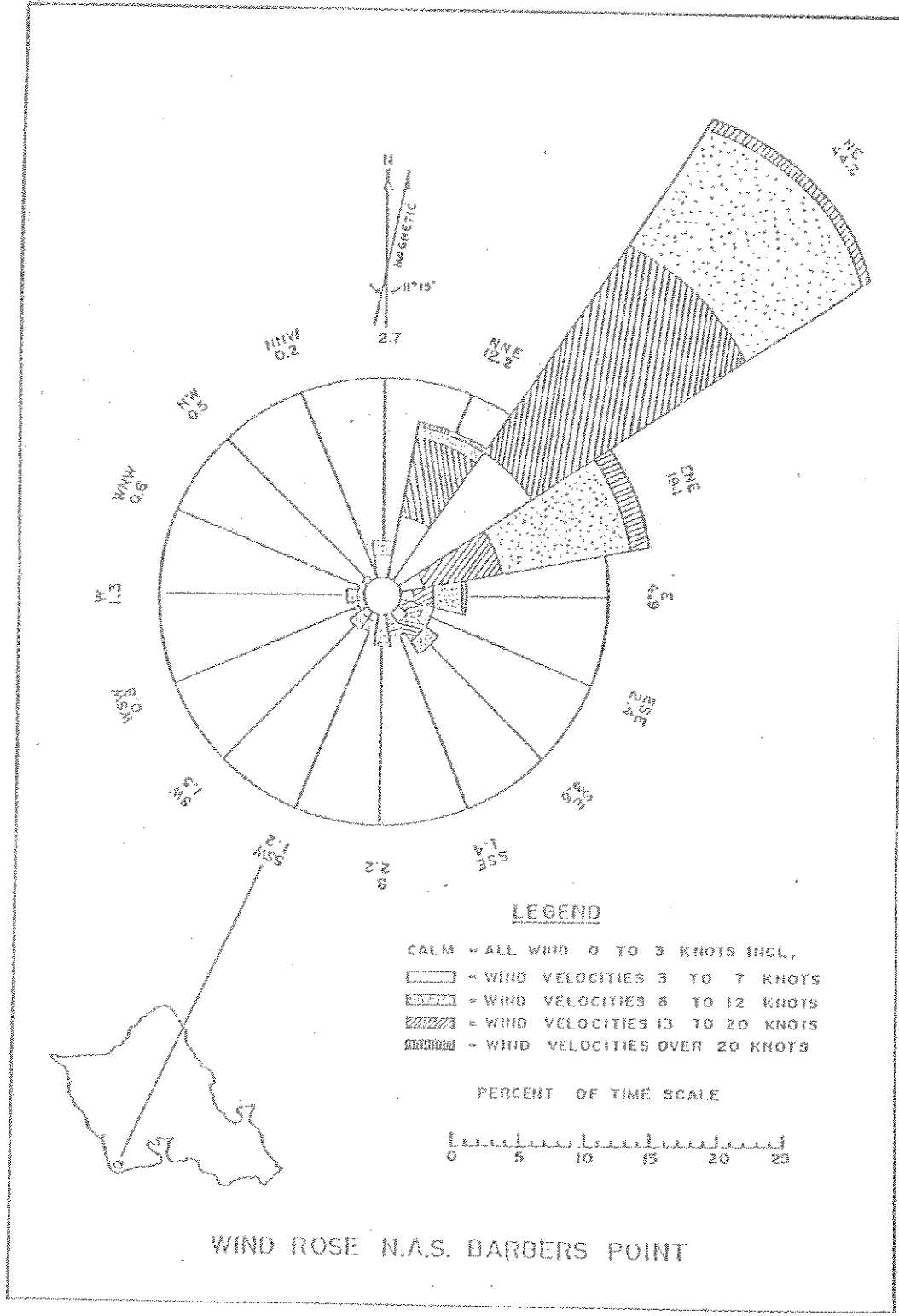
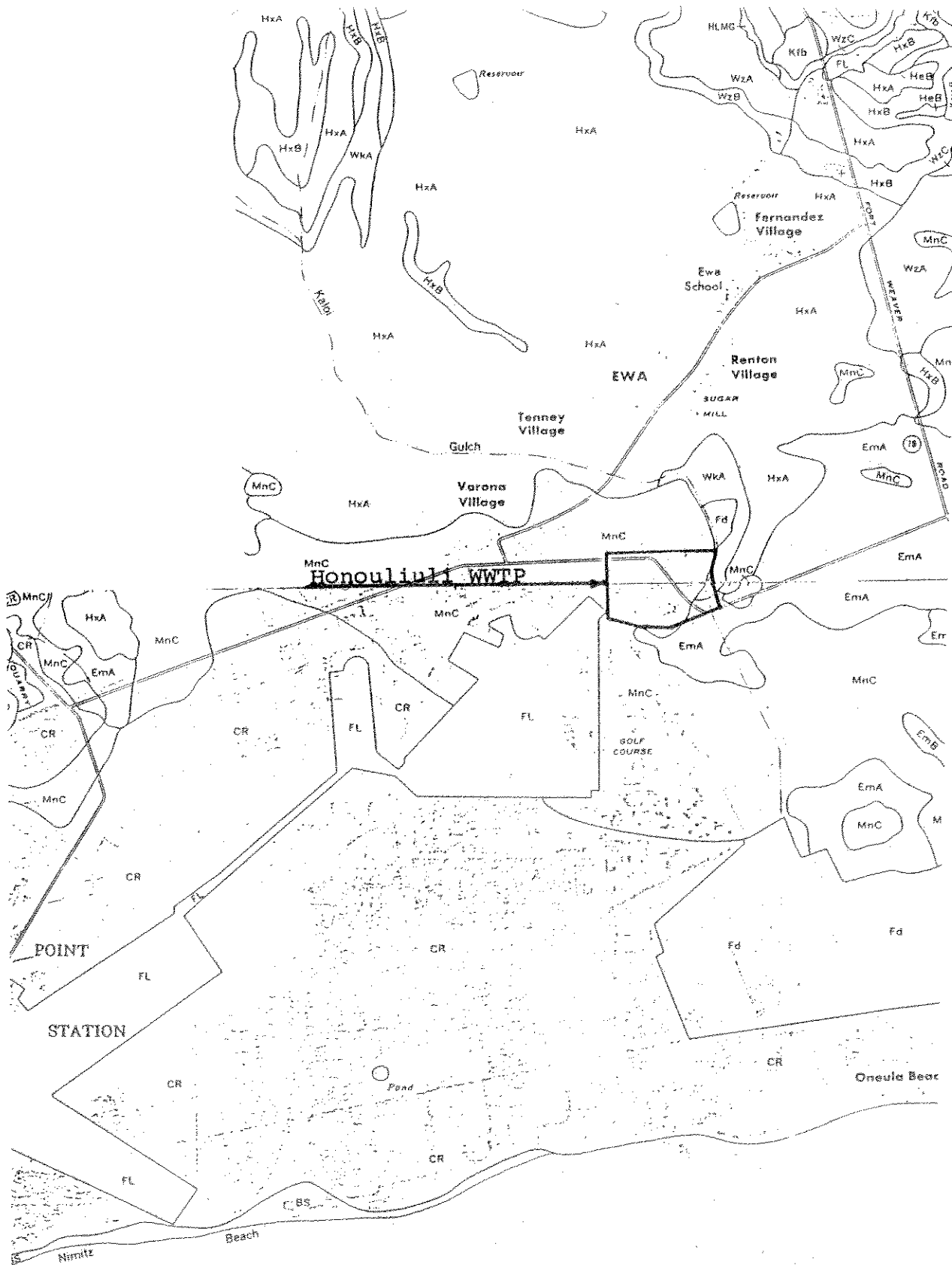


Figure III - 1



USDA, SOIL CONSERVATION SERVICE
SOIL SURVEY MAP

Figure III - 2

E. Hydrology

Kaloi Gulch which conveys storm runoff from a total drainage area of about 11.5 square miles traverses along the eastern boundary of the Honouliuli WWTP. The drainage area at the plant is approximately 9.2 square miles. Since the gulch is not able to contain the entire runoff in its unimproved state, a sheet flow is assumed to cross the northwest corner of the plant. This flow was estimated to be 1,600 cubic feet per second (CFS) and a 200-foot wide grassed swale was provided to direct the flow around the plant facilities and onto the downstream cane field.

Another 105 CFS from a drainage area of about 42 acres flow across the eastern portion of the plant through a 50-60 foot wide grassed swale onto the makai cane field. On-site drainage is entirely by surface flows via the aforementioned swales and the plant service roadway.

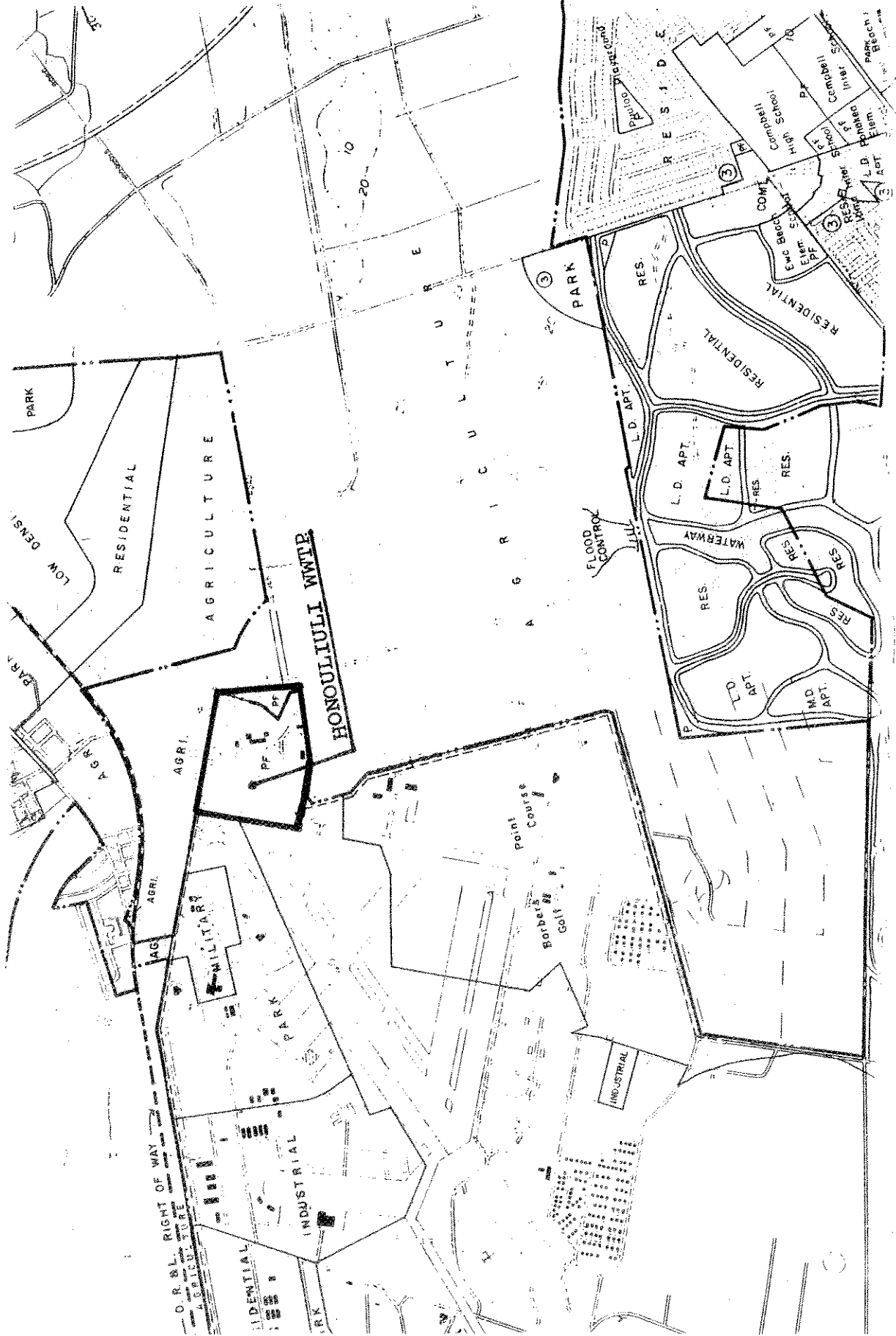
Portions of Varona Village and Ewa Village have been identified as Zone A in the Federal Flood Insurance Rate Map (Figure III-3). Barbers Point NAS, Honouliuli WWTP site and adjoining agricultural field are in Zone D, which are areas in which flood hazards are undetermined. Zone A are special flood hazard areas inundated by a 100-year flood.

Kaloi Gulch is expected to be improved as part of the off-site improvements of the Ewa Marina and Oahu West Developments. The improvements consist of two silting basins, one near Tenny Village and the other between Geiger Road and the marina; and a concrete lined channel along the Oahu West Developments to Geiger Road. The concrete channel improvements will be designed for a peak flow of about 13,700 CFS from a 100-year peak storm using design hydrographs of the U. S. Soil Conservation Services National Engineering Handbook.

When the channel improvements are completed, off-site flows through the plant will be drastically reduced or eliminated.

F. Land Use and Zoning

The Honouliuli WWTP site consists of two parcels identified by Tax Map Key 9-1-12:26 and 9-1-13:7. Parcel 26 is designated urban on the State land use map and is zoned Residential R-5. Parcel 7 is designated agriculture on the State land use map and is zoned Restricted Agricultural AG-1. Ordinance No. 4136 dated April 16, 1973, amended the General Plan of the City and County of Honolulu by changing the land uses of the site from military and agriculture to public facility (PF). Public facility is a permitted use on lands zoned Residential, R-5, and Agriculture, AG-1.



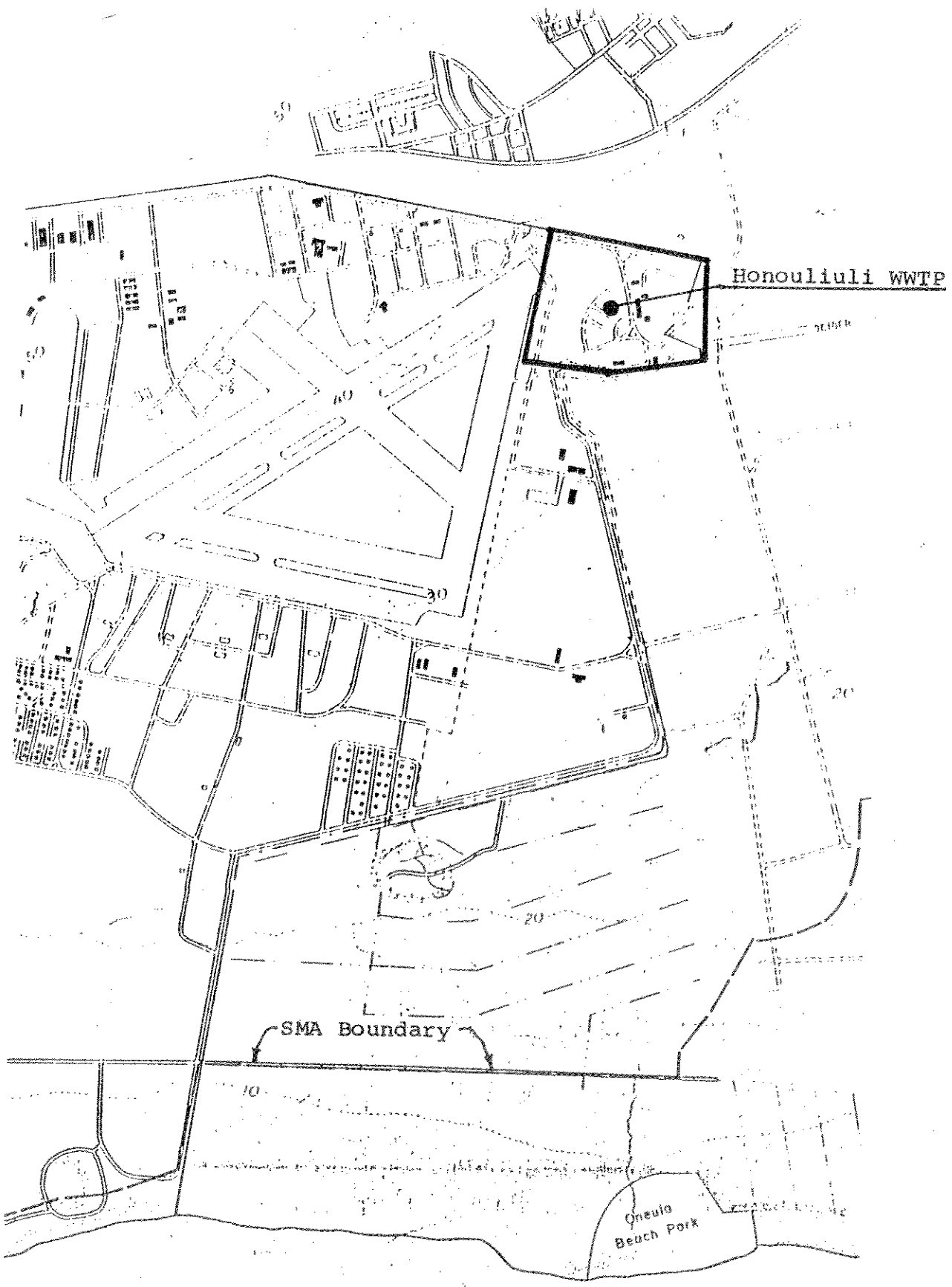
EWA DEVELOPMENT PLAN
LAND USE MAP

Figure III-4



Figure III - 5

DISTRICT MAP	STATE OF HAWAII	DISTRICTS
0-6	LAND USE COMMISSION	U = URBAN R = RURAL A = AGRICULTURAL C = COMMERCE
	DEPT. OF PLANNING & ECONOMIC DEVELOPMENT	
	EFFECTIVE DATE: DEC. 20, 1974	



PORTIONS OF SPECIAL MANAGEMENT
AREA MAP

Figure III - 6

The Honouliuli WWTP site was formerly part of the Barbers Point NAS. The station was initially an auxiliary airfield for Ford Island in the late 1930s. In 1942, after the Pearl Harbor attack, it was established as the Marine Corps Air Station, Ewa. After the expansion of the station to its present boundary, Barbers Point was designated a naval air station.

When the City and County acquired the site from the Federal government in 1974, the area was already improved and occupied by a small day care center and remnant of an abandoned runway. Subsequently, the area was graded during construction for Unit 1 of the plant in 1976 and the area was landscaped. Due to these activities, it must be assumed that anything of historic value was destroyed. No sink holes were uncovered at the site.

Further makai to where Ewa Marina (Makai) is proposed to be constructed, Davis (1979) has documented the presence of 107 cultural features in the One'ula Archaeological District (Site #80-12-2873) which may have belonged to an extensive late prehistoric or an early historic settlement. Subsequently, five test pits were excavated near the makai sugar cane fields. Depths of the pits were limited to the coral bedrock, ranging from 10 centimeters to 30 centimeters. No archaeological materials were uncovered in the five test pits. The district has been recommended for inclusion to the National Register.

H. Wildlife

The predominant wildlife identified at the site prior to construction of Unit 1 of the WWTP included mongoose, Hawaiian rats, mice, brown rats, black rats, and feral cats and dogs. Birds identified included Barred Dove, Spotted Dove, Japanese White-Eye, Brazilian Cardinal, American Cardinal, Golden Plover, and Rice Bird.

Wildlife in the general area or region compiled from surveys conducted in conjunction with the Barbers Point deep-draft harbor included the following species:

<u>Common Name</u>	<u>Scientific Name</u>
American Golden Plover	<u>Pluvialis dominica fulva</u>
Brazilian Cardinal	<u>Paroaria coronata</u>
Barred Dove	<u>Geopelia striata</u>
Black-headed mannikin	<u>Lonchura malacca atricapilla</u>
Black-crowned night Heron	<u>Nycticorax nycticorax hoactle</u>
Cardinal	<u>Cardinalis cardinalis</u>
Cattle Egret	<u>Bubulcus ibis</u>
Indian Mynah	<u>Acridotheres tristis</u>
House Finch	<u>Carpodacus mexicanus frontalis</u>
English Sparrow	<u>Passer domesticus</u>
Japanese White-Eye	<u>Zosterops palpebrosus japonicus</u>
Lace-necked Dove	<u>Streptopelia chinensis</u>
Ricebird	<u>Lonchura punctulata</u>
Ruddy Turnstone	<u>Arenaria interpres</u>
Ring-necked Pheasant	<u>Phasianus colchicus torquatus</u>
Sanderling	<u>Crocethia Alba</u>
Short-eared owl	<u>Asio flammeus sandwichensis</u>
Wandering Tattler	<u>Heteroscedus brevipes</u>
Pacific Golden Plover	<u>Pluvialis dominica fulva</u>
Feral Pigeon	<u>Columba livia</u>
Red-vented Bulbul	<u>Pycnonotus cafer</u>
Mockingbird	<u>Mimus polyglottos</u>

Sources: U.S. Fish and Wildlife Service (1975)
 Department of Land and Natural Resources (1975)

Wildlife species identified to the south of the project area in the vicinity of the proposed Ewa Beach Marina are listed as follows:

<u>Common Name</u>	<u>Scientific Name</u>
American Golden Plover	<u>Pluvialis dominica fulva</u>
Brazilian Cardinal	<u>Paroaria coronata</u>
Barred Dove	<u>Geopelia striata</u>
Barn Owl	<u>Tyto alba</u>
Black-crowned night Heron	<u>Nycticorax nycticorax hoactli</u>
Black-headed Munia	<u>Lonchura malacca</u>
Cardinal	<u>Cardinalis cardinalis</u>
Cattle Egret	<u>Bulbucus ibis</u>
English Sparrow	<u>Passer domesticus</u>
House Finch	<u>Carpodacus mexicanus</u>
Indian Mynah	<u>Acridotheres tristis</u>
Japanese white-eye	<u>Zosterops japonicus</u>
Orange-cheeked Waxbill	<u>Estrilda melpoda</u>
Peafowl	<u>Pavo cristatus</u>
Red-eared Waxbill	<u>Estrilda melpoda</u>
Red-vented Bulbul	<u>Pycnonotus cafer</u>
Ruddy Turnstone	<u>Arenaria interpres</u>
Rock Dove	<u>Columba livia</u>
Spotted Dove	<u>Zenaidura macroura</u>
Spotted Munia	<u>Lonchura punctulata</u>
Sanderling (Huna-kai)	<u>Calidris alba</u>
Shama Thrush	<u>Copsychus malabaricus</u>
Wandering Tattler	<u>Heteroscelus incanus</u>

Source: Table S-11, EIS for Ewa Marina (1985)

The species identified at the Barbers Point Harbor to the west and at the proposed Ewa Marina to the south are assumed to be present at the Honouliuli WWTP site.

The fauna identified at the Barbers Point Harbor and proposed Ewa Marina are assumed to be present at the WWTP site. The listing include:

<u>Common Name</u>	<u>Scientific Name</u>
Black rat (roof rat)	<u>Rattus rattus</u>
Brown rat (Norway rat)	<u>Rattus norvegicus norvigicus</u>
Hawaiian rat (Polynesian rat)	<u>Rattus exulans hawaiiensi</u>
House mouse	<u>Mus musculus domesticus</u>
Feral dog	<u>Canis familiaris</u>
Feral cat	<u>Felis catus</u>
Mongoose	<u>Herpestes auropunctatus</u>

I. Flora

The plant was completely landscaped during the site preparation phase of Phase I construction. A double tier of trees was planted around the plant periphery. Interior areas were grassed or covered with gravel beds. Crotons were planted between buildings and walkways. Existing monkey pod trees were retained where appropriate.

The flora used in the landscaping plan (Figure III-7) included the following:

<u>Common Name</u>	<u>Scientific Name</u>
Bombax	<u>Bombax malabarica</u>
Buffalo grass	<u>Stenotaphrum secundatum</u>
Cannon ball	<u>Couroupita guianensis</u>
Crotons	<u>Codiaeum variegatum</u>
Earpod	<u>Enterolobium cyclocarpum</u>
Kapok	<u>Ceiba pentandra</u>
Monkey pod	<u>Samanea saman</u>
Pak-lan	<u>Michelia alba</u>

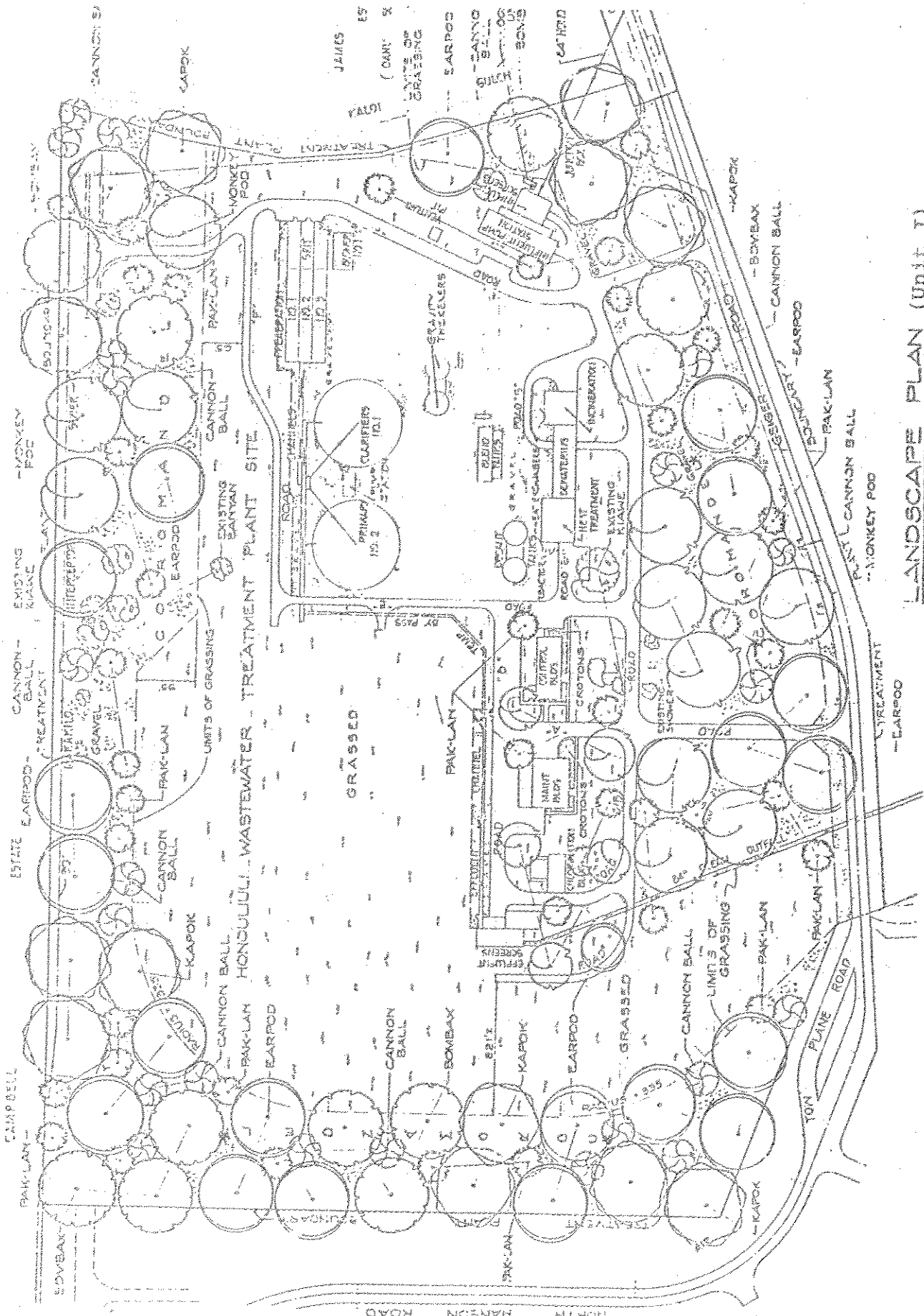
There are no plans to alter the landscaping at the driveways on Geiger Road that may interfere with the sight distances for both ingressing and egressing vehicles.

J. Utilities

Water, telecommunication and electric services are available at the plant site. These utility facilities were installed during construction of Unit 1 of the plant.

The Hawaiian Electric Company maintains a substation at the northeast-corner of the plant site which has an existing load of one MVA and an overall capacity of five MVA. Present average electricity consumption is about 450,000 kwh a month and is on HECO Schedule P. An additional 1,000 HP installed may be added during construction of Unit 2 and the total load should be about two MVA or less.

Originally, two 46 KV feeder lines and two transformers were planned to serve the plant; one 46 KV line from Ewa Village at the northern boundary, and the second from Geiger Road at the south. The second 46 KV line from Geiger Road and the second transformer were not installed during the construction of Unit 1 because of cost constraints. In addition, it was thought the one 46 KV line was sufficient to serve a primary plant; however, two lines would have been desirable for a secondary plant. Also, the outage record of the Ewa Beach substation indicated that interruptions were highly unlikely or would be of short duration.



LANDSCAPE PLAN (Unit I)
 SCALE: 1"=100'
 *Replaced by gravel

Figure III - 7

A second 46 KV feeder line and transformer may be constructed for added reliability for Unit 2, but the actual needs have not been determined yet because no advance design work has been initiated.

HECo has initiated a route selection study for a new 138 KV transmission line between Waiiau Power Plant to the Campbell Park substation. One alternative route would traverse near the mauka boundary of the Barbers Point NAS and the plant. If this route was selected, and a new 46 KV feeder line was provided from the proposed 138 KV transmission line to the Naval Air Station, it may be desirable for the City to be connected to this same feeder line to serve the plant.

As a safeguard for power outage, one existing and one proposed 36 mgd diesel-powered influent pump will be activated. A 600 kw generator in the pump station building provides emergency power for other facilities during electric outages.

During the construction of Unit 1, a 12-inch water line was installed along Geiger Road and connected to the Board of Water Supply's line on Fort Weaver Road. The initial average water consumption was about 17 million gallons per month (mgm), which was much higher than previously planned. A dual water system using secondary effluent and potable water was not implementable because secondary treatment units were never built.

The applications considered for secondary effluent included unchlorinated effluent for the influent and effluent screens, grit and preaeration tanks, wet scrubbers for the incinerator, dewatering, and chlorination solution feed water. Chlorinated reclaimed effluent was scheduled for housekeeping chores, froth control, ash conditioning, and lawn sprinkling.

Three options were considered to replace reclaimed secondary effluent; potable water, groundwater, and primary effluent. The use of potable water required only minor changes in the in-plant piping system plans and was adopted. The use of groundwater was deemed feasible, after analysis of dewatering water during the excavation of the pump station substructure in 1977 at the plant site. The chloride concentration of the groundwater was 445 mg/l, but no pumping tests were conducted to determine the maximum withdrawal rate.

Because of the need to conserve potable water, primary effluent was used on a trial basis for the incinerator wet scrubber. The reclaimed effluent passes through a rotary filter which removes suspended solid. Apprehension of system and filter clogging from the 0.007 percent solid effluent has not materialized. The amount of reclaimed primary effluent used for the wet scrubber is averaging about 6 mgm (200,000 gpd). Since the primary effluent reuse system was initiated, potable water consumption has decreased to 10.4 mgm. The high and low monthly consumptions were 18.2 mgm and 6.9 mgm, respectively.

It is proposed that a test well be drilled at the plant site to determine optimum yield from the shallow Ewa aquifer. A permit application will be sent to the Department of Land and Natural Resources (DLNR) in accordance with Title 13, Subtitle 7, Chapter 166, "Rules for the Control of Groundwater Use in the State of Hawaii," since the plant site is located within the Pearl Harbor Ground Water Control Area.

The proposed use of groundwater based upon its preliminary water quality will be dependent upon the optimum withdrawal rate and its availability. If optimum withdrawal rate is low, groundwater will be pumped in a tank (size to be determined later) for storage. Some of the potential uses of the ground water are lawn irrigation, plant cleanup, froth control, and incinerator scrubber.

Potable water requirement for Unit 2 will be dependent on the continued reuse of the effluent for the wet scrubber, and the potential usage of groundwater at the plant site. The gross estimated increase of potable water usage is between 50 to 100% over the present monthly consumption of 10 mgm.

Discussion: The proposed expansion of the Honouliuli WWTP will allow presently undeveloped areas in the West Beach - Makakilo areas to be urbanized as these areas are part of the tributary areas of the plant. Other approved developments in the Ewa and Central Oahu Development Plan areas as well as the Halawa - Pearl City sector of the Primary Urban Center will be served. The population projection guidelines from the State and County were used in deriving the year 2005 design resident population in the tributary areas of the plant.

If the 1987 Amendment to the General Plan assigns the entire two percent (19,000 persons) to the Ewa DP area, the required capacity will be increased to about one percent over the proposed 38 mgd capacity for the year 2005. Therefore, the expansion of the plant is in conformance to Objective C and its policies under population of the General Plan.

2. Natural Environment - Objective A - "To protect and preserve the natural environment of Oahu."

Policy 7 - "Protect the environment from damaging levels of air, water, and noise pollution."

Discussion: The Honouliuli sewer system collects, conveys, and treats municipal wastewater from its tributary areas at an average daily flow of 21 mgd (1987). After treatment, the effluent is discharged 1.7 miles offshore in 200-foot waters of West Mamala Bay. Prior to the construction of the treatment plant and the ocean disposal system, Pearl Harbor, its tributary streams and other nearshore waters were being used as receiving waters for the discharge of treated effluent from municipal and military wastewater treatment plants. Because these receiving waters had very limited assimilative capacity to stabilize the residual waste loads in the effluent, many water quality problems were created. These water quality problems have been corrected with the construction of Unit 1 of the Honouliuli Plant and the disposal of the plant effluent in deep waters of West Mamala Bay.

Construction of Unit 2 will allow the plant to adequately treat the waste loads from a projected resident population of 269,400 by the year 2005. The treatment and disposal systems were originally designed for an ultimate population of 387,800 and to be built in increments. There are no water quality problems in the receiving waters at the present time and none are anticipated when the wastewater flows are increased from 21 mgd in 1987 to 38 mgd in 2005.

The plant expansion is in conformance with the Objective A and Policy 7 under Natural Environment of the General Plan.

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

Policy 1 - "Plan for the construction of new facilities and utilities in the various parts of the island according to the following order of priority: first, in the primary urban center; second, in Ewa; and third, in the urban-fringe and rural areas."

Objective C - "To develop a secondary urban center in the West Beach - Makakilo area."

Policy 1 - "Allocate funds from the City and County's capital improvement program for public projects that are needed to bring about the gradual development of the West Beach - Makakilo area as a second urban center."

Discussion: The proposed expansion of the Honouliuli WWTP is listed in the current 1988-89 capital improvement program with construction scheduled for the 1990 Fiscal Year. Planning and engineering is scheduled during the 1988 Fiscal Year. The plant expansion is compatible with the above objectives and policies under Physical Development and Urban Design of the General Plan.

C. State Land Use Law

In 1961, Chapter 205, Hawaii Revised Statutes (HRS) was adopted, establishing the State land use law. Under the law, all lands in the State was assigned to one of four districts: urban, rural, agricultural and conservation. The rural classification does not apply in the City and County. The site of Honouliuli WWTP is assigned to the urban district. Activities and uses within urban districts are governed by the applicable provisions of the City and County's Land Use Ordinance (86-96).

D. Hawaii State Plan

The Hawaii State Plan is a long-range, comprehensive document containing statements of the social, economic and physical goals to be achieved for the general welfare and prosperity of Hawaii people. State Functional Plans define, implement and are to be in conformance with the overall theme, goals, objectives, policies and priority guidelines of the State Plan. Provisions of the State Plan are contained in Chapter 226, HRS, adopted in 1978, and amended in 1986 by Act 276.

The objectives and policies applicable to the expansion of the Honouliuli WWTP are listed in Sections 226-11, 226-13, 226-14, 226-15, 226-16 and 226-104, HRS.

1. Section 226-11: Physical Environments - Land Based, Shoreline and Marine Resources. The objectives and policies of this section are based on the multiple-use approach which encourages appropriate utilization of the State limited physical resources to support economic growth and self-sufficiency, and at the same time, provides recreational, scientific and subsistent opportunities for current and future residents.

Objective 226-11(a)(1) "Prudent Use of Hawaii's land-based, shoreline, and marine resources."

Objective 226-11(a)(2) "Effective protection of Hawaii's unique and fragile environmental resources."

Policy 226-11(b)(2) "Ensures compatibility between land-based and water-based activities and natural resources and ecological systems."

Policy 226-11(b)(4) "Manages natural resources and environs to encourage their beneficial and multiple use without generating costly or irreparable environmental damage."

Discussion: The existing treatment plant site is compatible with the activities adjacent to Barbers Point Naval Air Station and surrounding sugar cane field of the Oahu Sugar Company. Mitigating devices on the plant site control odor, noise and particulate emission.

The discharge of the effluent from the existing ocean disposal system does not interfere with the beneficial and multiple use of receiving waters in West Mamala Bay. The receiving waters stabilize the residual wastes in the effluent naturally without adverse depletion of dissolved oxygen. Residual nutrients in the effluent are eventually recycled to the primary trophic level without a noticeable increase of algae growth. Monitoring in the receiving waters indicates that ambient water quality standards are being maintained.

2. Section 226-13: Physical Environment - Land, Air and Water Quality. The objective and policies of this section are to stem environmental degradation and reduce associated health risks of Hawaii's residents affected by the quality of our land, air and water resources.

Objective 226-13(a)(1). "Maintenance and pursuit of improved quality in Hawaii's land, air and water resources."

Policy 226-13(b)(2). "Promote the proper management of Hawaii's land and water resources."

Policy 226-13(b)(3). "Promote effective measures to achieve desired quality in Hawaii's surface, ground, and coastal waters."

Discussion: The plant provides an adequate degree of treatment (primary); and the effluent is discharged at a great depth (200 feet) and distance from shore (9,000 feet) without environmental impairment to the marine ecosystem. Ambient water quality standards are being maintained and bacteriological standards are being met in the area of the discharge.

3. Section 226-14: Facility Systems - In General. The objective and policies under this section recognizes that pattern, rate and scale of urban development are influenced by the availability of facility systems. Facility systems can be "growth inducing" or "growth alleviating".

Objective 226-14(a) "Water, transportation, waste disposal and energy and telecommunication systems that support statewide social, economic, and physical objectives."

Policy 226-14(b)(1) "Accommodate the needs of Hawaii's people through coordination of facility system and capital improvement priorities in consonance with State and County plans."

Policy 226-14(b)(2) "Encourages flexibility in the design and development of facility systems to promote prudent use of resources and accommodate changing public demands and priorities."

Policy 226-14(b)(4) "Pursue alternative methods of financing programs and projects and cost-saving techniques in the planning, construction and maintenance of facility systems."

Discussion: The proposed expansion of the Honouliuli WWTP is in conformance with the land use policies of the City and County of Honolulu. Hence, the proposed expansion is considered growth alleviating because it is accommodating demands generated by planned developmental growth established in the City General Plan.

The plant treatment capacity has the required flexibility to accommodate changing public demands and priorities. Capacity is increased incrementally by process units. The plant site has sufficient area to accommodate secondary treatment units, if the need arises.

With the phasing out of the Section 201 construction grant program under the Clean Water Act shortly, alternate financial programs might be needed. Loans may become available under a State Water Pollution Control Revolving Funds Program that may be established by the State. A proposed facility connection charge has been suggested to finance future plant expansion. This proposal will have to be adopted by the Honolulu City Council.

4. Section 226-15: Facility Systems - Solid and Liquid Wastes. The objectives and policies of this section are based upon the safe disposal of solid and liquid wastes to protect public health and avoid serious environmental damages while accommodating planned growth.

Objective 226-15(a)(1) "Maintenance of basic public health and sanitation standards relating to treatment and disposal of solid and liquid wastes."

Objective 226-15(a)(2) "Provision of adequate sewerage facilities for physical and economic activities that alleviate problems in housing, employment, mobility and other areas."

Policy 226-15(b)(1) "Encourage the adequate development of sewerage facilities that complement planned growth."

Policy 226-15(b)(2) "Promote reuse and recycling to reduce solid and liquid wastes and employ a conservation ethic."

Policy 226-15(b)(3) "Promote research to develop more efficient and economical treatment and disposal of solid and liquid wastes."

Discussion: The plant expansion will complement planned growth in the tributary areas as stated in the 1982 General Plan of the City and County.

Studies conducted in the 1970's by the City and County showed that primarily-treated effluent can be safely discharged in deep oceanic waters through long outfall sewer without adversely affecting the environment. The more costly alternative was to discharge secondary effluent in shallow waters through a relatively shorter outfall sewer. Although secondary treatment was mandatory beginning in 1972, long, deep ocean disposal systems were constructed at Sand Island and Barbers Point. The Clean Water Act of 1977 provided marine waiver for secondary treatment, thus providing a vehicle for the City to save millions of dollars in construction and operating costs.

The use of wastewater effluent for sugar cane irrigation was being practiced at Oahu Sugar Company Field 215, mauka of Waipahu Mill until it was terminated in November 1986 at the request of the sugar company. The only area where the reuse of wastewater effluent is still being practiced is at Wahiawa and Whitmore Village. Effluent from the two municipal plants is discharged into Lake Wilson and subsequently reused in the mauka fields of the Waialua Sugar Company. This practice which started around 1930 will continue unless the sugar company decides to cease operation. In addition to the City's plants, the U.S. Army Schofield STP discharges its effluent directly into the plantation irrigation system.

Studies on the potential reuse of the primarily treated effluent from the Honouliuli WWTP was started in 1986 at Oahu Sugar Company Field 49, adjacent to the plant site. Previously, studies near Mililani WWTP considered only the reuse of secondarily treated effluent. The in-situ studies, conducted by the University of Hawaii Water Resources Research Center will determine the feasibility of the following objectives: recharging of the Ewa caprock aquifer to reduce its concentration of total dissolved solids and chlorides with the percolate of the effluent after irrigation of californian grass and sugar cane; establishing optimum recharge and irrigation rates; land requirements, health and aesthetic factors; and crop harvest and quality.

California grass and sugar cane cultivation will be used to filter and upgrade the effluent quality and thus produce a large quantity of percolating water to recharge and reduce the chloride concentration of the caprock groundwater. Final results of the studies will not be known until late 1988.

5. Section 226-16. Facility System - Water. The objective and policies of this section are directed to the heightened concern over water supplies, safe drinking water standards, alternative water services, and reducing water demand.

Objective 226-16(a) "Provision of water to adequately accommodate domestic, agricultural, commercial, industrial, recreational, and other needs within resource capacities."

Policy 226-16(b)(3) "Reclaim and encourage the productive use of runoff water and wastewater discharges."

Discussion: Whenever wastewater effluent is used by the sugar plantation company for irrigation as stated in the preceding section, there is that possibility that the plantation will be able to reduce its consumption of potable waters from groundwater pumpage. Hence, more potable water could be available for domestic consumption.

Municipal wastewater and storm runoff are conveyed in separate systems. Storm runoff is discharged into streams, reservoirs and coastal waters. Municipal wastewater is conveyed to treatment plants and the effluent is discharged into receiving waters. To the extent possible, storm runoff is kept out of sewerage systems because it occupies finite capacity in sewers, pumping stations and treatment plants which is allocated for the disposal of organic wastes.

A water treatment plant would be the appropriate facility to treat raw water from a reservoir or stream.

6. Section 226-104: Population Growth and Land Resources Priority Guidelines. The priority guidelines of this section emphasize resources protection, preservation needs, and protection of shorelines, agricultural lands, wetlands, and communities whose residents prefer rural or unique lifestyle.

Section 226-104(a)(1) "Encourage planning and resource management to insure that population growth rates throughout the State are consistent with available and planned resource capacities and reflect the needs and desire of Hawaii's people."

Section 226-104(a)(3) "Ensure that adequate support services and facilities are provided to accommodate the desired distribution of future growth throughout the State."

Section 226-104(b)(6) "Seek participation from the private sector for the cost of building infrastructure and utilities, and maintaining open spaces."

Section 226-104(b)(13) "Protect and enhance Hawaii's shoreline, open spaces, and scenic resources."

Discussion: The proposed expansion of the Honouliuli WWTP is in conformance with the priority guideline of this section. Planning for the expansion supports the land use policies of the City's 1982 General Plan.

Private sectors are participating in building portions of the infrastructure under the City's subdivision rules and regulations, and the Sewer Ordinance. These facilities include interceptor and trunk sewers and pumping stations.

E. State Health Functional Plan

The twelve State functional plans, prepared pursuant to Chapter 226 HRS, further define and implement statewide guidelines with respect to the goals, objectives, policies and priority guidelines in the Hawaii State Plan. One of the major objectives of the State Health Functional Plan is to

"prevent environmental degradation and enhance the quality of the air, land and water." The objective, policy and implementing actions of the environmental health program that are applicable to the proposed action are discussed below:

1. Environmental Health

Objective A "To prevent degradation and enhance the quality of Hawaii's air, land and water."

Policy A(1) "Prevent and control the pollution of air, water and land through long-range planning, environmental impact assessments, interagency coordination, programs, regulations, and financial assistance to local government."

Implementing Action A(1)(c) "Administer the Wastewater Treatment Work Construction Grant Program for construction or upgrading of public wastewater treatment plants, pumping stations and sewer lines, and review private wastewater treatment systems."

Implementing Action A(1)(d) "Support efforts to use treated effluent for agricultural irrigation."

Implementing Action A(1)(e) "Administer permit program for discharges to the air, surface and groundwater, and for treatment and disposal of solid wastes."

Implementing Action A(1)(g) "Investigate reports of pollution of air and water and ensure that compliance schedules and required actions are taken by dischargers by monitoring and inspection."

Discussion: The Department of Health and Public Works interact frequently in environmental planning. Currently, we are revising and updating the 208 Water Quality Management Plan for the City and County of Honolulu.

The proposed expansion of the Honouliuli WWTP is not eligible for Federal funds under Section 201 of the Clean Water Act. No State funds have been appropriated to assist the City and County in the financing of the project. If a water pollution control revolving fund is established in the State to provide assistance for the construction of treatment works under Title VI of the Water Quality Act of 1987, the proposed project may be eligible for a State loan.

The Department of Health and Public Works are both supporting agencies, among others on the research work being conducted on the reuse of primary effluent for the irrigation of sugar cane and californian grass at Oahu Sugar Company Field 49, adjacent to the Honouliuli WWTP site. This proposal is intended to reduce the chloride concentration of the Ewa caprock aquifer by dilution with the percolate from the irrigated effluent.

The Division of Wastewater Management conducts water quality monitoring in the receiving waters, analyzes wastewater effluent under the National Pollutant Discharge Elimination System (NPDES) permit; and monitors the emission of the sludge incinerator as part of the air quality permit. Both permit programs are administered by the Department of Health. Permit reports and data are reviewed by the Department of Health for compliance.

F. Coastal Zone Management Program

The Hawaii Coastal Zone Management Program was established in 1977 under Chapter 205A, HRS, and administered by the Department of Business and Economic Development (DBED). DBED reviews projects conducted or financially supported by, or requiring permits from Federal agencies to ensure that those activities will be conducted in a manner consistent with the Hawaii Coastal Zone Management Program.

The proposed expansion of the Honouliuli WWTP will not be eligible for Federal financial assistance under Section 201 of the Clean Water Act, and no Federal construction permit will be required. A Section 301(h) waiver for secondary treatment is presently being processed by the U.S. Environmental Protection Agency (EPA) for the 25 mgd capacity in Unit 1 of the treatment plant. The duration for the 301(h) waiver is five years. When the waiver is renewed, Unit 2's capacity will be added for a total treatment capacity of 38 mgd.

The objectives and policies of the Hawaii CZM Program are reviewed and discussed below:

1. Recreational Resources

Objective 205A-2(b)(1)(A) "Provide coastal recreational opportunities accessible to the public."

Policy 205A-2(c)(1)(A) "Improve coordination and funding of coastal recreational planning and management."

Policy 205A-(c)(1)(B) "Provide adequate, accessible and diverse recreational opportunities in the coastal zone management area by:

i) Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;

ii) Requiring replacement of coastal resources having significant recreational value, including but not limited to surfing sites and sandy beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the State for recreation when replacement is not feasible or desirable;

iii) Providing and managing adequate public access, consistent with conservation of natural resources, to and along shoreline with recreational value;

iv) Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;

v) Encouraging expanded public recreational use of County, State, and Federally owned or controlled shoreline lands and waters having recreational value;

vi) Adopting water quality standards and regulating point and non-point sources of pollution to protect and where feasible, restore the recreational value of coastal waters;

vii) Developing new shoreline recreational opportunities, where appropriate, such as artificial reefs for surfing and fishing; and

viii) Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, county planning commissions; and crediting such dedication against the requirements of section 46-6."

Discussion: The existing discharge of the Barbers Point ocean outfall sewer does not interfere with coastal recreational activities in West Mamala Bay. The existing disposal system was designed to conform with the State water quality standards and provide submergence of the effluent plume for most of the time.

The outfall structure, pipe, and armor rocks provide hard bottom sites for sessile organisms, refuge for invertebrates and fishes, and feeding and breeding habitats for fish species normally found in shallower reef environments.

Nutrients from the effluent contribute to the propagation of marine life without adversely affecting water quality, or creating algae bloom in the receiving waters.

The existing fish aggregation buoys and a deepwater artificial reef being developed by the Department of Land and Natural Resources near the ocean disposal system are compatible with the discharge because the outfall seems to attract a high diversity of fish species.

The sanitary conditions at Ewa Beach Park, Oneula Beach and Nimitz Beach are excellent based on the Department of Health (DOH) bathing standards in Chapter 11-54. The latest fecal coliform count (most probable number) was 4.8/100 ml at Ewa Beach, 3.5/100 ml for Oneula Beach, and 2.9/100 ml for Nimitz Beach. The fecal coliform count at the area of discharge was less than 2/100 ml. The overall sanitary conditions in West Mamala Bay are considered excellent and the impact on recreational facilities and activities is considered nil.

2. Historic Resources

Objective 205A-2(b)(2)(A) "Protect, preserve, and, where desirable, restore those natural and man-made historic and pre-historic resources in the coastal zone management area that are significant in Hawaiian and American history and culture."

Policy 205A-2(c)(2)(A) "Identify and analyze significant archaeological resources;"

Policy 205A-2(c)(2)(B) "Maximize information retention through preservation of remains and artifacts or salvage operations; and"

Policy 205A-2(c)(2)(C) "Support State goals for protection, restoration, interpretation, and display of historic resources."

Discussion: Not applicable. No historic/archaeological resources were discovered during the mass grading within the plant site during the construction of Unit 1. If any archaeological resources are uncovered during excavation, construction will be halted, and the State Historic Preservation Officer will be called.

3. Scenic and Open Space Resources

Objective 205A-2(b)(3)(A) "Protect, preserve and, where desirable, restore or improve the quality of coastal scenic and space resources."

Policy 205A-2(c)(3)(A) "Identify valued scenic resources in the coastal zone management area;"

Policy 205A-2(c)(3)(B) "Insure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;"

Policy 205A-2(c)(3)(C) "Preserve, maintain and, where desirable, improve and restore shoreline open space and scenic resources; and"

Policy 205A-2(c)(3)(D) "Encourage those developments which are not coastal dependent to locate in inland areas."

Discussion: New buildings at the plant site will be low-profile structures. Open space buffer areas around the plant units will be landscaped.

The effluent plume in the receiving waters will continue to be submerged most of the time except occasional surfacing may occur during winter months. Aesthetics will not be distracted by floatable materials, turbidity, and discoloration.

4. Coastal Ecosystems

Objective 205A-2(b)(4)(A) "Protect valuable coastal ecosystems from disruption and minimize adverse impacts in all coastal ecosystems."

Policy 205A-2(c)(4)(A) "Improve the technical basis for natural resource management;"

Policy 205A-2(c)(4)(B) "Preserve valuable coastal ecosystems of significant biological or economic importance;"

Policy 205A-2(c)(4)(C) "Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and"

Policy 205A-2(c)(4)(D) "Promote water quantity and quality planning and management practices which reflect the tolerance of fresh water and marine ecosystems and prohibit land and water uses which violate State water quality standards."

Discussion: West Mamala Bay is an open coastal water area and is classified Class A Marine Waters. The discharge of primary effluent in deep marine waters is a permitted use because it is compatible with the protection and propagation of fish, shellfish, and wildlife and with recreation in and on these waters. Primary treatment has been deemed by the DOH to be an acceptable control strategy to reduce pollutant loads from the discharge for the attainment of water quality standards for Class A Marine Waters.

The proposed expansion of the Honouliuli WWTP will not involve any construction in West Mamala Bay. Currently, the existing disposal system and its protective armor stones constitute an artificial reef and provide habitat for sessile organisms and fishes. Fish surveys along the 2,000-foot long diffuser section conducted annually since 1981, suggest that large numbers of fishes are attracted to the outfall structure including those fish species that are not normally seen over flat, soft bottoms at the 200-foot depth. A proposed nearby 31 acres State deepwater fish habitat at about the 70 fathoms (420 feet) depth should be compatible with the ocean disposal discharge.

Nutrients from the effluent will contribute to the marine food chain, however, the ambient water quality standards will be maintained because of the oligotrophic (nutrient-deficient) characteristics of the receiving water. A monitoring program under the Section 301(h) secondary treatment waiver permit will insure conformance to the standards.

The Department of Health oversees the implementation of the monitoring program through the zone of mixing and the National Pollutant Discharge Elimination System (NPDES) permits.

5. Economic Uses

Objective 205A-2(b)(5)(A) "Provide public or private facilities and improvements important to the State's economy in suitable locations."

Policy 205A-2(c)(5)(A) "Concentrate in appropriate areas the location of coastal dependent development necessary to the State's economy;"

Policy 205A-2(c)(5)(B) "Insure that coastal dependent development such as harbors and ports, visitor industry facilities, and energy generating facilities are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and"

Policy 205A-2(c)(5)(C) "Direct the location and expansion of coastal dependent developments to areas presently designated and used for such development and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:

i) Utilization of presently designated locations is not feasible;

ii) Adverse environmental effects are minimized; and

iii) Important to the State's economy."

Discussion: The proposed expansion of the Honouliuli WWTP will allow for increased wastewater flows to be disposed of in an environmentally acceptable manner, without violating ambient water quality standards, or creating public health hazards. Economic and population growth in the tributary areas will not be hampered by the lack of treatment capacity at the plant. The existing ocean disposal system has been designed and constructed to handle the ultimate average flow of 51 mgd (112 mgd peak hydraulic flow).

6. Coastal Hazard

Objective 205A-2(b)(6)(A) "Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, and subsidence."

Policy 205A-2(c)(6)(A) "Develop and communicate adequate information on storm wave, tsunami, flood, erosion, and subsidence hazard;"

Policy 205A-2(c)(6)(B) "Control development in areas subject to storm wave, tsunami, flood, erosion, and subsidence hazard;"

Policy 205A-2(c)(6)(C) "Ensure that developments comply with requirements of the Federal Flood Insurance Program; and"

Policy 205A-2(c)(6)(D) "Prevent coastal flooding from inland projects."

Discussion: The proposed expansion of the Honouliuli WWTP will not contribute to any coastal flooding. The existing ocean outfall was constructed to withstand storm waves.

7. Managing Development

Objective 205A-2(b)(7)(A) "Improve the development review process, communication, and public participation in the management of coastal resources and hazards."

Policy 205A-2(c)(7)(A) "Effectively utilize and implement existing law to the maximum extent possible in managing present and future coastal zone development;"

Policy 205A-2(c)(7)(B) "Facilitate timely processing of application for development permits and resolve conflicting permit requirements; and"

Policy 205A-2(c)(7)(C) "Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life cycle and in terms understandable to the general public to facilitate public participation in the planning and review process."

Discussion: The proposed expansion of the Honouliuli WWTP is undergoing public review under the State EIS process under Chapter 343, HRS.

G. 208 Planning

The proposed expansion of the Honouliuli WWTP is in conformance with the Water Quality Management Plan (208 Plan) for the City and County of Honolulu under Section 208 of the Federal Water Pollution Control Act Amendment of 1972 (Public Law 92-500) as amended. The expansion plans are based on the wastewater flows and projected population in the current 208 Plan (now under revision).

V. ENVIRONMENTAL IMPACT AND PROPOSED MITIGATIVE MEASURES

A. Potential Impact At The Plant Site

There are several potential impacts at the plant site and its surrounding environs. They include odors, air quality, noise levels and aesthetics. A treatment facility is a light industrial plant whose unit processes are designed to remove organic wastes from the community-generated wastewater to a level, sufficient to allow the effluent to be discharged into receiving waters without creating public health problems and adversely affecting the environment. Organic materials which are removed undergo further treatment for stabilization, or in the case of the Honouliuli Plant, are destroyed by incineration.

Organic wastes from the community undergo decomposition as soon as they enter the sewerage collection system. If dissolved oxygen is available in the wastewater, as the waste is conveyed to the treatment plant, the decomposition by bacterial action is aerobic and the byproducts are carbon dioxide and water. When the time of conveyance to the plant is prolonged, as in the case of the Honouliuli sewer system, the dissolved oxygen becomes exhausted and the organic wastes undergo anaerobic decomposition. The byproducts of anaerobic decomposition include inorganic gases; such as, hydrogen sulfide, ammonia, carbon dioxide and methane, of which only hydrogen sulfide and ammonia are malodorous. Organic vapors; such as, indoles, skatoles, mercaptans and nitrogen-bearing organics are often present and are also malodorous.

Hydrogen sulfide, the most familiar of the odors associated with wastewater has a "rotten egg smell" and an odor threshold level of 0.00047 parts per million (ppm). Hydrogen sulfide is extremely toxic and corrosive to metals. Mercaptans are malodorous with extremely low threshold odor level ranging from 0.00005 ppm to 0.0011 ppm. Odor characteristic of mercaptans vary from strong garlic-coffee smell to the unpleasant skunk smell.

Odors at treatment plants can be generated at most unit processes if they are not properly designed and maintained. Primary clarifiers can become sources of odor if the detention time is too long, and scum and settled solid withdrawals are infrequent or incomplete. Drops, flumes, aerated grit chambers, preaeration chambers and other like structures at the headworks which induce turbulence can cause dissolved hydrogen sulfide to be released from the influent to the atmosphere.

There are at least three general control techniques of odor control at wastewater treatment plants. The control techniques include prevention of the formation of odorous emission by good housekeeping; collection and treatment of odorous air by enclosures and treating the odors by a scrubber, filter or absorptive media; and odor modification by using chemical agents to disguise odors or render them less offensive. The odor control techniques utilized at the Honouliuli WWTP consist of the combination of good housekeeping and treatment of odors collected within enclosures.

The prevention of odorous emissions through good housekeeping ensures that process equipment and channels are kept clean and free of accumulated grease, solids and organic material and grit. Equipment and structures that are daily cleaned and flushed include bar screens, grit and screening conveyance systems at the headworks, and scum scrapers, pits and wet wells on primary clarifiers.

Another control methodology of preventing odor emission at the plant site which may be implemented is upstream treatment of raw wastewater before it enters the plant. The methodology available includes air or oxygen injection into force (pressure) main and chemical addition into force or gravity main; such as, chlorine, hydrogen peroxide, potassium permanganate, or sodium nitrate.

Many of the odor sources at the Honouliuli WWTP are completely enclosed or covered, as in tanks. Trapped odorous air within enclosures is treated and destroyed before release to the atmosphere. Unit processes treated under this technique are the influent screens, gravity thickener, decant tanks and blend tanks.

Odor treatment devices used for odorous trapped air include wet scrubbers, granular-activated carbon (GAC), and other absorptive processes. Wet scrubbers use a chemical solution or water to remove odor compounds from the air stream. Chemical solution used include sodium hypochlorite and potassium permanganate, or sodium hydroxide. ARI's LOCAT scrubbers (iron-chelate) are also available. Most of the wet scrubbers are proprietary equipment.

Activated carbon absorption method of treatment has been used as primary odor control system or as a polishing step following other alternatives; such as, wet scrubbers. The absorption phenomenon occurs when the gas molecules adhere to the activated carbon's large surface areas. For low flow volume or at a small facility, other absorptive media; such as, activated alumina impregnated with potassium permanganate and wood chips mixed with iron oxide have been used.

Ozone contactors have also been used to control odors especially in industrial applications. Ozonators were initially used at the Sand Island WWTP but have since been replaced by wet scrubbers.

The existing absorption scrubbers at Honouliuli WWTP consists of a mist eliminator and an activated carbon absorber. A fume exhaustor (fan) transfers malodorous air from the source, through the mist eliminator and carbon absorber, to the atmosphere through a stack. The mist eliminator employs plastic monofilaments to entrain liquid droplets, grease and oil. The absorptive media consists of activated carbon, impregnated with sodium hydroxide to destroy hydrogen sulfide and other odors.

When the activated carbon is spent, it is regenerated or replaced. Regeneration is accomplished by treating the spent carbon with caustic soda. Mist eliminators are periodically washed with detergent. The activated carbon scrubbers are effective in destroying hydrogen sulfide; however, regeneration is being needed sooner than anticipated because of the higher concentration of the inlet H₂S.

A two-stage scrubber is being considered to eventually replace the present scrubbers. The first stage will consist of a wet scrubber which will remove the bulk of the odors, followed by the activated carbon scrubbers acting as the polishing unit. The scrubbing liquid in the first stage has not been determined yet.

Odors collected in the solid handling building are exhausted to the multiple hearth incinerator and destroyed.

During 1987, the average daily removal of suspended solids was about 26,400 pounds (dry weight). After heat treatment and mechanical dewatering, about 2,820 pounds of wet sludge were fed to the incinerator per hour. When the flows to the plant reach 38 mgd by the year 2005, the amount of solid produced could reach 47,800 pounds per day (dry weight), based on the present concentration of incoming suspended solids (222 mg/l) and removal efficiency (68%).

However, removal efficiency will decrease as the flows increase, as well as suspended solid concentration, as the tributary areas of the plant are expanded. Hence, the anticipated suspended solids removed are estimated to decrease to 39,900 pounds per day (dry weight). The amount of wet sludge incinerated is estimated to be about 4,280 pounds per hour after heat treatment and dewatering. When the flows reach 51 mgd, 53,600 pounds of solids will be removed per day (dry weight) and 5,740 pounds of dewatered heat treated sludge will be fed to the incinerator per hour.

The design of the incinerator at the Honouliuli WWTP was based on secondary treatment which produced about twice as much sludge as primary treatment. The amounts of sludge produced for the 25 mgd and 51 mgd secondary plant were 38,500 and 78,500 pounds per day (dry weight), respectively. The hourly feed rates were 4,580 and 9,350 pounds of dewatered heat treated sludge for the 25 and 51 mgd flows.

Initially, one large incinerator was considered to serve the entire 51 mgd secondary plant. However, because of potential operational problems which would occur during the lower flow period in Unit 1, the large unit was reduced in size to handle the sludge for a 25 mgd secondary plant. Since the amount of sludge from a 51 mgd primary plant is less (12%) than a 25 mgd secondary plant, the existing incinerator has sufficient capacity to serve Unit 2 flows. With wet sludge, between 30 to 35 percent solid, a feed rate of 6,000 pounds per hour is sufficient to handle the anticipated quantity of sludge generated during Unit 2 operation. The statement in the Draft EIS that another incinerator will have to be added is premature at this time based on current evaluation.

The anticipated sludge loading to the incinerator during Unit 1 was 45,700 pounds of wet sludge a day. The amount of volatile solids destroyed amounted to about 9,400 pound per day, and about 4,000 pounds of ash was produced. The residual solids were transported to the City landfill site for final disposal. The ash was sterile.

The incinerator has seven hearths or separate furnaces. The multiple hearths are grouped into three zones according to their functions. The upper hearths (drying zone) are used to dry the wet sludges which are added at the top of the incinerator. The intermediate hearths (combustion zones) are utilized for the combustion phase, and the lower hearths (cooling zones) are used to cool the resultant ash which is stored in the ash storage bin prior to being discharged to a dump truck.

Rotating rabble arms at the drying hearths assist in the gravity movements of wet sludge to the combustion zone. A single rotating rabble arm distributes ash to the cooling hearth. Air which is used to cool the hearth is recycled from the furnace to the bottom hearth. Flue gases which are collected at the drying hearth are piped to a waste heat recovery boiler before entering an impingement-venturi type wet scrubber. The solid particulates collected by the wet scrubber are discharged into a storage tank and the gases exit to the atmosphere.

The incinerator is equipped with a wet venturi impingement type scrubber that is used to cool and remove particulate matter from the exhaust gases to help maintain air quality. The major component of the scrubbers include the precooler, venturi scrubber, and impingement scrubber. Hot flue gases containing particulate matter are directed from the top hearth of the incinerator into the precooler where the volume, and temperature of the gases are reduced. Temperature reduction of up to fifty percent or about 400 degrees Fahrenheit ($^{\circ}\text{F}$) is accomplished by the water sprays.

Upon entering the venturi scrubber, additional water is sprayed on the gases to further reduce gases' volume and temperature. The velocity of the mixture of gases, water, and wet suspended solids is accelerated through the constriction (throat) of the venturi. As the gas-water-solid mixture expands in the divergent section, the larger entrained particulate materials are shunted away from the gas stream. The saturated gas mixture then passes into the bottom of the impingement scrubber at temperatures of about 180°F .

The impingement scrubbers employ a series of flat plates with tiny holes to remove the remaining entrained particulate matter. As the gases rise through the holes in the impingement plates, the remaining fine particulates are entrained by a stream of continuously flowing water as the gases rise to the fixed blade mist eliminator where the fine water droplets are removed by centrifugal action. Gas temperature leaving the impingement scrubber is about 100°F as the gases exit to the stack.

An opacity analyzer in the stack monitors the operating level air quality. Opacity readings are recorded continuously on the hour. Ninety-five percent of the randomly selected readings examined from the opacity analyzer were three percent or less and 100 percent of the reading indicate that the opacity is conservatively within the limits of the permit. The incinerator which operates under an air quality permit from the State Department of Health is also monitored by the agency.

During the plant start up in late 1983, the incinerator was monitored to determine whether it met Federal and State air quality regulations in 40 CFR Part 60, Sub-part O, and Department of Health Chapter 11-60. The Federal standards for particulate matter for sludge incineration emission is at a rate of 1.30 pounds per ton of dried sludge input, and opacity of 20 percent or less. The Hawaii standards permit the emission of particulate matter not exceeding 0.20 pounds per 100 pounds of refuse (sludge) charged.

The results of the sampling demonstrated compliance with the Federal and State regulations on sludge incineration as shown below:

PARTICULATE MATTER EMISSION
(Source: Ultrachem Corp. 1983)

Test	EPA (lbs./ton)	DOH (lbs./100 lbs.)	Emission Rate (lbs./hr.)	Opacity (%)	
				Average	Range
A	0.45	0.023	0.24	0.0	0-5
B	0.50	0.025	0.27	0.3	0-5
C	0.67	0.034	0.35	2.0	0-15
Average	0.54	0.027	0.29	-	-

The Department of Health (DOH) prepares annual emission report for the Honouliuli plant. Sources of the emission are the multiple hearth incinerator steam boiler, emergency diesel engine generator and the emergency diesel engine pump. Emission estimates by the DOH are shown below for 1985 to 1987 for particulate matter, sulfur oxides (SO_x), nitrogen oxide (NO_x), carbon monoxide (CO), hydrocarbon (HC), and lead.

EMISSION ESTIMATES FOR HONOULIULI WWTP
(Source: Department of Health)

<u>Parameter</u>	<u>Estimated Emission (tons/year & pounds/day)</u>					
	<u>1985</u>		<u>1986</u>		<u>1987</u>	
	(tpd)	(ppd)	(tpd)	(ppd)	(tpd)	(ppd)
Particulate matter	0.4	0.10	0.3	0.10	0.3	0.12
SO _x	0.7	0.17	0.8	0.27	3.3	1.29
NO _x	3.8	0.91	2.6	0.88	2.2	0.86
CO	0.1	0.02	.01	.01	19.6	7.67
HC	0.7	0.17	0.5	0.17	0.8	0.31
Lead	0.2	0.05	.01	.01	0.2	0.08

1. Negligible

In summary, it should be pointed out that the amount of sludge that will be incinerated will be considerably less for the primary plant than envisioned in the 1975 FSEIS for the 51 mgd secondary plant. The amount of wet sludge from the 51 mgd primary plant will amount to about 99,700 pounds per day compared to 224,400 pounds per day for a secondary plant. Hence, the estimated annual emission from the plant should have less an impact on air quality than the 51 mgd secondary plant described in the 1975 FSEIS.

The State Department of Health maintains ten air quality monitoring stations on Oahu. The closest monitoring station to the Honouliuli WWTP is located at the Standard Oil Refinery in the James Campbell Industrial Park about 5.0 miles away in a southerly direction. Only two contaminants are measured at the Barbers Point Station: particulate matter and sulfur dioxide. Another station is located at Pearl City about 6.5 miles to the northeast.

Annual summary of 24-hour sampling data for particulate matter and sulfur dioxide at Barbers Point and Pearl City for 1982 to 1986 are shown in Table V-1. Based on the applicable air quality standards (100 ug/m^3), the number of times when the State ambient air quality standard for particulate matter was exceeded between 1982 to 1986 was 6 days. The Federal standards of 260 ug/m^3 was not exceeded during the same period.

The Hawaii ambient air quality standards for sulfur dioxide (80 ug/m^3) was exceeded once in the same period at the Barbers Point station. The Federal standard of 365 ug/m^3 was not exceeded at all.

The current State and Federal ambient air quality standards are shown in Table V-2.

TABLE V-1
STATE OF HAWAII
ANNUAL SUMMARY OF HAWAII AIR MONITORING STATION 5 - 24-HOUR SAMPLING

ARTICULATE MATTER (ug/m ³)	Barbers Point, Oahu			Pearl City, Oahu						
	1982	1983	1984	1985	1986	1982	1983	1984	1985	1986
a. Period of sampling (mos.)	12	12	12	12	12	12	12	12	12	12
b. Number of samples	52	40	42	-	52	52	55	56	60	60
c. Range of values	15-63	28-193	17-112	24-138	7-66	19-54	17-57	16-45	17-65	17-65
d. Arith. average of values	41	55	50	57	26	31	30	28	30	30
e. No. of Days State AQS* exceeded (100 ug/m ³)	0	2	1	3	0	0	0	0	0	0

SULFUR DIOXIDE (ug/m³)

Parameters

a. Period of sampling (mos.)	12	11	12	12	12	12	12	12	10**
b. Number of samples	55	44	42	-	56	43	50	42	42
c. Range of values	5-12	5-95	5-5	5-25	5-10	5-10	5-5	5-5	5-5
d. Arith. average of values	5	7	5	5	5	5	5	5	5
e. No. of days State AQS* exceeded (80 ug/m ³)	0	1	0	0	0	0	0	0	0

* Particulate matter = 100 ug/m³; sulfur dioxide = 80 ug/m³.

** Discontinued on 10/10/84

TABLE V-2

SUMMARY OF STATE OF HAWAII AND FEDERAL
AMBIENT AIR QUALITY STANDARDS

POLLUTANT	SAMPLING PERIOD	FEDERAL STANDARDS		STATE STANDARDS
		PRIMARY	SECONDARY	
1. Total Suspended Particulate Matter (TSP)	Annual Geometric Mean	75	60	60
(micrograms per cubic meter)	Maximum Average in Any 24 Hours	260	150	150
2. PM-10	Annual	50	50	-
(micrograms per cubic meter)	Maximum Average in Any 24 Hours	150	150	-
3. Sulfur Dioxide (SO ₂)	Annual Arithmetic Mean	80	-	80
(micrograms per cubic meter)	Maximum Average in Any 24 Hours	365	-	365
	Maximum Average in Any 3 Hours		1,300	1,300
4. Nitrogen Dioxide (NO ₂)	Annual Arithmetic Mean	100		70
(micrograms per cubic meter)				
5. Carbon Monoxide (CO)	Maximum Average in Any 8 Hours	10		5
(milligrams per cubic meter)	Maximum Average in Any 1 Hour	40		10
6. Photochemical Oxidants (as O ₃)	Maximum Average in Any 1 Hour	240		100
(micrograms per cubic meter)				
7. Lead (Pb)	Maximum Average in Any Calendar Quarter	1.5		1.5
(micrograms per cubic meter)				

B. Potential Impact of the Ocean Discharge

1. Oceanographic characteristics

a. Circulation

The circulation patterns in the receiving waters at West Mamala Bay were first described in great detail during the Water Quality Program for Oahu with special emphasis on waste disposal (WQPO 1971). Additional current measurements were taken in 1972-1973 during the design of the Barbers Point Ocean outfall by R.M. Towill, the City's consultant. The information gathered by the two oceanographic studies were summarized in the final EIS for the Honouliuli WWTP and Barbers Point Ocean Outfall System (June 1975).

The following description of the circulation in Mamala Bay has been extracted from the City's 301(h) application for the Honouliuli WWTP (October 1983):

"The circulation in the offshore and nearshore areas of the Hawaiian Islands has been intensively investigated in recent years. The work has been performed by the State of Hawaii, the City and County of Honolulu, the University of Hawaii, and numerous independent agencies and firms. The studies have shown that the circulation is complex, varying seasonally in some locations but not in others, and that the relative importance of the modifying forces such as tides, winds, and offshore eddies varies with location. In most nearshore locations, the semidiurnal tide and the underlying 'permanent' current are the main driving forces influencing the circulation. The diurnal tide and a combination of seasonal and annual changes tend to make the current patterns more complex. The surface layers (approximately the top 5 m [5.5 feet]) are influenced by the prevailing winds.

The Barbers Point ocean outfall is located in West Mamala Bay, midway between Pearl Harbor and Barbers Point.

Available information indicates that the tide is the principal circulation component in Mamala Bay, with the exception of the wind-driven surface layers. The tidal influence is modified by a 'permanent' westward flow generated by the Pacific North Equatorial Current.

The Pacific North Equatorial Current flows in a generally westerly direction through the Hawaiian Islands and is part of the cyclonic circulation of the North Pacific. Although this permanent flow exists in a statistical sense, it varies in both speed and direction (U.S. Navy, 1968). The flow direction may vary from west-southwest to north-northwest. Average velocity of the current is estimated at approximately 25 cm/sec [0.48 knots]. The permanent current component is difficult to separate from existing current meter records because of eddying on the downcurrent (west) coasts of the Hawaiian Islands and masking by the stronger tidal flows.

Hawaii has predominantly semidiurnal tidal variations with a pronounced diurnal inequality. The average tidal change per 24 hours is 0.72 m (2.36 feet). The semidiurnal tidal wave approaches Oahu from the northeast as a progressive wave, with the flow separating and moving around the island.

Common amplitudes of the semidiurnal currents are 20 to 30 cm/sec [0.38 knots to 0.57 knots] (Wyrтки et al, 1969). At most locations in Hawaii the maximum current occurs in the interval between two hours before Honolulu high water and one hour after. The velocities associated with the diurnal tidal current are smaller than those corresponding to the semidiurnal tide. At most current meter stations monitored by Wyrтки et al (1969), the diurnal component was only 10 to 15 cm/sec [0.19 to 0.29 knots]. The coherence with the Honolulu sea level was also low.

Measurements off Diamond Head (Laevastu et al, 1964) indicate the predominance of the semidiurnal currents, with flood tide currents moving west and ebb currents moving east, parallel to the shoreline. Similar measurements northwest of Barbers Point showed semidiurnal current reversals, but with the opposite flood and ebb tide flow directions.

This indicated that the area of convergence of the flood current and divergence of the ebb current lies between Diamond Head and Barbers Point. The oceanographic study undertaken for the design of the Barbers Point ocean outfall located this convergence/divergence area west of Pearl Harbor in the vicinity of Ewa Beach.

This combination of 'permanent' flow across Mamala Bay and the tidal flow can be expected to produce reversing currents with a net southwest transport. The effects of wind and bathymetry, however, also influence circulation in Mamala Bay. Localized eddies resulting from flow past prominent points such as Diamond Head or Barbers Point may cause irregularities in the observed currents and have been observed in Mamala Bay during past studies.

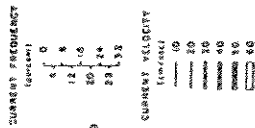
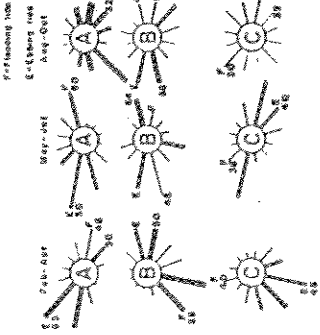
The available published and unpublished circulation data for Mamala Bay, Oahu, derived from current meter records, drogue tracks, dye studies, and drift card tracks has been summarized in an ocean circulation atlas (Bathen, 1978). This atlas has analyzed the direction and strength of the net drift by season."

Bathen's (1978) summaries of the net transport, current roses, wind roses, ebb and flood current pattern and other information is shown in Figure V-1 for West Mamala Bay. The vectorial sum of the tidal geostrophic, and wind driven components of the current is the net transport.

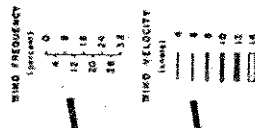
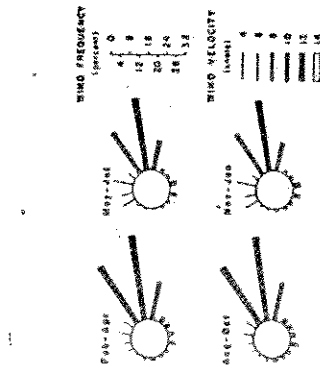
"The dominant reversing tidal currents parallel the bottom contours. Flood tide flow is to the west and ebb tide flow is to the east. Seasonal changes near the diffuser are minor, as evidenced by the current meter roses and the net drift vectors."

Tidal geostrophic and wind-driven flows (Bathen 1978) for the Island of Oahu are shown in Figure V-2, V-3, and V-4, respectively.

CURRENTS (cm/sec)



WINDS (cm/sec)



LEGEND

CIRCULATION	STRENGTH	OCCURRENCE	SEASON
FLOOD	WEAK	VARIABLE	FEB-JAN
EBB	MODERATE	CONSISTANT	MAY-JUL
	STRONG	CONSISTANT	AUG-OCT
			NOV-JAN
			ALL SEASONS

NOTES:

A) Flood & ebb directions of this sector are shown for semidiurnal tide. (Note: Flood & ebb directions may vary during spring tides.)

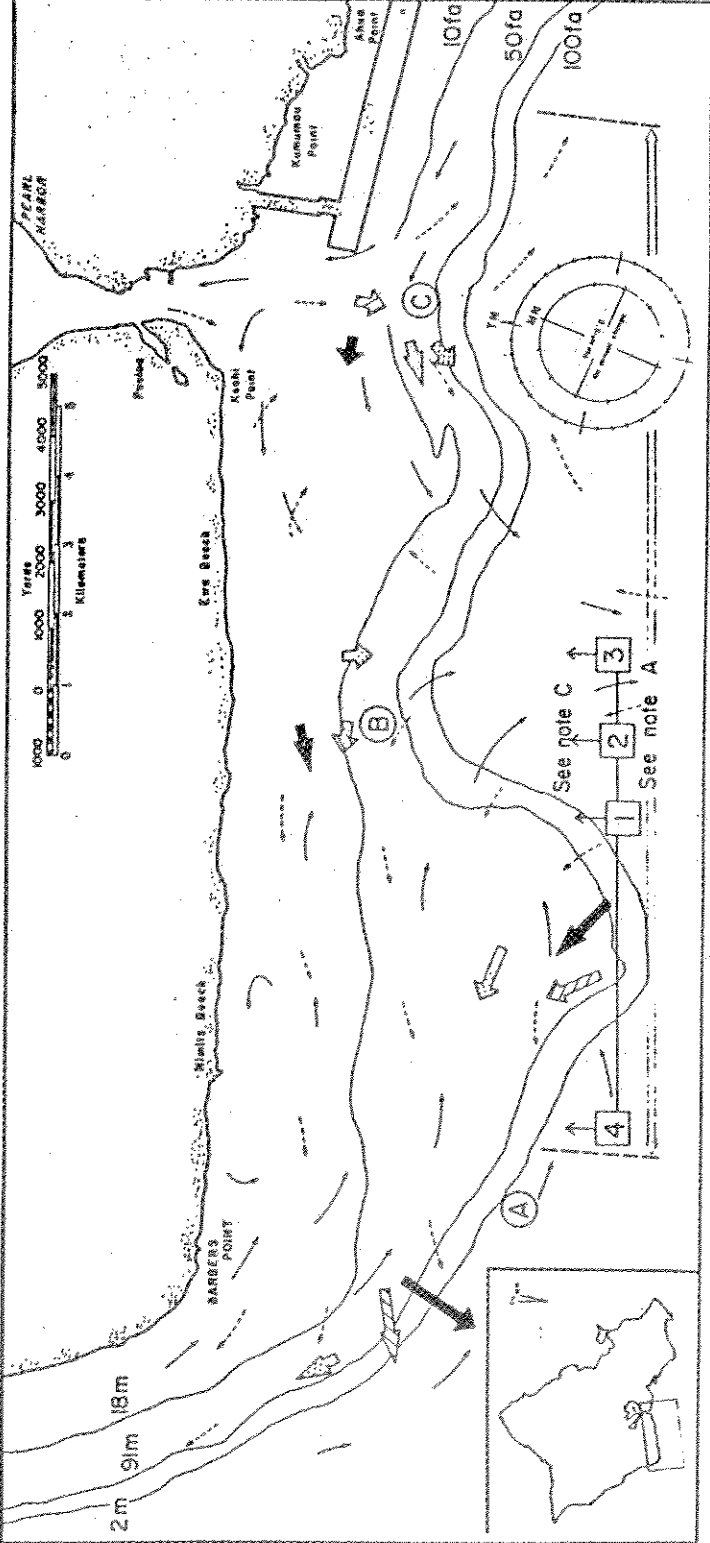
B) Wind strength & frequency shown in case strong current flooding.

C) Wind strength & frequency shown in case strong current ebbing.

D) Strong semidiurnal tide noted semidiurnal tide rises through flood.

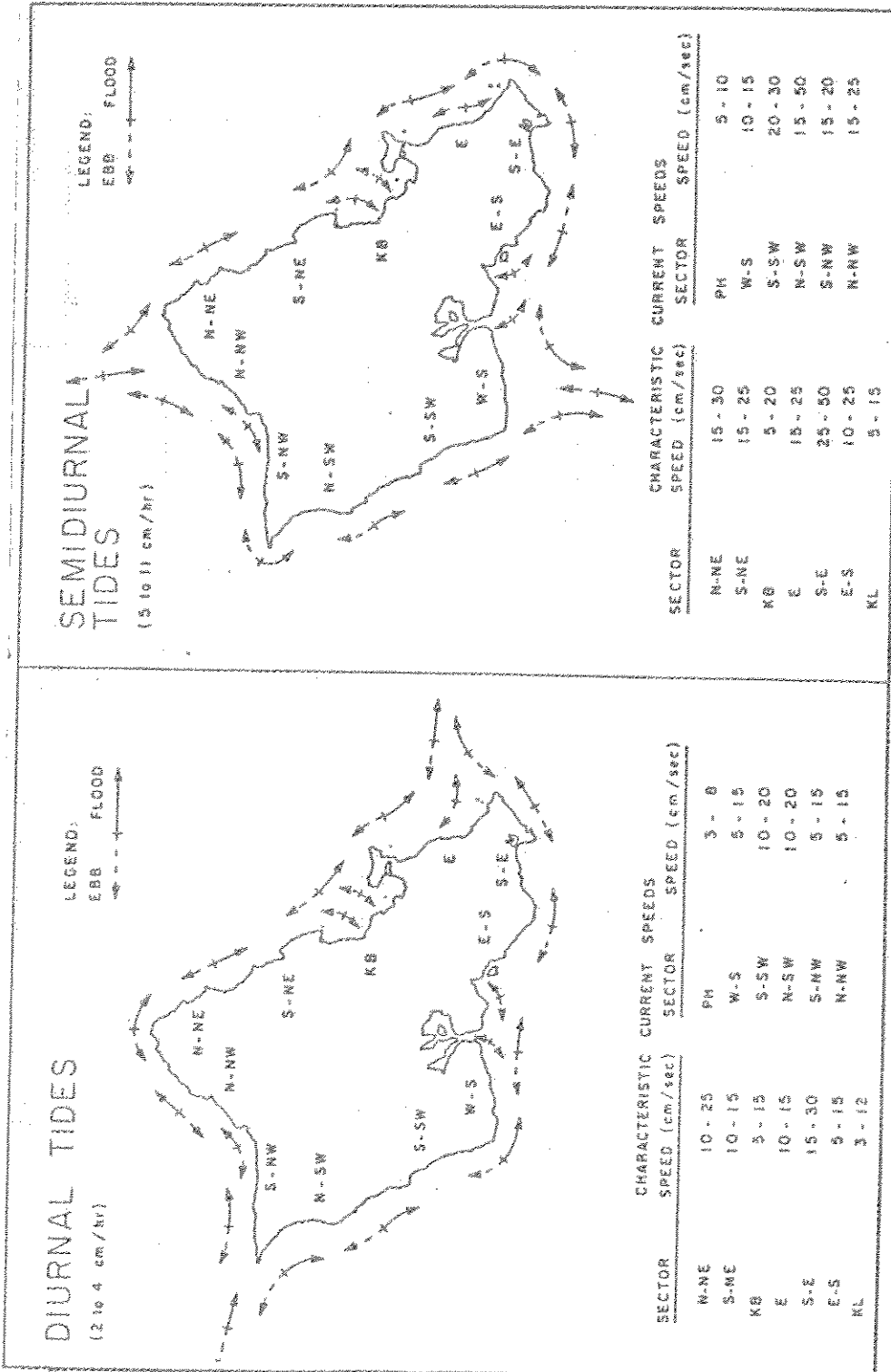
E) Wind (cm/sec)

F) Feb-Mar G) Apr-May H) Jun-Sep I) Nov-Jan



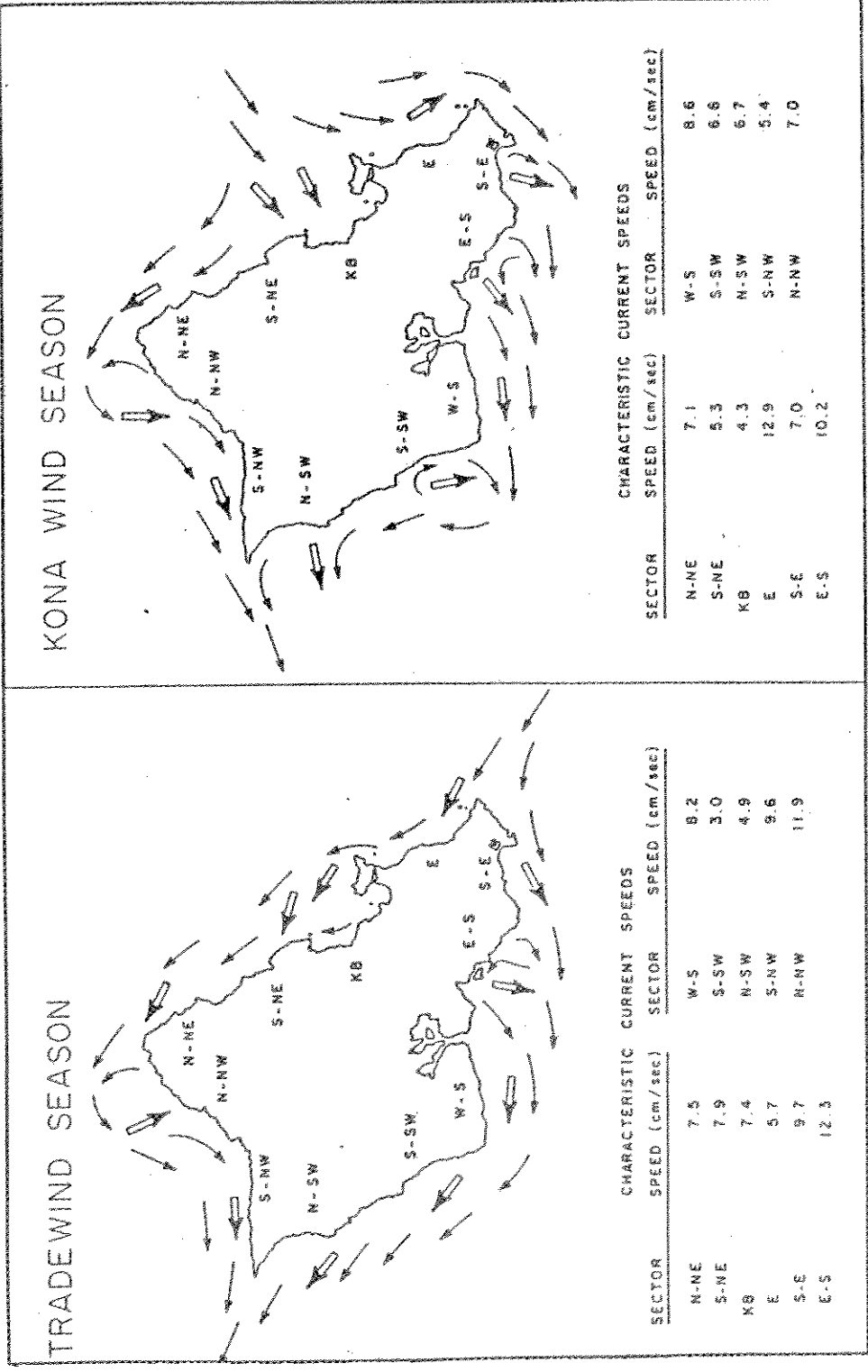
SOURCE: Bathen, K. 1978. Circulation Atlas for Oahu, Hawaii. University of Hawaii, SEAGRANT-MR-78-05, p. 26

FIGURE V - 1
CURRENT AND WIND ROSE
OF THE W-S SECTOR, PEARL
HARBOR TO BARBERS POINT



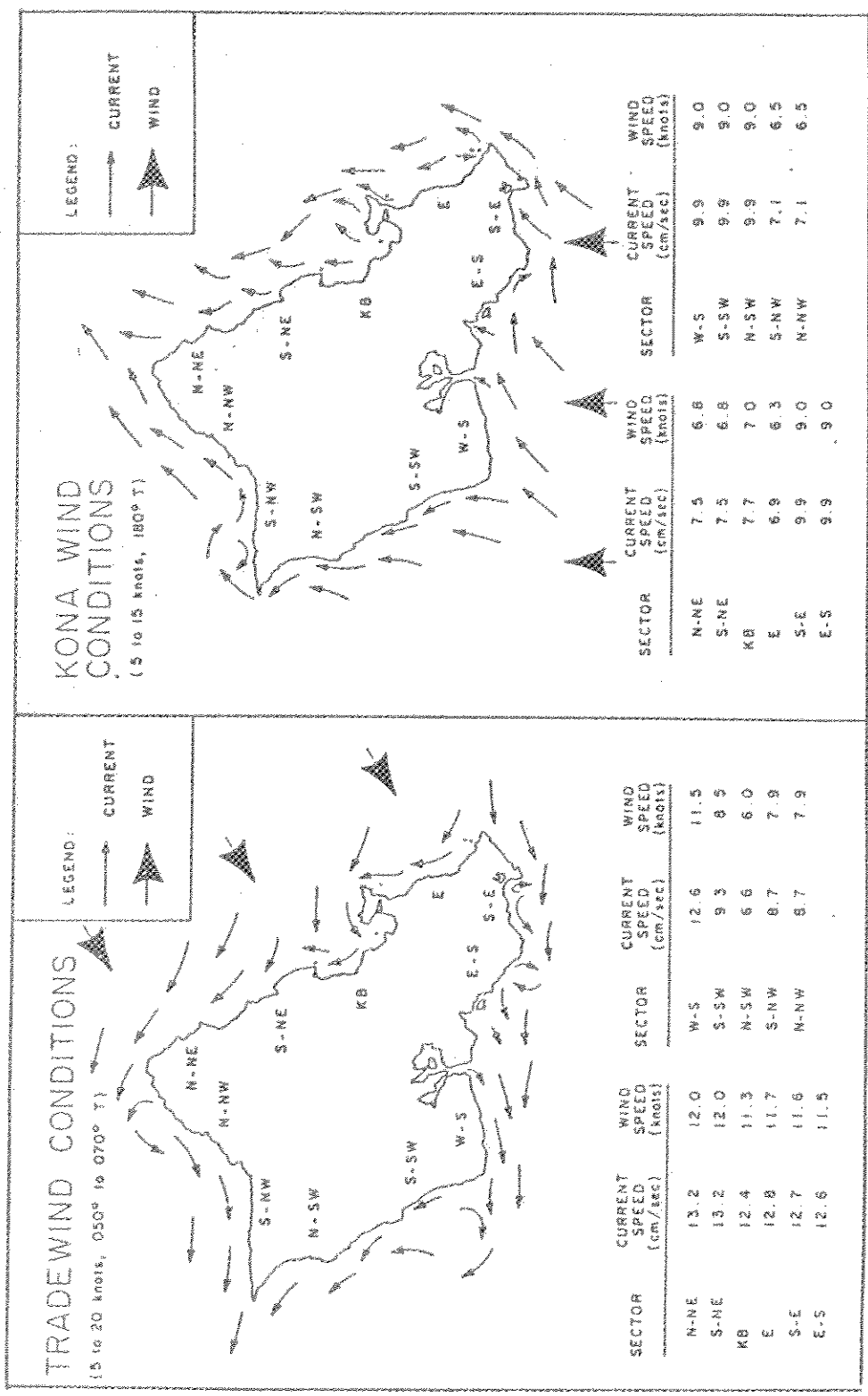
SOURCE: Bathen, K. 1978. Circulation Atlas for Oahu, Hawaii. University of Hawaii, SEAGRANT-MR-78-05, p. 49.

FIGURE V - 2
TIDAL FLOW
(THROUGHOUT WATER COLUMN)



SOURCE: Bathen, K. Circulation Atlas for Oahu, Hawaii. University of Hawaii, SEAGRANT-MR-78-05, p. 48.

FIGURE V - 3
 GEOSTROPHIC FLOW
 (SURFACE TO APPROXIMATELY 120m)



SOURCE: Bathen, K. 1978. Circulation Atlas for Oahu, Hawaii. University of Hawaii, SEAGRANT-MR-78-05, P. 47.

FIGURE V - 4

WIND-DRIVEN FLOW
(EKMAN SURFACE DRIFT)

Current measurements were collected from four (4) stations off Barbers Point during 1969-70 (WQPO 1971) and four (4) stations by R.M. Towill in 1972-73. Locations of the stations are shown in Figure V-5. Stations "2" and "F" are located near the present diffuser section of the outfall.

Current roses for stations 2, 3, 4 for surface, mid-depth and bottom currents are shown in Figures V-6, V-7, and V-8, respectively. Surface currents at Station "G" under vary wind conditions are shown at the current roses in Figure V-9. The current roses of these stations provide enough information to adequately describe the circulation pattern in West Mamala Bay.

The total current measurements taken during the period 1970-73 in the area of discharge are summarized as follows:

- i. "The most characteristic behavior pattern observed in the current meter records is a prevailing net transport to the south and west, although there are some exceptions.

- ii. In general, reversing tidal currents have dominated the circulation behavior in the near-surface, mid-depth, and bottom layers, as indicated by the current roses in Figures V-6, V-7, and V-8. The nearsurface stations (30 feet deep) showed only minor evidence of wind influence. The pattern of tidal reversals have indicated that the tidal convergence/divergence is located in the outfall vicinity. As discussed in the introduction, during flooding, tide water flows into Mamala Bay eastward around Barbers Point and westward around Diamond Head, converging in Mamala Bay.

At the westernmost stations (3 and 4), the current usually flowed west at moderate velocities during ebbing tides and to the east at higher velocities but for shorter periods during flooding tides. At the easternmost station (1), the pattern reversed, with flow to the west during flooding tides and east during ebbing tides."

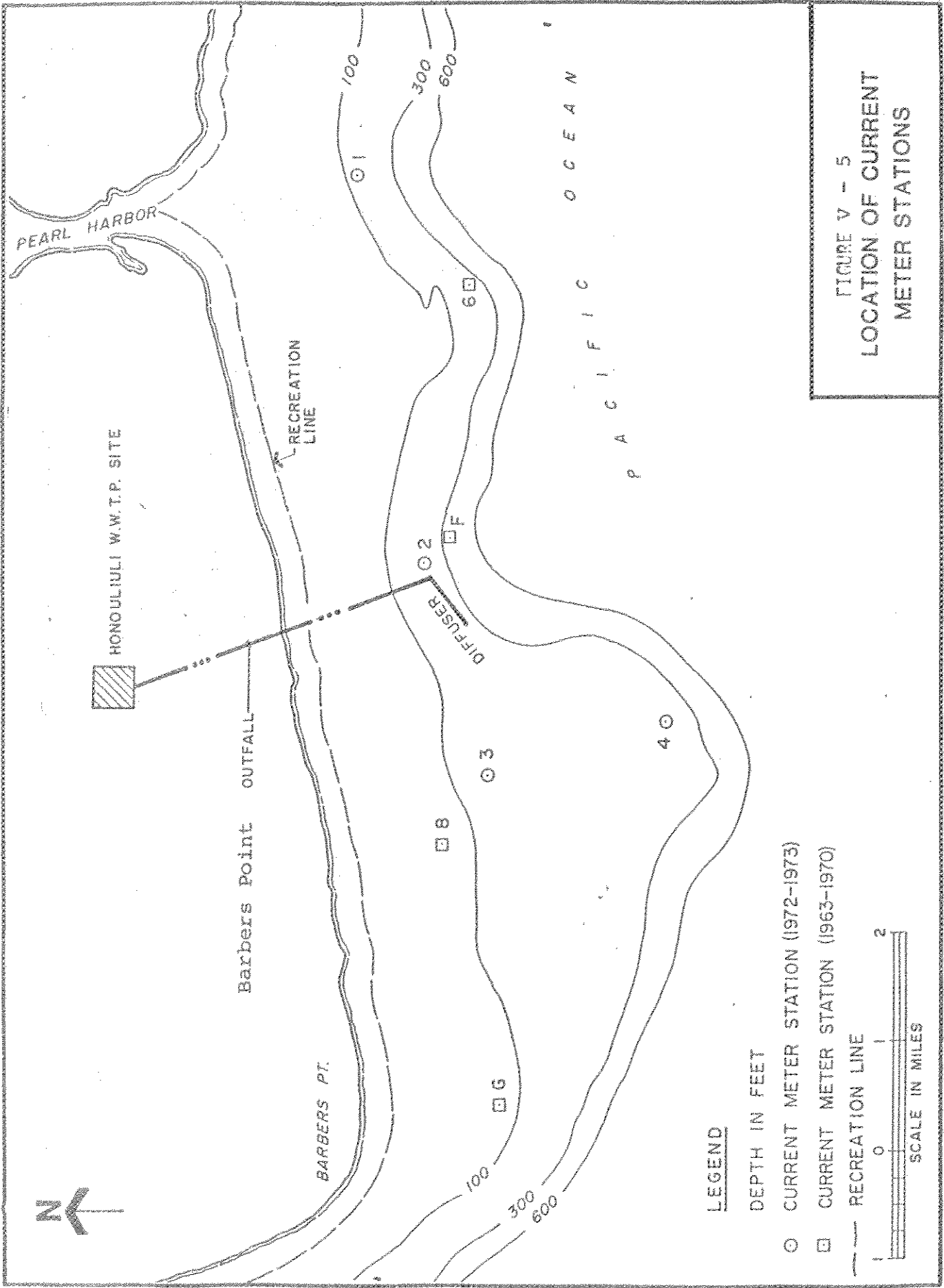


FIGURE V - 5
 LOCATION OF CURRENT
 METER STATIONS

LEGEND

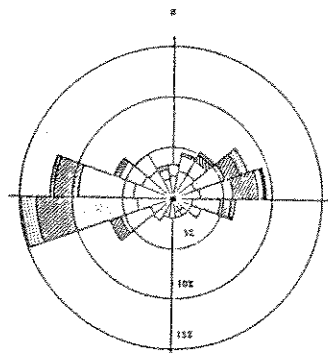
DEPTH IN FEET

○ CURRENT METER STATION (1972-1973)

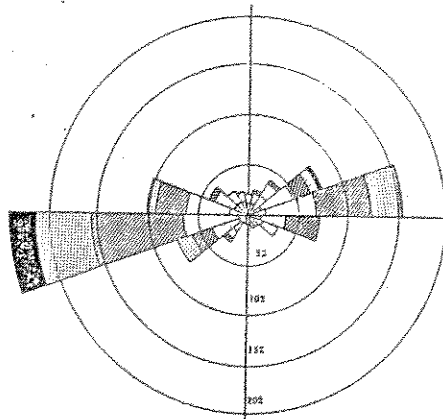
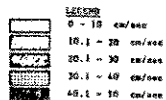
□ CURRENT METER STATION (1963-1970)

--- RECREATION LINE





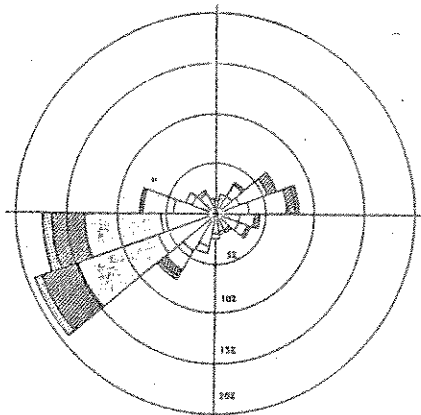
SUMMER - SURFACE
 STATION: 1, 4
 DATE: 8/21/72 TO 9/21/72
 4/20/73 TO 6/9/73
 DEPTH: 10°/180°, 30°/240°
 DURATION: 1,642 HOURS OF RECORD
 NET TRANSPORT: 2.5 cm/sec., 312° T



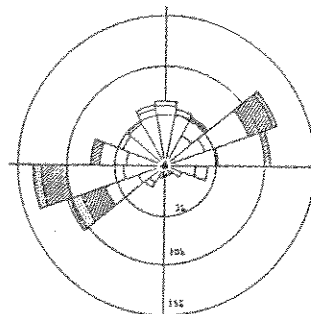
WINTER - SURFACE
 STATION: 1
 DATE: 12/15/71 TO 1/14/72
 DEPTH: 30°/180°
 DURATION: 132 HOURS OF RECORD
 NET TRANSPORT: 5.9 cm/sec., 216° T

Source: WQPO, 1971, and other studies.

FIGURE V - 6
 CURRENT ROSE
 (SURFACE)



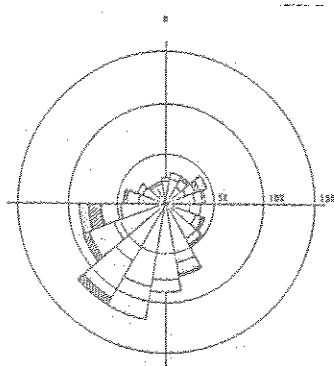
SUMMER - MID-DEPTH
 STATION: 1, 3, 4
 DATE: 8/21/72 TO 9/26/72
 4/20/73 TO 5/31/73
 DEPTH: 104°/186°, 34°/136°, 115°/246°
 DURATION: 2,798 HOURS OF RECORD
 NET TRANSPORT: 4.1 cm/sec., 284° T



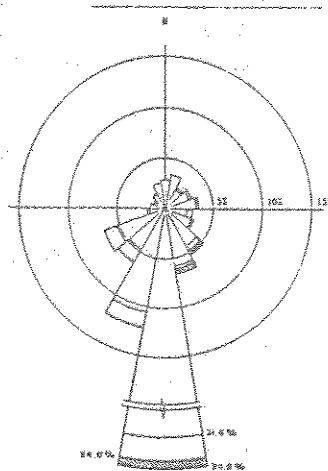
WINTER - MID-DEPTH
 STATION: 1, 3
 DATE: 12/15/71 TO 1/7/72
 DEPTH: 75, 300°/180°
 25, 34°/180°, 90°/240°
 DURATION: 1,402 HOURS OF RECORD
 NET TRANSPORT: 2.1 cm/sec., 302° T

Source: WQPO, 1971, and other studies

FIGURE V - 7
 CURRENT ROSE
 (MID-DEPTH)



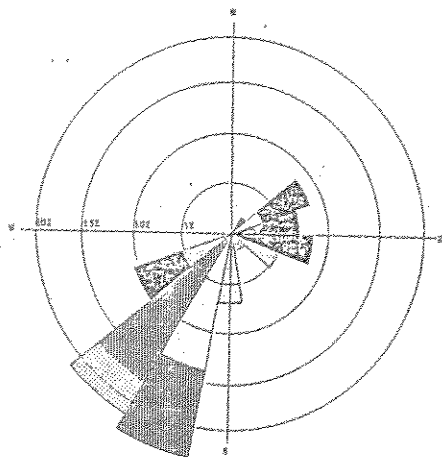
SUMMER - BOTTOM
 STATION: 3, 4
 DATE: 6/11/73 TO 8/24/73
 5/20/73 TO 6/25/73
 DEPTH: 33, 114', 126'
 34, 430', 440'
 DURATION: 3,948 HOURS OF RECORD
 NET TRANSPORT: 3.3 cm/sec., 248° E



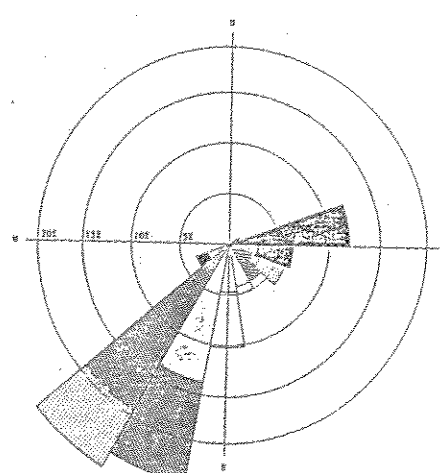
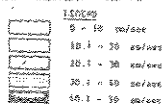
WINTER - BOTTOM
 STATION: 2
 DATE: 1/9/73 TO 2/4/73
 DEPTH: 176', 186'
 DURATION: 410 HOURS OF RECORD
 NET TRANSPORT: 5.6 cm/sec., 179° E

Source: WQPO, 1971, and other studies

FIGURE V - 8
 CURRENT ROSE
 (BOTTOM)



SURFACE LAYER - VARIABLE AND GOOD WIND CONDITIONS
 STATION: SANDS POINT (C)
 DATE: OCTOBER 15, 16, 17, 1970
 DEPTH: 20', 50'
 DURATION: 58 HOURS OF RECORD
 NET TRANSPORT: 15.8 cm/sec., 148° W



SURFACE LAYER - MODERATE TRADE WINDS
 STATION: SANDS POINT (C)
 DATE: 10/19 TO 10/27/70
 DEPTH: 20', 50'
 DURATION: 233 HOURS OF RECORD
 NET TRANSPORT: 13.16 cm/sec., 144° W

Source: WQPO, 1971, and other studies

FIGURE V - 9
 CURRENT ROSE
 (VARYING WIND CONDITIONS)

In the discharge area (Station 2) the net transport of the surface currents in the summer months ranged from 0.03 knots to 0.11 knots between the 258 and 275 degree (magnetic) direction. Mid-depth net transport ranged from 0.05 knots to 0.05+ knots between the 257-298 degree (magnetic) direction. Finally bottom net transport ranged from 0.05 knots to 0.08 knots between the 185 to 221 degree (magnetic) direction.

During the winter months, the net transport of mid-depth currents was 0.05 knots at the 353 degree (magnetic) direction. Winter bottom net transport was 0.10 knots at 179 degree (magnetic). Net transport for surface current was 0.05 knots at 273 degree (magnetic) direction at Station 3, one mile west of Station 2.

During the summer months, the net transport of mid-depth currents at Station 3 was 0.04 knots at the 267 degree (magnetic). During the winter months, the net transport of mid-depth currents ranged from 0.04 knots to 0.05 knots at a direction of 273 to 297 degree (magnetic).

The onshore current measurements between 270° and 050° (magnetic) of all readings were analyzed, to determine the probability of the effluent reaching the imaginary recreational line, 1,000 feet seaward of the fringing reef line. The onshore components of the surface currents (0-20 foot depth) was estimated to be 5.4 percent during the summer months at an average speed of 0.26 knots, and 16.8 percent during the winter at 0.17 knots.

"Although some of the water layers appear to have a relatively high percentage of shoreward transport (41 percent), the defined onshore sector is large (a 140-degree sector) and there is some evidence that the flow is deflected by the bathymetry before reaching the coastline. Three hundred fifty surface drift cards were released in the vicinity of station 2 and 4 on June 6, 1973, during a period of 10- to 15-knots Kona winds, and none of the cards were returned. A release of 150 cards on August 3, 1973, during offshore tradewinds again failed to yield any returned cards."

The probability of transport from the diffuser to shore within four hours was nil, and very small (1 percent) for even seven hours because of the low onshore components of the currents.

b. Stratification

Temperature and salinity data were recorded at four monitoring stations in West Mamala Bay from June 1970 to February 1971 during WQPO (1971). Additional data were collected by R.M. Towill from August 1972 to September 1973 for the outfall's design. Using these data, the density structure at the discharge area was determined.

The measurements indicated that maximum stratification occurs during the late summer and fall months from August to October and minimum stratification occurs during the winter months between January to March. The degree of stratification will determine whether the discharge plume above the diffuser section will remain submerged or surfaced.

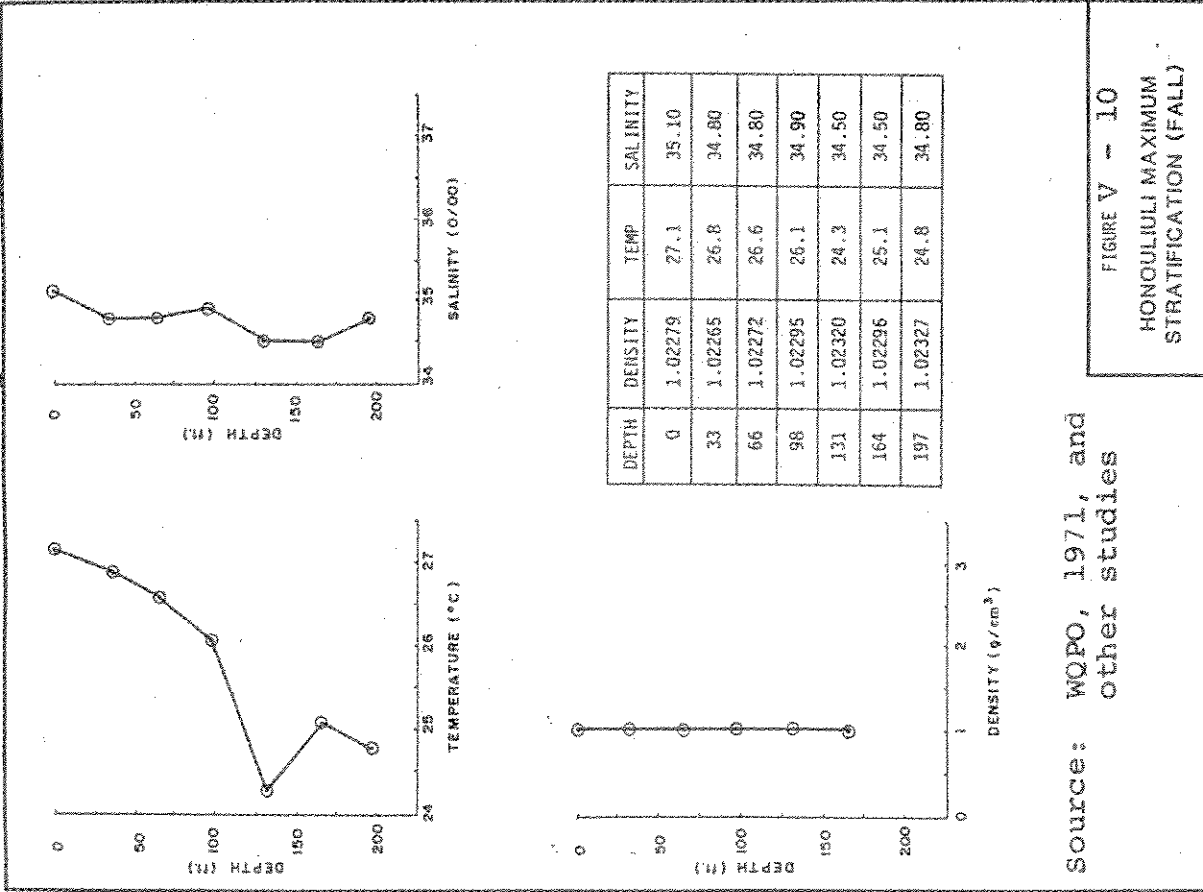
During the summer months, the mixed layer depth varied from 140 to 200 feet, and to 300 feet or more during the winter months. Diurnal changes were also noticed, thought to be caused by diurnal insolation patterns or by semidiurnal tide changes. The surface layer thickness was increased during the early afternoon and a subsequent decrease by nightfall.

The density profiles at the outfall (Station 2) for maximum and minimum stratifications are shown in Figures V-10, and V-11, respectively. Densities ranged from 1.02265 to 1.02320 g/cm³ during the fall and 1.02387 to 1.02398 g/cm³ during the spring. The average density of Honouliuli wastewater is 0.99755 g/cm³.

2. Description of the Ocean Disposal System

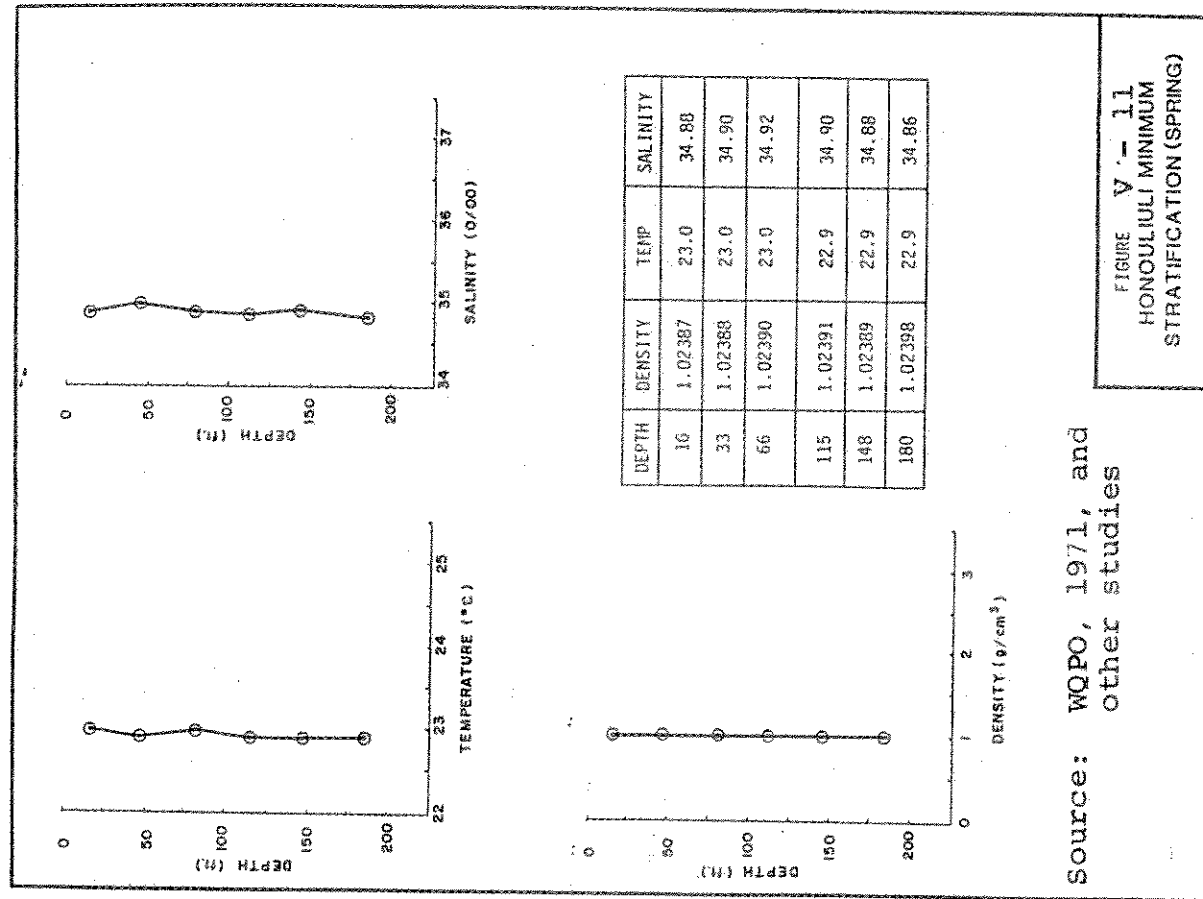
The existing outfall consists of an 84-inch reinforced concrete pipe, 9,166 feet long land portion, and an 8,760 feet ocean portion with a diameter of 78 inches. The diffuser section is 1,750 feet long, almost parallel to the shoreline. There are 148 parts, ranging in sizes from 3.5 to 3.75 inches and spaced every 24 feet apart at a depth of 200 feet. The angle of the port orientation from horizontal is 0°.

The disposal system was designed for an average flow of 51 mgd and a peak wet weather flow of 112 mgd.



Source: WQPO, 1971, and other studies

FIGURE V - 10
HONOLIULI MAXIMUM STRATIFICATION (FALL)



Source: WQPO, 1971, and other studies

FIGURE V - 11
HONOLIULI MINIMUM STRATIFICATION (SPRING)

The ocean portion is buried in a trench to about the 80-foot depth. Thereafter, the sewer rests on the ocean floor, supported on both sides with quarry rocks. The diffuser section rests on a flat carbonate sand bottom.

3. Description of the Ocean Discharge

The present NPDES permit for sampling requirements for Honouliuli WWTP include analysis of biochemical oxygen demand, suspended solids, pH units, and settleable solid. Fecal coliform count, Kjeldahl nitrogen, total nitrogen, total phosphorous and oil and grease concentration of the effluent are not available. However, equivalent average values are available from other sources; e.g., based on actual and equivalent values of primary effluent, the mass emission rates where appropriate are summarized in Table V-3 for the 1987 and 2005 year based on present loading and removal efficiencies.

There are presently no known industrial or commercial sources of toxic wastes that are discharged into the Honouliuli sewer system. If there are any new sources of toxic wastes, the source will have to meet pretreatment standards in Chapter 11, Revised Ordinances of Honolulu, 1978.

<u>Pollutant</u>	<u>Concentration (mg/l)</u>	<u>Pollutant</u>	<u>Concentration (mg/l)</u>
Arsenic	0.1	Selenium	0.2
Cadmium	0.2	Silver	0.2
Copper	2.0	Total chromium	0.5
Cyanide	1.0	Zinc	3.0
Lead	1.0	Total	
Mercury	0.01	Chlorinated	
Nickel	1.0	Hydrocarbon	0.02
		Phenolic	
		Components	1.0

Under Chapter 11, all discharges of industrial wastewater in the public sewers must obtain and comply with the provisions of an Industrial Wastewater Discharge Certificate. Discharges may be required to provide sampling analysis and flow measurements for their wastes. Pretreatment of industrial wastes may be required before the wastes are allowed to enter the public sewers.

Table V-3
EFFLUENT QUALITY AND MASS EMISSION RATE
Honouliuli WWTP

<u>Parameter</u>	<u>Effluent Quality</u>		<u>Mass Emission Rate (lb/day)</u>	
	<u>Units</u>	<u>Concentration</u> <u>mg/l</u>	<u>1987</u> <u>(21 mgd)</u>	<u>2005</u> <u>(381 mgd)</u>
BOD	mg/l	112	19,616	35,490
Suspended Solids	mg/l	71	12,435	22,501
Settleable Solids	mg/l	1.45	253	458
Total Nitrogen ²	mg/l	22	3,853	6,972
Total Phosphorous ²	mg/l	4.3	753	1,362

1. MER based on effluent quality in 1987 where applicable.
2. Estimates are based on Sand Island Effluent

Limited amount of toxic materials may enter the public sewers through ordinary household and commercial activities. Heavy metals are typically formed in domestic sewage from all communities even those from non-industrial sources. Some of the heavy metals come from household products. For example, zinc and selenium can be derived from shampoo; mercury from drugs; and zinc, etc., from cleaning solution.

A partial list of heavy metal sources includes dyes, paints, printing, lacquers; insecticides, rodenticides, fungicides; coating, engraving; photographic chemicals, wood preservatives; pigments, pharmaceuticals; fumigants; electroplating, fertilizers, metal cleaners; varnishes; and external antiseptics and astringents.

Table V-4 shows the results of the analysis of the influent and effluent concentration of toxic substances. The discharge concentrations after dilution meet the applicable criteria for marine aquatic life (EPA 440/5-86-001, May 1, 1986).

When lower density fluid, such as wastewater effluent is discharged from an open-ended pipe or a multiport diffuser in the marine environment, it creates a buoyant plume that rises rapidly toward the ocean surface. The behavior of the plume is determined by several factors including the effluent flow; the number, depth and diameter of the ports, and the characteristics of the receiving waters and effluent. The buoyant plume mixes the effluent with the entrained ambient saline water as it rises to the surface. When the density of the mixed plume equals the ambient water density, it will spread horizontally at the level of neutral buoyancy. The phenomena is called "initial dilution" and the volume where it occurs is called the zone of initial dilution (ZID). If the receiving waters are stratified, the plume may remain submerged.

A dilution ratio of 200 to 1 means a mixture of 199 parts of ambient seawater and 1 part of effluent. The initial dilution ratio is used to determine if the effluent will meet water quality standards in the ZID. The amount of diluting ambient seawater must be continuously replenished by the currents in the discharged area to preclude re-entrainment. In open coastal waters, the supply of dilution water is sufficient compared with estuaries.

TABLE V-4
TOXIC SUBSTANCES CONCENTRATION
HONOLULULI WWTP

Metals/Inorganics	Influent ¹ (ug/l)	Effluent ² (mg/l)	Water Quality Criteria ³ Average Maximum (ug/l)	Estimated Concentration (ug/l) After Initial Dilution at maximum flow ⁴	
				1987 (31.5 mgd)	2005 (57.0 mgd)
Antimony	27	0.5	NE	2.137	2.451
Arsenic	22	0.001	NE	0.004	0.005
Beryllium	ND	0.03	NE	0.128	0.147
Cadmium	1	0.003	43	0.013	0.015
Chromium	21	0.01	1,100 (VI)	0.043	0.049
Copper	42	0.05	2.9	0.214	0.245
Cyanide	10	0.01	NE	0.043	0.049
Lead	20	0.02	140	0.086	0.098
Mercury	0.1	0.001	0.025	0.004	0.005
Nickel	18	0.05	140	0.214	0.245
Selenium	ND	0.005	300	0.021	0.025
Silver	3	0.02	2.3	0.086	0.098
Thallium	88	0.2	NE	0.855	0.980
Zinc	60	0.14	170	0.598	0.686

1. Composite sample, Pearl City WWTP & Waipahu Pond.
2. 1984 Data Honolulu Effluent, EPA 40 CFR Part 136 as amended.
3. EPA 440/5-86-001, 1986.
4. 1987, Ave. Dilution 235; 2005+, Ave. Dilution 205.

ND - Not Detected
 NE - Not Established
 NT - Not Taken
 ND* - Not detected at the 10 ug/l level
 ND** - Not detected at the 1 ug/l level

TABLE V-4 (Contd.)
TOXIC SUBSTANCES CONCENTRATION
Honouliuli WWTP

Metals/Inorganics Pesticides	Influent 1 (ug/l)	Effluent 2 (mg/l)	Water Quality Criteria ³		Estimated Concentration (ug/l) After Initial Dilution at maximum flow ⁴
			Average	Maximum	
			(ug/l)		
Endrin	NT	ND**	0.0023	0.037	ND
Endosulfan I & II	ND	ND**	0.0087	0.034	ND
Chlordane	NT	ND**	0.0040	0.09	ND
Demeton	ND	ND*	NE	0.1	ND
Guthion	ND	ND*	NE	0.1	ND
Heptachlor	ND	ND**	0.0036	0.53	ND
Malathion	ND	ND*	NE	0.1	ND
Methoxychlor	ND	ND*	NE	0.03	ND
Mirex	ND	ND*	NE	0.001	ND
Parathion	ND	ND*	NE	0.04	ND
Toxaphene	ND	ND**	NE	0.07	ND

1. Composite sample, Pearl City WWTP & Waipahu Pond.
2. 1984 Data Honouliuli Effluent, EPA 40 CFR Part 136.
3. EPA 440/5-86-001, 1986.
4. 1987, Ave. Dilution 235; 2005+, Ave. Dilution 205.

ND - Not Detected
 NE - Not Established
 NT - Not Taken
 ND* - Not detected at the 10 ug/l level
 ND** - Not detected at the 1 ug/l level

Table V-5 shows initial dilution ratio for the Barbers Point discharge for the present (1987) and subsequent five-year periods to the year 2020. The ratios shown are flux-averaged dilutions derived from computer program for ocean discharges (EPA 600/3-85-0736, 1985) for maximum flows during maximum and minimum stratification periods.

Based on the computer model, flux-averaged dilution of maximum flows, ranged from 235 in 1987 to 206 in 2005 during periods of maximum stratification, and 1,864 to 1,357 during periods of minimum stratification. However, the potential dilution is limited by the supply of available diluting seawater which is transported to the area of discharge by ocean currents. Therefore, the maximum dilution possible ranged from 442 in 1987 to 247 in 2005+ during period of maximum stratification, and 754 to 417 during periods of minimum stratification. Hence, initial flux-averaged dilutions will be limited by available supply of diluting water only during periods of minimum stratification to the year 2005+. Thereafter, initial dilutions will be limited at all periods by the amount of diluting seawater.

4. Impact on Water Quality

a. Description of Water Quality Monitoring Program in West Mamala Bay.

In addition to those water quality samplings which were conducted during the WQPO and the design of the Barbers Point outfall, the City and County has had a comprehensive program beginning from 1981 to the present time. The current water quality monitoring program has been designed to comply with the proposed 301(h) permit requirements for the plant.

The receiving waters program includes the analysis of the parameters for open coastal waters as specified in the DOH Chapter 11-54 and indicator group bacteria. Ten stations in the bays are sampled at one or more depths: surface water, 15-meter (45 feet) and 30 meter (90 feet) depths. The nearshore Station 10 located near the 30-foot depth contour is sampled to determine the effects on onshore currents. Station 1 is the control station located near the Pearl Harbor main ship channel. The locations of the stations are shown in Figure V-12.

Stations 2, 8, 9 and 10 are located outside the immediate discharge area: Station 2 to the east, stations 8 and 9 to the southwest; and station 10 to the north (the nearshore station off Oneula Beach).

Table V-5
 INITIAL DILUTIONS FOR BARBERS POINT DISCHARGE (HONOULIULI WWTP)

Period (Year)	Projected Flows		Average ¹ Dilution		Plume Level Below Water Surface (ft.)		Average ⁴ Annual Dilution	
	Average (Mgd)	Maximum (Mgd)	Maximum ²	Minimum ³	Maximum ²	Minimum ³	Maximum ²	Minimum ³
1987	21.0	31.5 ⁵	235	1,864	50	9	442	754
1990	24.4	36.6	227	1,714	49	9	381	646
1995	30.0	45.0	216	1,534	49	8	310	528
2000	32.8	49.2	212	1,465	48	8	286	483
2005	36.4	54.6	207	1,387	48	8	257	436
2005+	38.0	57.0	206	1,357	48	8	247	417
2020	51.0	76.5	193	1,173	47	0	185	324

1. Flux averaged dilution based on maximum flow.
2. Maximum stratification - Fall.
3. Minimum stratification - Spring.
4. Average available annual dilution (supply of diluting seawater).
5. Existing flows.

Within the ZID and the proposed zone of mixing (ZOM), there are five stations: Station 3 is located in the ZID and stations 4, 5, 6 and 7 are in the ZOM. The proposed ZOM is 2,000 feet wide and 3,700 feet in length and is allowed under Chapter 11-54 for the assimilation of domestic agricultural and industrial discharges which have received the best degree of treatment or control.

The stations are sampled quarterly by the Division of Wastewater Management's oceanographic team which operates one research vessel and one boat to collect samples in marine waters. Testing procedures for the analysis of the parameters are based on the latest edition of Standard Methods and EPA Methods under 40 CFR Part 136.

The water quality monitoring program is only one phase or subprogram of the monitoring program for the Honouliuli WWTP and disposal system. The other monitoring subprograms are the National Pollutant Discharge Elimination System (NPDES), toxic control, sediments, and biological monitoring. The entire program is based on EPA guidelines for Section 301(h) discharges and is shown in Appendix A.

b. Potential Impact on Specific Water Quality

The major potential impacts on the receiving waters in West Mamala Bay from the discharge of primary effluent from the Honouliuli WWTP are on the water quality parameters of dissolved oxygen (DO), suspended solids (SS), and turbidity.

The other parameters which are affected but in a lesser degree are total nitrogen, total phosphorus, light extinction coefficient, chlorophyll a and fecal coliform/enterococci bacteria. Under the current revision (1987) of Chapter 11-54, Water Quality Standards, nutrient concentrations will be expressed as total nitrogen and total phosphorus, and enterococci bacteria will replace fecal coliform as indicator organism for marine recreational areas. The revised standards will probably be adopted in early part of 1988.

(i) Impact on Dissolved Oxygen (DO)
Concentration

Primary effluent has a greater initial impact on receiving waters than secondary effluent because of its higher biochemical oxygen demand (BOD₅). Average BOD strength for primary

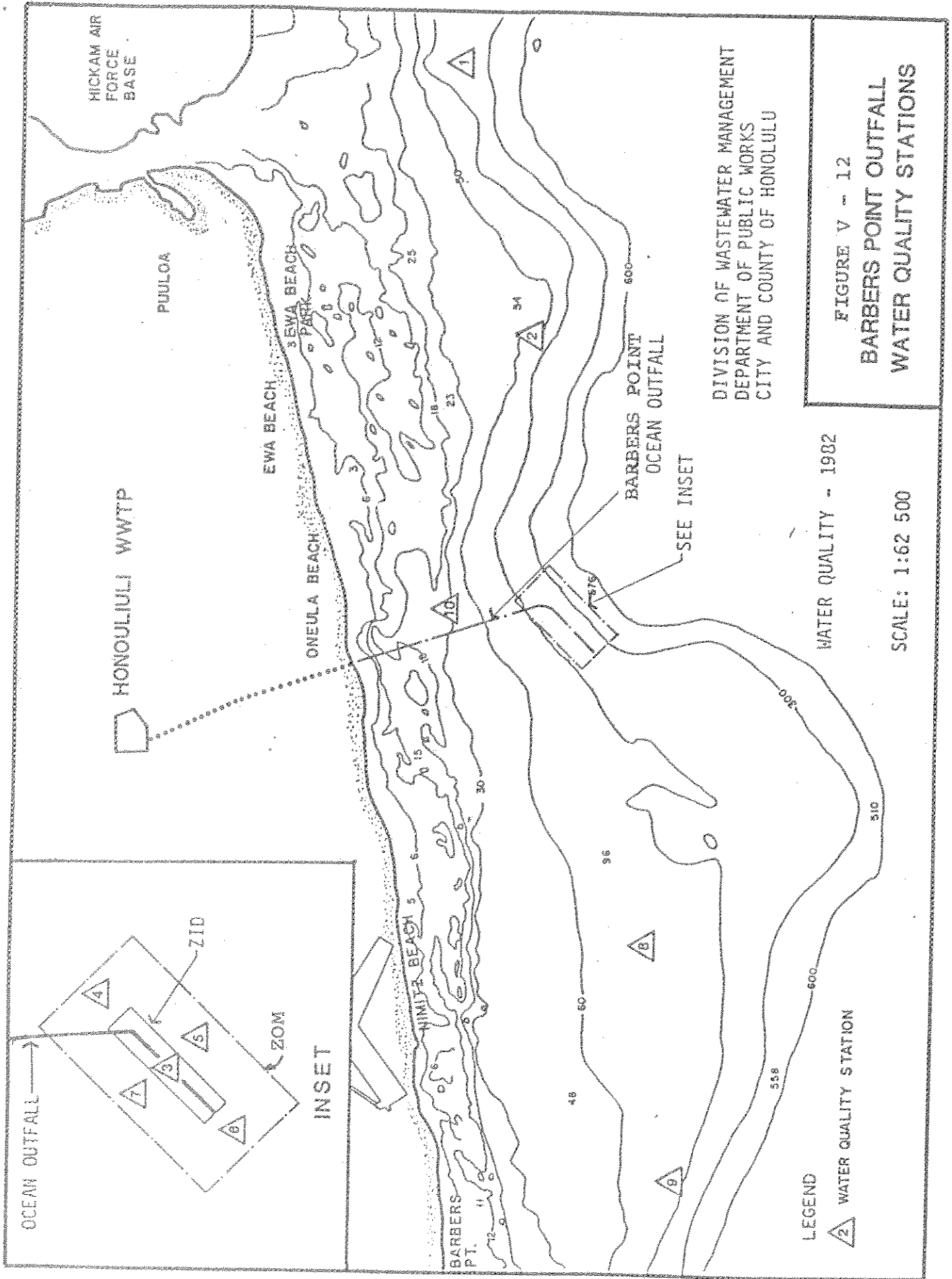


FIGURE V - 12

BARBERS POINT OUTFALL
WATER QUALITY STATIONS

DIVISION OF WASTEWATER MANAGEMENT
DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

WATER QUALITY - 1982

SCALE: 1:62 500

LEGEND
 ▲ WATER QUALITY STATION

effluent from domestic sewage is about 140 mg/l based on a 30% removal efficiency at the plant. The average BOD concentration in the effluent from the Honouliuli WWTP was 112 mg/l during 1986 and ranged from 99-119 mg/l. Based on earlier laboratory tests, it was determined that the immediate dissolved oxygen demand (IDOD) for the Honouliuli effluent to the year 2005 was 1 mg/l based on an anaerobic incubation travel time of 6.82 hours.

The mean ambient DO concentration in the receiving waters of West Mamala Bay varies from season to season. The lowest concentration occurs during the Fall (6.26 mg/l) and the highest in Winter (6.57 mg/l). During the spring and summer, the mean ambient DO concentrations were 6.50 mg/l and 6.46 mg/l respectively. These concentrations were observed from sampling data, taken prior to the Honouliuli discharge. The potential ambient DO saturation concentration in the receiving waters is 7.2 mg/l (24°C & 33 ppt). Under the State Water Quality Standards (WQS), dissolved oxygen shall not be less than 75% of saturation or 5.4 mg/l.

Dissolved oxygen concentration after initial dilution can be estimated when the DO concentration of the effluent and the receiving waters are known plus the immediate dissolved oxygen demand and the flux-averaged dilution of the effluent plume. Since minimum dilution and ambient DO occurs during the fall, the values selected are 206:1 and 6.26 mg/l respectively. The IDOD is known to be 1.0 mg/l and the DO of the effluent is assumed to be zero under worst conditions. Using the above value, the DO concentration at the top of the effluent plume (topping level) is estimated to be 6.22 mg/l.

After the effluent plume leaves the ZID, the remaining BOD in the waste field continues to exert an oxygen demand on the receiving water. This reaction will depress the DO concentration (farfield oxygen depression). Maximum depression is about 0.28 mg/l, two-four hours of traveling time after discharge. The dissolved oxygen will have a calculated concentration of 5.98 mg/l. The minimum DO concentration observed was 5.75 mg/l at Station 8 during the fall which is still considerably higher than 5.4 mg/l allowed under the standards.

(ii) The mean concentration of suspended solids in the receiving waters observed before the discharge had a mean value of 6 mg/l. The amount of suspended solids in the effluent in 1986 ranged from 53-93 mg/l with an average of 71 mg/l. Using the upper range of 93 mg/l, the maximum increase of the suspended solid concentration in the receiving waters is estimated to be less than 1 mg/l after initial dilution, or an ambient condition less than 7 mg/l (6.42). The WQS is 20 mg/l. Based on current sample dates, the suspended solid concentration at all stations was less than 1 mg/l.

Almost all of the suspended solids discharged from the ocean disposal system remain in the water column and are eventually transported by the currents into the open ocean. Dollar (1986) estimated that only one percent of the suspended solids are deposited on the ocean floor in the vicinity of the diffuser section.

(iii) Turbidity evaluation of the Honouliuli effluent conducted at an earlier study showed turbidity units (NTU) ranging from 56 units to 61 units for average and maximum flows respectively. The highest turbidity units observed in the receiving waters during the past year was 0.16 NTU at station 1, the control station (before discharge began the highest observed was 0.5 NTU). The maximum potential change in the receiving waters is 0.3 NTU after initial dilution and could possibly raise the turbidity in the receiving waters to 0.46 NTU. The WQS not to exceed value (2%) is 1.00 NTU or 0.54 NTU less than the calculated value.

Based on current water quality data, turbidity values ranged from 0.07 NTU to 0.12 NTU in the ZID. The maximum value was observed at Station 10 at 0.18 NTU. Based on the sampling data at West Mamala Bay and Mokuapu in Windward Oahu, the DOH has been requested to revise ambient turbidity criteria for open coastal waters.

(iv) Effluent pH level in the Honouliuli effluent ranged from 6.63 to 7.31 during 1986. Ambient pH in the receiving waters observed ranged from 8.07 to 8.35. The WQS allow pH units to vary between 7.60 to 8.6. The maximum change to the ambient pH units from the discharge after initial dilution is less than 0.06 units.

(v) Nitrogen and phosphorus parameters are not required to be analyzed by the plant NPDES permit. Average concentrations taken at the Sand Island WWTP, another primary plant, in 1984 were 25.1 mg/l for total nitrogen and 4.64 mg/l for total phosphorus. After dilution, the effluent concentration for total nitrogen and total phosphorus could reach about 0.12 mg/l (122.4 ug) and 0.02 mg/l (22.6 ug/l) respectively. Total nitrogen observed in the ZID ranged from 56.3 ug to 95.4 ug/l, and total phosphorus ranged from 5.48 ug/l to 11.83 ug/l. The Water Quality Standards for total nitrogen (Kjeldahl) and total phosphorus are 110 ug/l and 16 ug/l, respectively, for the geometric mean values.

(vi) Light extinction coefficient (K) and chlorophyll a in the ZID ranged from 0.018 to 0.029, and from .03 to .05 ug/l, respectively. The WQS for Light Extinction coefficient (k unit) is 0.10, and 0.15 ug/l for chlorophyll a for the geometric mean values. The maximum values observed for light extinction coefficient (K) was 0.236 units at station 10 in the spring of 1987. The 10% allowable value in the WQS is 0.30 units. The maximum value observed for chlorophyll a was 0.35 ug/l at Station 10 in the fall of 1987. The 10% allowable value in the WQS is 0.50 ug/l.

Based on the water quality monitoring program, the effluent from the Honouliuli WWTP meets applicable water quality standards for Class A open coastal waters.

5. Impact on Public Water Supply

The discharge of primary effluent off Barbers Point will not affect any existing or potential sources of public water supplies including plans for the desalination of ocean or brackish water. The Board of Water Supply (BWS) does not have any plans to construct an intake structure along the coastline. The BWS has confirmed this findings by letters dated August 4, 1978, and September 12, 1983.

6. Biologic Impact of Discharge

Prior to the design of the Barbers Point ocean outfall, R.M. Towill, Inc., the City consultant undertook several benthic surveys along the proposed outfall alignment. Four stations were established at depths of 20, 40, 60 and 80 feet. The bottom at stations between 20 to 60-foot depths consisted of hard coral rock stratum on flat relief but station at the 80-foot depth was sandy and was slightly sloped to seaward. Pocillopora meandrina was the dominant living coral at the 20 foot depth and 80-foot depth; an encrusting species, Porites lobata was dominant at 40 and 60-foot depths. Coral cover at the 20 and 80-foot depths was sparse, 1.1% at both stations compared to a cover of 7.8% at the 40-foot depth and 9.9% at the 60-foot depth.

Topographic relief at the 200-foot isobath in the ZID did not allow for the development of a rich and diverse fauna and flora because of the dome-shaped, smooth or calcium carbonate stratum with 2 to 3 feet in height relief.

The nearshore to the 60-foot depth areas between Iroquois Point and Nimitz Beach was surveyed by AECOS (1979, 1980) in the report, "Oahu Coral Reef Inventory", for the U.S. Army Corps of Engineers. The description of this nearshore stretch is described in the City and County 301(h) waiver application for Honouliuli WWTP (M & E Pacific, 1983) and quoted as follows.

"The shallow area (shoreline to 30 feet) is characterized by turbid water, flat substratum of sand or consolidated dead coral, and very few live corals. Algae are the most abundant organisms from the shoreline to a depth of approximately 15 to 20 feet. Live corals are generally not observed in water shallower than 15 to 20 feet. As water depth increases to 60 feet, live corals are more common (8 to 10 percent coverage of the substratum), but distribution is patchy. At least in one area live coral coverage was estimated to be 60 percent

in a narrow band along the top of the ledge. Below the ledge, live corals were sparsely distributed and were visually estimated (by the investigator) from underwater photographs (R.M. Towill, 1972) to account for less than 1 percent of the substratum cover."

"The sparsity of live corals and low bottom relief is due to the high wave energy environment, which results in sand resuspension and resultant sand scouring of the bottom (AECOS, 1980). Since these abrasive and destructive effects are part of the natural, local marine environment, the BIP is not considered 'stressed'. Sand abrasion is the limiting factor in the areal distribution and magnitude of coral and coral dependent populations."

In 1983, a biomonitoring survey was conducted by the City Consultants (Russo u.d.) near water Quality Station (WQS) 10 in about 40-foot depth. The limestone basement rock was sparsely covered by the corals Porites lobata and Pocillopera meandrina; also by small patches of Montipora spp. The mean cover at this station was about 1.0%.

Algae of the genera Galaxaura, Neomeris, and Sargossum were observed at WQS 10 in scattered patches. Orange and red sponges were also seen but there were little sponge growth on the basement rock.

Dames and Moore (EIS for Ewa Marine 1984) found an abundance in the nearshore waters to the 30-foot depth near the proposed channel into the marina. Dames and Moore 1984 survey reported 40 taxa from the algae phyla; Chlorophyta (Green Algae), Cyanophyta (Blue Green Algae), Phaeophyta (Brown Algae), and Rhodophyta (Red Algae). Twenty five taxa of the 40 taxa were Rhodophyta, the most abundant group. One Cyanophyta taxa was identified. Algae cover ranged from 20 to 50 percent near the 18-foot depth contour to 10 to 20 percent at the deeper 30-foot depth station.

From December 1981 to September 1986, four (4) fish surveys were conducted along the 1,750 foot long Barbers Point diffuser section at the 66 meter (217 feet) depth, using the submersible Makali'i (Russo, 1986). Number of species observed ranged from 28 in 1986 to 12 in 1984. Total abundance was 1,171/400 yd² the highest in December, 1981, before discharge started, compared to 187, the lowest in 1984 when 15 mgd of screened effluent was being discharged. Total abundance was 643/400 yd² in September 1986 when 19.0 mgd of

primary effluent was being discharged. The data suggests that pretreated effluent "dramatically decreased total fish abundance and species' richness while the discharge of primary effluent between 0 and 19 mgd does not".

Damselfishes and the lemon butterfly fishes were present over the five years of observance. These fishes are water column feeders, known to be abundant also over other deep ocean outfalls. High diversity of fish species appears to be attracted by the outfall, but only a few species comprised over 75% of the total abundance. Results of the surveys are shown in Table V-6.

A fish species abundance survey was also undertaken in nearshore waters near WQS 10. Total abundance varied from 17 to 30/100 yd² at three transects representing 9 to 13 species. Results of the survey are tabulated in Table V-7

In summary, the outfall pipe and supporting armor rocks provide additional habitat in the substratum which is devoid of topographic relief. Demersal fishes have been attracted to the outfall since its construction in 1978. Fish communities found at the outfall consist of the common demersal fish that are found in reefs to the 600-foot depth. Fish species composition and abundance does not appear to be affected by primary effluent and large number of fish species normally associated with shallower pristine waters are attracted to the diffuser section.

The use of micromollusks (mollusks less than 10 mm in diameter) to monitor the effects of an ocean discharge has been implemented by the City and County assisted by the University of Hawaii Water Resources Research Center (WRRC). Benthic stations were established around each ocean outfall and sediment samples were recovered and analyzed for abundance and species composition of micromollusk as well as the characteristics of the sediments such as grain size analysis, oxidation-reduction potential, etc.

Sampling of the infauna (benthic fauna living in the substrate) at fixed stations is conducted prior to construction of the outfall sewer; after construction is completed, prior to initial effluent discharge; and periodically thereafter at 3-5 year intervals. For Section 301(h) discharges, sampling is conducted annually after a modified permit has been granted.

TABLE V-6
 FISH SPECIES ABUNDANCE ALONG THE BARBERS POINT OCEAN OUTFALL, OAHU*
 AT THE 217-FOOT DEPTH

Family/Species	Discharge in Million Gallons Per Day				Number per 336 square meter (400 sq. yds.) of bottom area
	0	3.1	15.0	17.5	
	Sampling Date				
	December 1981	March 1982	May 1984	April 1985	September 1986
Acanthuridae (Surgeon fishes)	26	29	8	17	29
<u>Acanthurus nigrofuscus</u>					
<u>A. nigroris</u>	1	4		5	3
<u>A. olivaceus</u>	10	15		4	13
<u>Naso hexacanthus</u>	10	4	2	2	5
<u>N. literatus</u>	2				
<u>N. unicornis</u>				3	2
<u>Zanclus cornutus</u>	3	4	6	3	6
Aulostomidae (Trumpet fishes)		1		3	1
<u>Aulostomus chinensis</u>		1		3	1
Balistidae (Trigger fishes or Humuhumus)	1	5	3	7	12
<u>Melicthys niger</u>					
<u>M. vidua</u>	1	5	3	2	2
<u>Suffamen frenatus</u> ¹				5	6
Carangidae (Jacks)		1		2	4
<u>Caranx ignobilis</u>		1		2	

1. Formerly S. capistratus

*Source: Russo, A.R. 1986. "Fish Community Structure On A Deep Ocean Outfall: Barbers Point, O'ahu, Hawai'i, 1981-1986"
 WRRC Special Report 11:86. Adopted from Table 1.

TABLE V-6 (Contd.)
FISH SPECIES ABUNDANCE ALONG BARBERS POINT OCEAN OUTFALL, OAHU
AT THE 217-FOOT DEPTH

Family/Species	Sampling Date			
	December 1981	March 1982	May 1984	April 1985 September 1986
Chaetodontidae (Butterfly fishes)	82	114	35	48
<u>Chaetodon auriga</u>				33
<u>C. fremblii</u>	3		1	2
<u>C. lunula</u>	2	3		2
<u>C. miliaris</u>			25	2
<u>C. multicinctus</u>	70	100		38
<u>C. unimaculatus</u>	5	2		2
<u>Forcipiger flavissimus</u>			7	2
<u>Heniochus diphreutes</u> 2	2	5	2	2
		4	2	2
Diodentidae (Spiny puffers)				
<u>Dioden holocanthus</u>				12
				12
Holocentridae (Squirrel fishes)	8	20		2
<u>Myripristis</u> sp.	8	20		2
Labridae (Wrasses or Minaleas)	2	3		7
<u>Sodianus bilunulatus</u>				5
<u>Coris flavovittata</u>				2
<u>Labroides phthirophagus</u>	2	1		1
		2		3
				1

Number per 336 square meter (400 sq. yds.) of bottom area

2. Formerly H. acuminatus

FISH SPECIES ABUNDANCE ALONG BARBERS POINT OCEAN OUTFALL, OAHU
AT THE 217-FOOT DEPTH

Family/Species	Sampling Date			
	December 1981	March 1982	May 1984	April 1985 September 1986
Lutjanidae ('Opakapakas or Snappers)	500	500	10	200
<u>Lutjanus kasmira</u>	500	500	10	200
Monacanthidae (File fishes)	2	3	300	275
<u>Pervagor spilosoma</u>	2	3	300	275
Mullidae (Goat fishes)	110	75	29	3
<u>Mulloidichthys</u> sp.	100	52	23	
<u>Parupeneus cyclostomus</u>		3		
<u>P. multifasciatus</u>	5	11	6	1
<u>P. porphyreus</u>	5	9		
Pomacentridae (Damsel fishes)	438	357	112	78
<u>Chromis agilis</u>			8	4
<u>C. leucura</u>	100	150	100	125
<u>C. verater</u>	288	186	10	9
<u>Dascyllus albisella</u>	50	21	2	3
Scaridae (Parrot fishes or Uhus)	2			2
<u>Scarus</u> sp.	2			2
Tetraodontidae (Puffers or Balloon fishes)			2	2
<u>Arothron hispidus</u>				1
<u>Canthigaster lactator</u> ³			2	1
Total Abundance	1171	1108	187	556
Number of Species	22	25	12	26
Number of Families	10	11	5	11

3. Formerly Cantherigasteridae Family

TABLE V-7
FISH SPECIES ABUNDANCE AT NEARSHORE WATERS
(40 FOOT) OFF ONEULA BEACH, OAHU
AT WATER QUALITY STATION 10*
MAY, 1983

Family/Species	Transect 1	Transect 2	Transect 3
	#/90m ² (100 yd. ²)		
Acanthuridae (Surgeon fishes)	2	6	0
<u>Acanthurus nigoris</u>	2	0	0
<u>A. nigrofuscus</u>	0	5	0
<u>Zanclus canesens</u>	0	1	0
Balistidae (Trigger fishes/Humuhumus)	1	0	1
<u>Safflamen bursa</u>	1	0	1
Chaetodontidae (Butterfly fishes)	5	4	1
<u>Chaetodon miliaris</u>	2	3	0
<u>C. fremblii</u>	0	1	1
<u>Holacanthus arcuatus</u>	3	0	0
Labridae (Wrasses or Hinaleas)	12	7	4
<u>Thalassome dupperey</u>	9	3	3
<u>T. bullieui</u>	1	0	0
<u>Coris venusta</u>	1	2	1
<u>C. gaimardi</u>	1	2	0
Mullidae (Goat fishes)	0	5	2
<u>Mullordichthys auriflamma</u>	0	2	2
<u>Parupeneus cyclostomus</u>	0	3	0
Pomacentridae (Damsel fishes)	5	2	7
<u>Dasvullus albisella</u>	2	2	0
<u>Plectiglyphidodon johnstoniams</u>	0	0	2
<u>Chromis spp.</u>	3	0	5
Cirrhitidae (Hawk fishes)	0	1	0
<u>Paracirrhites forsteri</u>	0	1	0

*Source: Russo, A.R. u.d., "Fish and Epibenthic Populations"

TABLE V-7 (contd.)
FISH SPECIES ABUNDANCE AT NEARSHORE WATERS
(40 FOOT) OFF ONEULA BEACH, OAHU
AT WATER QUALITY STATION 10*
MAY, 1983

Family/Species	Transect 1	Transect 2	Transect 3
	#/90m ² (100 yd. ²)		
Canthigasteridae (Puffers)	4	2	2
<u>Canthigaster cinctus</u>	1	1	1
<u>C. jactator</u>	3	1	1
Murenidae (Puhi)	1	0	0
<u>Gymnothorax flavimarginatus</u>	1	0	0
Number of Families	7	7	6
Number of Species	13	13	9
Total Abundance	30	27	17

*Source: Russo, A.R. u.d., "Fish and Epibenthic Populations"

All micromollusk data collected at Barbers Point and Mamala Bay from 1973 to 1983, and thereafter are stored at the University of Hawaii Computer Center. Physical-chemical characteristics of the samples are also included in the data base.

The pre-discharge survey was conducted in 1981 from 23 stations. In 1983, when the outfall began discharging all stations were sampled at least once. The number of individual shells were counted at each station from about 100 species of mollusks and analyzed for: coefficient of similarity, relative species composition, abundance and number of shells per cm^3 of sediment, and community dominance.

Abundance of shell at about the 80-foot depth is about 10 shells per cm^3 in Hawaiian waters. In deeper waters or under stressed environment, abundance values are higher. About fifty percent of the assemblages belong to 6 or 7 common species. Anaerobic conditions in substrates are indicated by sporadic distribution patterns.

During the 1981-83 survey (Kay & Kawamoto 1984) mean abundance was 21 shells/ cm^3 , species' number ranged from 15 to 34, and species diversity from 1.8 to 3.3. Abundance was 21 shells/ cm^3 at the diffuser depth; increasing to 31 shells/ cm^3 at the 300-foot depth. There were no significant differences in abundance or species richness between pre-discharge and post discharge samples, and the two assemblages from the two sampling periods had the same proportions. The data indicated that there were no detectable influences on the micromolluscan assemblages from the Barbers Point ocean discharge.

In 1986, another benthic survey (Nelson et al, 1987) was conducted by the WRRC in conjunction with the City 301(h) application for the Barbers Point discharge. The benthic infaunal from seven (7) stations along the diffuser isobath (± 200 -foot depth) were sampled following EPA sampling guidelines and indices. Three of the stations were located at the ZID boundary; the control station was located 3,500 meters (11,500 feet) to the east of the ZID; a far-field station was located 3,500 meters to the southwest; and a near-field station at 500 meters (1,640 feet) away to the southwest (See Figure V-13).

The sampling effort consisted of biological and geologic analysis at each station. Geologic analysis included sediment grain size, total volatile solids and oxidation-reduction potential. Biological analysis were conducted on both mollusk and non-mollusk fractions and included identification, abundances for each species, test for normality of distribution, dominant species, diversity, and index of dissimilarity among others.

Grain size analysis, oxidation-reduction potential and total volatile solids at the stations are shown in Table V-8. There were relatively little variability among the stations. Station 2 at the diffuser had a lower percentage of large size particle, but percentage of finer size particles was about the same as other stations. Oxidation-reduction potential ranged from +35 mV to 57 mV, extremely similar, and indicated that the sediments at all stations were aerobic. There were no evidence of reducing conditions of the surface sediments at all stations including those in the ZID.

Percentage for total volatile solids were similar and ranged from 1.7% to 2.6%. There were no indication that the station in the ZID were experiencing larger deposition of organic material from the Barbers Point discharge and other sources than more distant stations. Visual observation from the submersible Mokali'i at the diffuser showed the physical habitat in general was not altered. The rising individual plumes from each port were restricted within a 9-15 feet band on both sides of the diffuser pipe. Outside this band, very few solids are evidence in the water column. Initial dilution is very rapid and completed between 1 to 4 minutes.

Mean number of species for mollusk and non-mollusk groups are shown in Table V-9. The Polychaetes had the highest number of species (97) in the non-mollusk group. Gastropods comprised the majority of the taxa from the mollusk group. The dominant species for the 7 stations were comprised from 9 species. There were no indications from the benthic samples that the stations were affected by organic materials from the effluent discharges that would cause/create a stress community response. A stressed community response would consist of a barren zone around the diffuser caused by anaerobic sediment; surrounded by an intermediate zone with peak abundances composed of hardy species. A transition zone is then encountered with high species diversity but lower abundance, surrounded by the normal unstressed community.

TABLE V-8
 CHARACTERISTICS OF SEDIMENTS FOUND AT BENTHIC SURVEY STATIONS
 AT BARBERS POINT OCEAN OUTFALL*

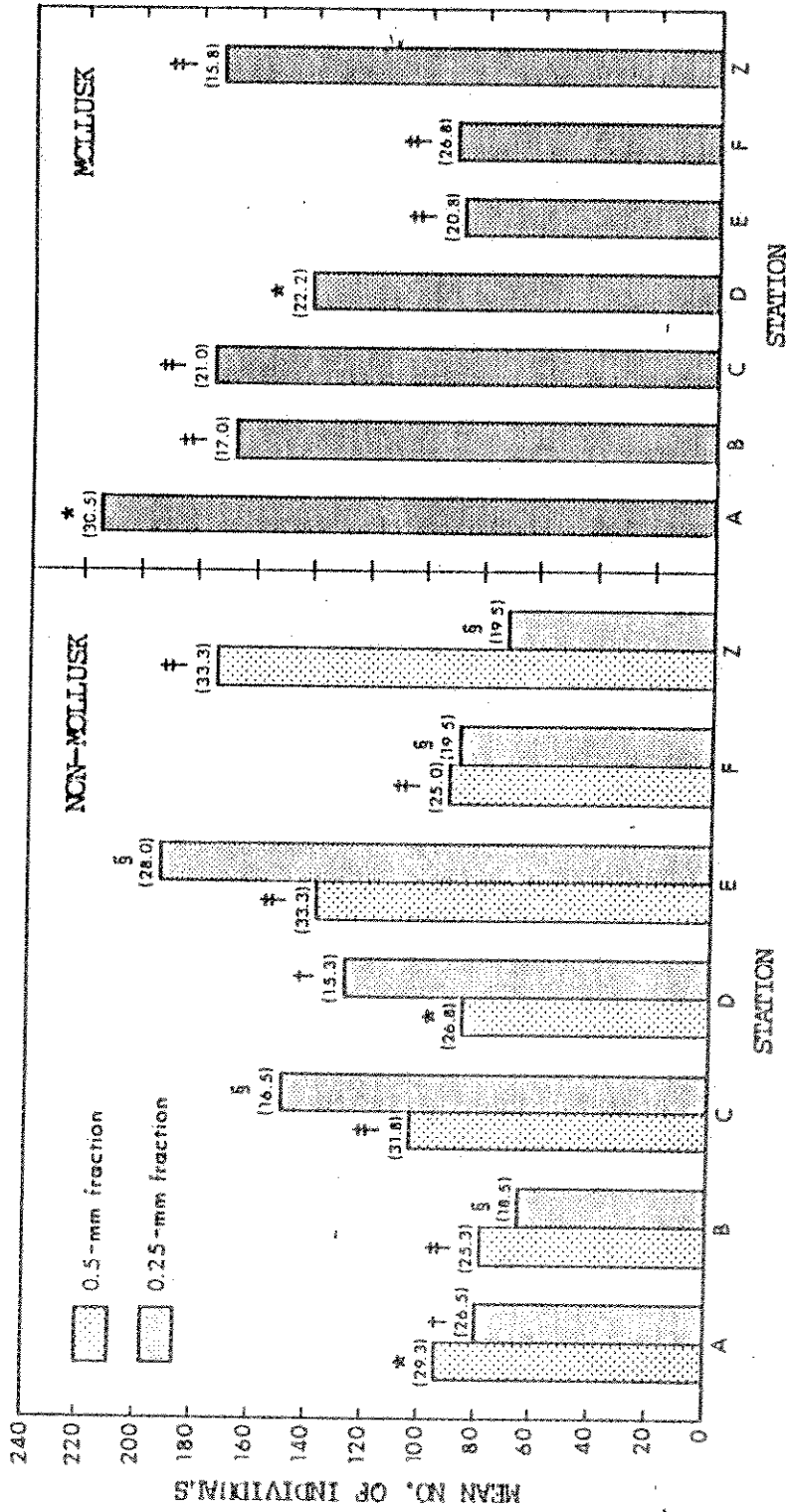
STATION	GRAIN SIZE ANALYSIS										Oxidation - Reduction		Total Volatile Solids (%)
	PERCENT OF SEDIMENT RETAINED BY EACH SIEVE										mv	Standard Deviation	
	Sieve Size (phi)												
	-1	0	1	2	3	4	4-81						
A1	3.5	8.1	14.6	19.5	27.4	19.4	6.0	+52	92			2.5	
A2a	6.9	12.4	17.6	19.5	23.3	13.9	5.0					2.6	
A2b	7.3	11.5	17.4	19.7	23.8	14.2	4.6						
A3	8.2	12.5	16.2	17.8	22.7	15.1	5.6					2.3	
A4	12.4	12.3	15.3	16.8	21.3	14.5	5.7					2.2	
A5	6.7	13.0	19.6	19.3	21.7	13.5	3.6					2.6	
Ba	10.7	13.4	28.2	25.1	14.3	5.1	2.4	+44	33			1.8	
Bb	10.0	13.7	27.5	25.6	14.5	5.1	1.9						
C	4.6	5.9	14.0	21.5	35.6	13.8	3.6	+57	223			2.0 ⁴	
D1a	1.1	3.7	11.3	23.9	39.7	16.3	3.1	+42	35			2.5	
D1b	2.2	3.9	11.3	23.9	38.8	15.6	3.3						
D2	0.8	4.5	14.5	25.5	36.4	14.4	2.7					2.3	
D3	1.1	3.5	13.6	26.5	38.3	13.4	2.6					2.3	
D4	1.7	6.1	18.5	28.3	31.7	10.1	2.8					2.1	
D5	10.4	8.9	15.8	22.6	24.0	12.4	2.7					2.2	
E	2.7	7.8	14.5	22.0	33.1	13.7	5.0	+39	13			1.7	
F	3.1	9.0	16.8	30.5	31.5	6.2	1.7	+35	03			2.1	
Z	0.3	2.7	13.2	23.1	37.0	18.2	4.1	+55	132			2.5	

1. Fine sediment fraction determined by pipette analysis
2. Mean of 4 replicates
3. Mean of 6 replicates
4. Duplicate
5. Mean of 9 replicates

*Source: Nelson, et al. 1987. "Benthic Infaunal Sampling near Barbers Point Ocean Outfall, O'ahu, Hawaii'1" WRRC Special Report 4:02:87. Adopted from Tables 2 and 3.

TABLE V-9

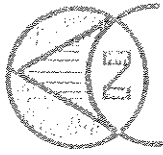
MEAN NUMBER AND SPECIES OF NON-MOLLUSK AND MOLLUSKS
BARBERS POINT OCEAN OUTFALL STATIONS



NOTE: Mean number of species within parentheses.
*Ten replicates.
†Six replicates.
‡Four replicates.
§Two replicates.

Source: "Benthic Infaunal Sampling Near Barbers Point Ocean Outfall, Oahu, Hawaii", Figure 2. UH-WRRC Special Report 4:02:87, April 1987.
A report prepared for the Department of Public Works.

MAKAKILO



EWA

HONOLULULI WWTP



HICKAM AIR FORCE BASE

Maipis Point

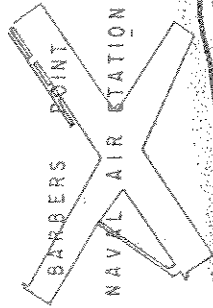
Hammer Point

Keahi Pt.

PUULOA

EWA BEACH
3 Ewa Beach Park

ONEULA BEACH



BARBERS POINT

NAVAL AIR STATION

Barber's Beach

BARBERS PT

48

96

510

558

600

ZONE OF INITIAL DILUTION (406 x 2165')

BARBERS POINT OUTFALL

BENTHIC STATION

372

54

600

A

B

C

D

E

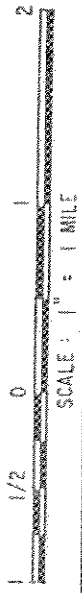
F

DIVISION OF WASTEWATER MANAGEMENT
 DEPARTMENT OF PUBLIC WORKS
 CITY AND COUNTY OF HONOLULU

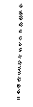
FIGURE V - 13

**BARBERS POINT OUTFALL
 BENTHIC STATIONS**

WATER QUALITY - SEPT. 1986 SCALE: 1" = 62.500'



LEGEND:



The results of the benthic infaunal sampling in 1986 are quoted as follows:

"In summary, all analyses indicate that all stations examined in the Barbers Point Ocean Outfall benthic survey were relatively similar to one another for all faunal fractions analyzed. Little evidence was seen for any significant input of organic matter into the bottom sediments. Only the dominance patterns for the mollusk fraction gave any indications of potential changes in relative faunal composition at the ZID and near-ZID stations. However, examination of individual species patterns for the dominant mollusks in reference to studies at other Hawai'i ocean outfalls suggest that the changes in dominance observed were probably unrelated to the proximity of the outfall. Therefore, it is concluded that the Barbers Point Ocean Outfall is having little effect on any component of the benthic fauna examined in this study."

The impact on primary productivity from the discharge of nitrogen and phosphorus from the Barbers Point Outfall in open coastal waters is not a great concern compared to a discharge into an estuary or an embayment. Nitrogen, phosphorus and trace metals are essential to the growth of phytoplankton provided they are available in surface layers of the ocean within reach of sunlight. Sunlight which provides the energy for photosynthesis is limited to the surface layers or euphotic zone. The zone usually varies with the seasons and the turbidity of the water column. The extinction coefficient for visible light off Ewa Beach was determined to be 0.03 during the WQPO.

Measurements of chlorophyll a, a manifestation of primary productivity, before and after discharge was initiated in the receiving waters off Barbers Point showed no significant difference in mean values. Chlorophyll a concentration in the ZID at all depth ranged from 0.03 to 0.14 ug/l during the 1986-87 compared to a range of 0.01 to 0.34 ug/l prior to discharge in 1981-82. The range of measurements for chlorophyll a at Station 1 (control) during 1986-87 was higher and varied between 0.04 to 0.30 ug/l.

Early zooplankton studies indicated that there were high natural temporal and spatial variability in the receiving waters. However, studies by AECOS, Inc. (1983), the City's consultant, revealed that the Barbers Point discharge did not have a measurable impact on the zooplankton communities in the receiving waters. The studies do suggest that waters from Pearl Harbor appeared to have a greater impact on the planktonic communities in the receiving water than the Barbers Point discharge.

7. Impact on Recreational Activities

The recreational areas which may be affected by the Barbers Point discharge of primary effluent extends from Barbers Point Beach on the west to Fort Kamehameha Beach at the channel entrance to Pearl Harbor. The beach at Fort Kamehameha is also affected by the discharge of the Fort Kamehameha STP, located at a depth of 46 feet, 1,800 feet offshore. The area of potential influence from the discharge area of the Barbers Point outfall intercepts the coastline within a radius of eight kilometers (5 miles). (See Figure V-14.)

There are five (5) beaches within the ten mile stretch of the coast line. Two beaches, Nimitz Beach and Iroquois Beach, are under the control of the U.S. Navy. The other three are municipal beach parks (BP) with Oneula BP (28.4 acres) being the largest. Ewa Beach BP, although the smallest in area (4.3 acres) is one of the intensive use beach parks. Nearshore water recreational activities that have been identified along the southern coastline include surfing, swimming, diving, fishing, shell fishing and picnicking. Surfing sites have been identified and are shown on Figure V-14.

Most water contact activities are believed to be confined within 1,500 feet off the shoreline to a depth of about 25 feet. The State Department of Health (DOH) has not imposed any restrictions on any water contact sport activity in any areas due to the discharge of the effluent.

The edible seaweed "ogo" is gathered at several locations along the coast. The ogo grows in waters up to 9 feet deep. The DOH and the State Aquatic Resources Division have not imposed restrictions on the consumption of ogo or fish caught in the vicinity of the outfall diffuser. The Division of Aquatic Resources have no record of fish kills or any indication of adverse impacts on marine life and/or recreational/commercial fishing activities in the receiving waters of the Honouliuli discharge.

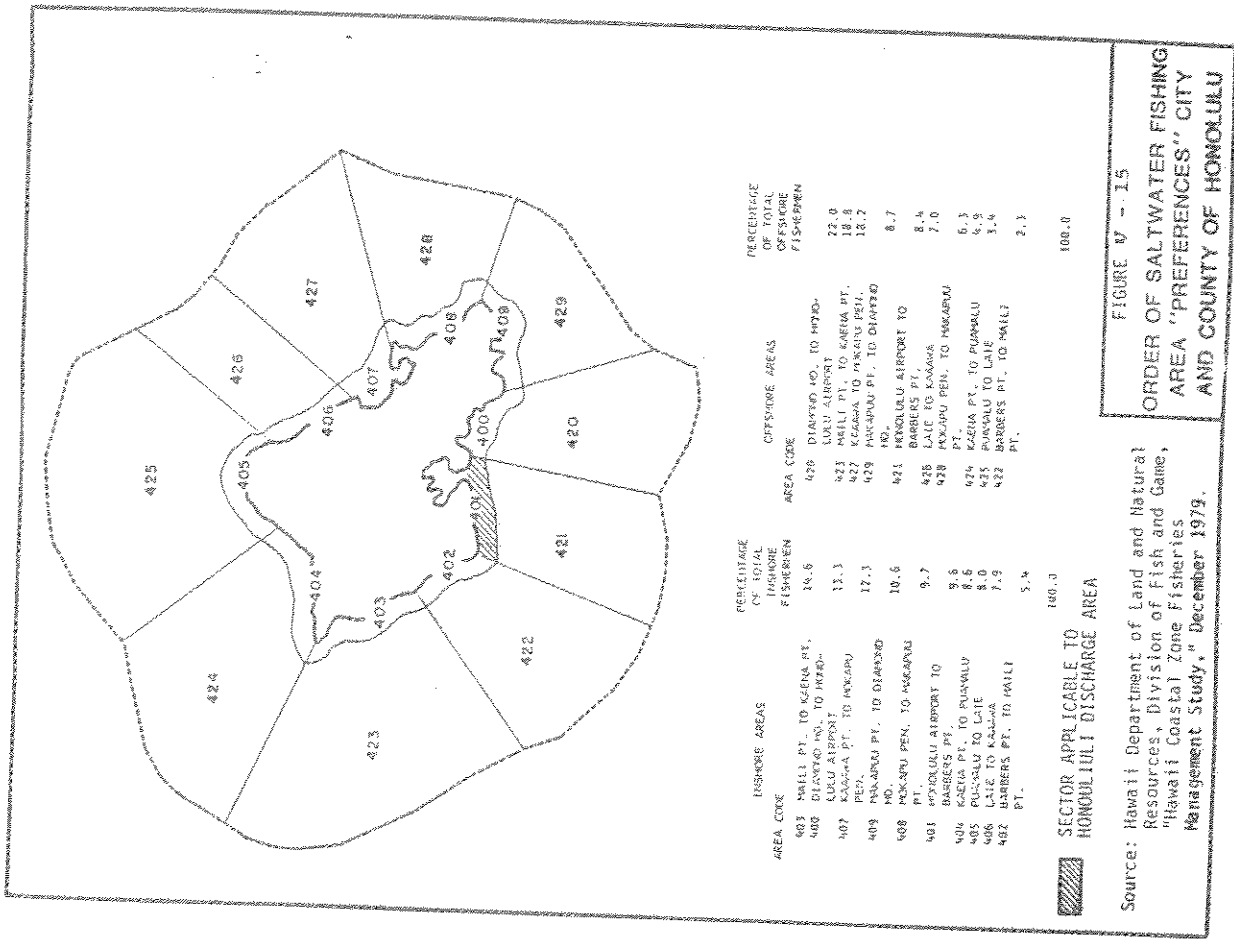
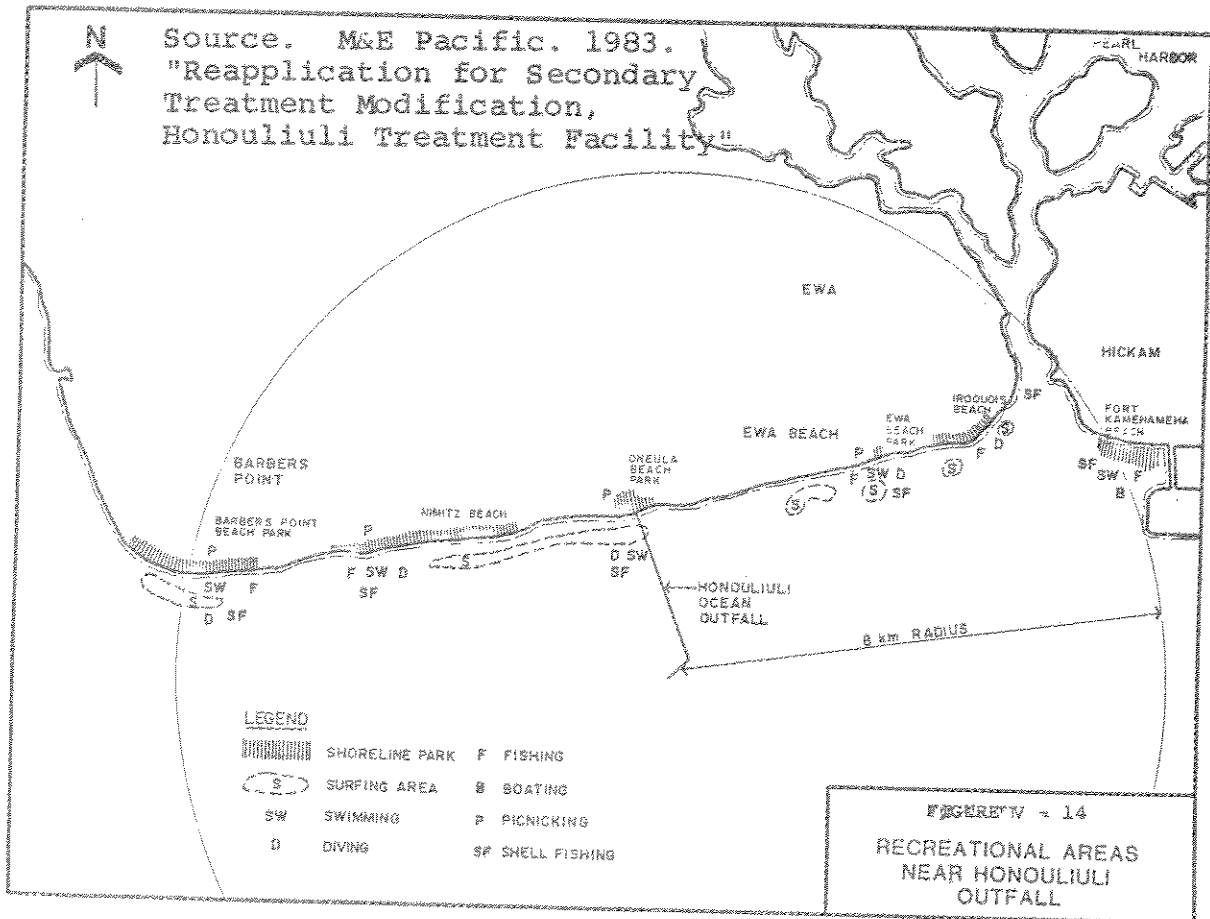
The coastal nearshore waters between Barbers Point and Honolulu International Airport are frequented by 9.6% of the total number of inshore fishermen on Oahu according to a survey conducted in 1979 by the Department of Land and Natural Resources (see Area 401 on Figure V-15). An average of 68% of sport fishing occurs in inshore waters throughout the State according to the 1979 report.

There are several fish aggregation devices (FAD) in the nearby oceanic waters which are used to attract fish. FADs are used to control fish recruitment by the emplacement of tethered buoys because it is well known that fishes are attracted to floating objects. Studies from the University of Hawaii Sea Grant Program suggests that yellowfin tuna are attracted to FADs for foraging expedition on small fishes who are attracted to FADs for shelter.

The Division of Aquatic Resources of the Department of Land and Natural Resources is in the process of establishing a 31-acre deepwater fish habitat off Ewa Beach. The site is about 1.5 miles offshore in about 60-fathom (360 feet) depth, not far from the Barbers Point outfall diffuser section (200-foot depth), but in deeper waters. Up to 10,000 tons of surplus rock boulders and damaged concrete products will be dumped to create a high vertical relief in the surrounding waters. Two surplus navy barges have already been sunk at the site. In the 1979 survey, the offshore area between Barbers Point and Honolulu Airport attracted 8.4% of offshore fishermen.

The fish surveys taken annually between 1981 to 1986 along the diffuser section at the 200-foot depth by a submersible, suggest that the proposed deepwater fish habitat will be successful in bottom fish; such as, the opakapaka. The nutrients supplied by the effluent will be recycled into the marine food chain leading to some degree of abundance of marine life.

The concept of an effluent discharged adjacent to an artificial fish habitat is not new. At Waianae, the outfall diffuser is located within one hundred yards of the existing artificial reef. Previously, the diffusers were located about 3,000 feet away beginning from 1968. Between 1962 to 1973, the average standing crop increased 10 fold for the car bodies portion, and 5-fold for the concrete pipe section, inspite of the nearby effluent discharge. There appears to be a symbiotic relationship between the effluent discharge and the artificial reef habitat. This relationship is possible because there are little or no toxic material in the wastewater effluent.

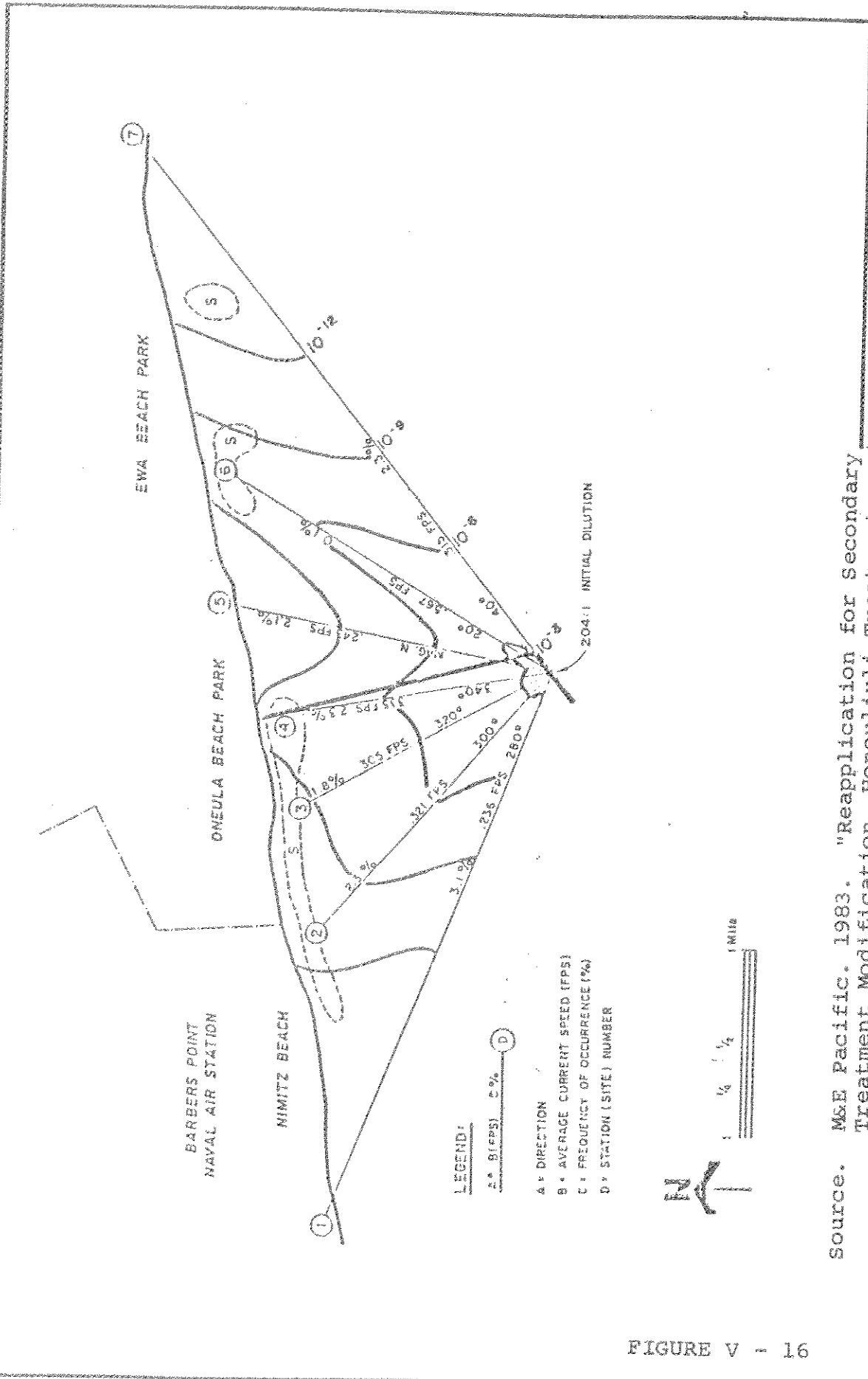


Currently (November 1987), the criteria for marine recreation waters within 1,000 feet of the shoreline, including natural bathing area (Section 11-54-08, Chapter 11-54, DOH) specifies that the geometric mean of 10 or more samples in a 30-day period should not exceed a fecal coliform count of 200/100 ml (200 organisms per 100 milliliter) nor should 10% of the samples exceed 400/100 ml in the same period. In addition, the criterion specify that raw or inadequately treated sewage should not be discharged within 1,000 feet from the shoreline.

Based on water quality data collected at the Zone of Initial Dilution (ZID) boundary (406 feet by 2,165 feet) at the outfall diffuser, approximately 9,000 feet offshore, fecal coliform counts were negligible, considering that the wastewater may have as much as 10^8 organisms/100 ml.

To determine the fate of coliform bacteria when surfacing of the effluent occurs during onshore current period (predominantly during the winter months) iso-bacteria die-out (extinction) rates were plotted on unidirectional onshore current velocities. The die-out rate selected was one hour for a reduction of 90 percent (T_{90}) of the coliform bacteria which is on the conservative side, compared to the maximum 33 minutes observed at Sand Island during the Oahu water quality studies in 1970-71. The "isoextinction curves" were based on an initial dilution of 100:1 (10^{-2}). One hour after surfacing, the extinction coefficient is 10^{-3} , etc. Since the calculated initial dilution when the effluent surfaces based on the present EPA model is used, the values ranges from 1,173 to 1,864 to 1. Assuming a conservative value of 1,001:1, the extinction coefficient of coliform bacteria is 10^{-4} after one hour after surfacing.

The worst case conditions that could hypothetically occur is at Station 4 (See Figure V-16), the surfing site off Oneula Beach Park, directly onshore from the discharge area. Assuming the effluent has a maximum fecal coliform count of 6×10^8 /100 ml and an average initial dilution value of 204:1 (this value is very conservative compared to 1,001:1, computed by the model). After surfacing, the coliform density is 3×10^6 /100 ml. After 5.4 hour travel time, the theoretical coliform density will be about 12/100 ml which is still well below the current state criterion of 200/100 ml. If an initial dilution value of 1001:1 is used, the theoretical concentration of coliform bacteria is about 2/100 ml. The theoretical coliform concentration at other stations would be less because of the longer travel time.



BACTERIAL DIE-OFF CONTOURS
 IMPOSED ON
 WINTER SHOREWARD
 CURRENTS FOR
 BARBERS POINT OUTFALL

Source. M&E Pacific. 1983. "Reapplication for Secondary Treatment Modification, Honouliuli Treatment Facility".

FIGURE V - 16

Based on sampling data between 1981 to the present time at the Zone of Initial Dilution (ZID), the maximum observed concentration of fecal coliform bacteria was 6,400/100 ml, taken at three depths in April 1983 when pretreated effluent was being discharged. Based on a 5.4 hour travel time, the fecal coliform densities will be less than 1/100 ml. Since 1984, when primary effluent was being discharged, the average geometric means of fecal coliform bacteria was less than 2/100 ml within the ZID.

The travel time of 5.4 hours used in the estimate of fecal coliform density at the shoreline was based on onshore current velocities recorded by current meters located near the ZID. Assumptions were made that the entire wave mass was moving at the same constant velocity even in shallower waters, and no deflection occurs in the surf zone. Hence, the calculated values should be considered very conservative.

In 1986, EPA studies indicated that the use of fecal coliform bacteria as indicator organism group for both marine and fresh waters were inadequate. The EPA studies suggest that enterococci bacteria have a better correlation with swimming--associated gastrointestinal illness in both marine and fresh water than fecal coliform. *Escherichia coli* (*E. coli*), a specific bacterial species included in the fecal coliform group, has a correlation with gastrointestinal illness in fresh water equal to the enterococci, but does not correlate as well in marine waters.

The recommended EPA criteria for bathing are:

Fresh Water: *E. Coli* - not to exceed 126/100 ml
or enterococci - not to exceed
33/100 ml;

Marine Water: Enterococci - not to exceed
35/100 ml.

The criteria are based on the geometric mean, generally not less than five samples equally spaced over a thirty-day period. The recommended bathing criteria for marine waters were adopted by the Department of Health (DOH) in Chapter 11-54, "Water Quality Standards" on April 14, 1988. The Barbers Point discharge is expected to meet the new bathing criterion in the receiving waters. Samples taken in July 1987 showed enterococci density of 1/100 ml or less at all 10 monitoring stations.

TABLE V-10
FECAL COLIFORM BACTERIA DENSITY
BARBERS POINT OUTFALL ZID

<u>Year</u>	<u>No. of Samples</u>	<u>Geometric Means #/100 ml</u>	<u>Range #/100 ml</u>	<u>Remarks</u>
1981	31	1.5	0 - 4	Predischarged condition
1982	60	1.5	1 - 4	Discharge of pretreated effluent begins
1983	55	16.0	1 - 6,400	Discharge of pretreated effluent begins
1984	60	1.3	1 - 76	Discharge of pretreated effluent ends
1985	21	1.3	1 - 136	Primary effluent
1986	20	1.4	1 - 6	Primary effluent
1987	15	2.4	1 - 37	Primary effluent

Source: WWM Data

The DOH conducts a monthly bacteriological monitoring at 18 public beaches on Oahu. Most of the sampling stations are located in the Ala Moana - Waikiki area. The other stations are located at Ewa Beach, Kailua Bay and Kaneohe Bay. The annual geometric means of fecal coliform densities at Ewa Beach ranged from 4.4 to 6.3/100 ml between 1981 to 1986. A one-year sampling program was conducted by the DOH at Oneula Beach and Nimitz Beach in 1983. The geometric means were 3.5/100 ml at Oneula Beach and 2.9/100 ml at Nimitz Beach. The annual geometric means values at all three beaches are well below the DOH criteria of 200/100 ml for fecal coliform.

8. Impact on Marine and Estuarine Sanctuaries, and Endangered Species

The discharge of primary effluent from the Honouliuli WWTP into Mamala Bay follows the City and State policies of no new discharge into estuary and embayment. Hence, there are no impacts on estuarine waters associated with the Barbers Point discharge. Pearl Harbor, an estuary which formerly served as receiving waters for many of the municipal discharges, is not considered an estuarine sanctuary by the National Marine Fisheries Service (NMFS), of the National Oceanic and Atmospheric Administration, Department of Commerce.

According to the NMFS, there are no formally designated marine sanctuaries in the State of Hawaii, however, the waters surrounded by Maui, Molokai, Lanai and Kahoolawe is a candidate for designation for the protection of the endangered humpback whale (Megaptera novaenqial). The four municipal discharges on Oahu with proposed 301(h) permits located at Sand Island, Waianae, Mokapu and Barbers Point will not adversely affect those waters.

In addition to marine sanctuaries, no State waters have been designated as critical habitat for the protection of fish, reptiles, or marine mammals under the jurisdiction of the NMFS. Endangered species identified by NMFS in Hawaiian waters include the humpback whale, green turtle (Chelonia mydas), Hawaiian monk seal (Monachus schauinslandi), hawksbill turtle (Eretmochelys imbricata), and the leatherback turtle (Dermochelys coriacea).

TABLE V-11
 FECAL COLIFORM DENSITY
 SELECTED BATHING BEACHES

Year	Ewa Beach (189)		Oleula Beach (211)		Nimitz Beach (212)	
	No. of Samples	Geometric Means #/100 ml	No. of Samples	Geometric Means #/100 ml	No. of Samples	Geometric Means #/100 ml
1981		6.3				
1982	11	5.5				
1983	10	4.4	12	3.5	12	2.9
1984	10	4.8				
1985	11	5.1				
1986	7	5.7				

Source: DOH Data and DOH Statistical Reports

The endangered humpback whale migrates annually to Hawaiian waters during the winter months from December through May. Several hundreds of the whales are found in Hawaiian waters especially during February and March. According to the NMFS, the whales can be usually found in waters less than 100 fathoms (600 feet) deep. Humpback whales can be found at or near the Barbers Point outfall but are more commonly spotted at the Mokapu outfall site on Windward Oahu. The NWFS has stated that the four municipal discharges on Oahu, including the Barbers Point outfall will not adversely affect the endangered humpback whale when "proper primary treatment and dispersion/dilution mechanisms" are provided. The Honouliuli discharge meets these guidelines with good treatment efficiency and a minimum average initial dilution exceeding 200:1.

The only other endangered species that are commonly found in receiving waters of municipal outfalls around Oahu is the green turtle. Primary effluent will not adversely affect these mammals with good treatment efficiency and dispersion/dilution mechanism such as those provided by the Honouliuli treatment and disposal system.

The Hawaiian monk seal, and the hawksbill and leatherback turtles are rarely found in receiving waters of municipal outfall according to the NMFS; and therefore, there should be no adverse impacts on these endangered mammals.

C. Potential Construction Impacts At The Plant Site

Construction on the expansion of the treatment plant will be limited to the existing site. Construction impacts include elevated noise level from construction activities, vehicles, and equipment; air emissions from construction equipment and vehicles; dust; and potential discharges of oil and other chemical products onto the ground. The contractor shall comply with all applicable Federal, State and City and County laws and regulations.

Excavated material from trenching and the construction of tanks and other structure may be stored on the site. Material not suitable for backfill will be hauled away to a site arranged by the contractor. Pipes, crushed rock and other construction material may be stored at the plant site. If soils are stockpiled at the plant site, they will be adequately protected from washout by storm runoff.

Sheet piles may be used for deep excavation or when unstable ground conditions are encountered. Blasting may be used when hard coral strata are found. Noise and vibration impact will be experienced by residents in Ewa Village if these construction activities are needed.

Other noise impact will be generated from construction equipment and heavy vehicles and will range from 75 to 85 dBA in the immediate construction zone (50 feet radius). Within 100 feet and 200 feet radius from the construction zones, the noise level will be reduced to 69 to 79 dBA and 63 to 73 dBA ranges, respectively.

Construction equipment and vehicles will be required to be equipped with proper mufflers or other attenuating devices. Noise level of construction vehicles traveling through residential areas will be minimized by the contractor who must comply with the provisions of Chapter 11-42, "Vehicular Noise Control for Oahu" of the State Department of Health. A noise permit under Chapter 11-43, "Community Noise Control for Oahu," will be obtained by the contractor if construction noise level exceeds 70 dBA at the property line of the plant site.

Although not expected to be a problem, fugitive dust at the construction site will be mitigated by watering or the use of palliatives by the contractor. The contractor's construction vehicles which emit unreasonable amount of visible exhaust will not be permitted on streets, roads and highways. Air pollution control systems which are an integral part of construction equipment will be operable at all times and properly maintained according to Chapter 11-60, "Air Pollution Control" of the State Department of Health. Open-bodied trucks, transporting material likely to give rise to airborne dusts, shall be covered.

The contractor will not be allowed to discharge excavated or fill material into Kaloi Gulch. He will also be required to take reasonable measures to control oil, grease, and other chemicals from being discharged onto the ground.

If archaeological remains are uncovered during excavation, construction will be halted and the State Historic Preservation Officer (SHPO) will be summoned.

After the completion of construction, the disturbed areas will be restored, regrassed or landscaped.

D. Potential Secondary Impact of the Plant Expansion

1. Introduction

The availability of sewerage facilities to serve urban developments within the tributary areas extending from Halawa to the Waianae coast, and from Mamala Bay to Mililani/Waipio Acres is crucial because of environmental restrictions on the discharge of domestic wastewater. The Honolulu Board of Water Supply (BWS) prohibits the construction of new individual wastewater system (IWS); e.g., individual household cesspools in "no pass zone" where there is a potential of contaminating the domestic groundwater supply.

The areas where new household cesspools are not allowed include most of the Central Oahu DP Area, the Pearl City-Halawa portions of the Primary Urban Center DP Area, and the Makakilo portions of the Ewa DP Area. Within the "no pass line," new urban developments in the tributary areas must be served by sanitary sewers. The pass zone and no pass zone within the Honouliuli District is shown in Figure V-17.

In the "pass zone," household cesspools for single family residences are allowed; however, for industrial, commercial and apartment developments, the rules of the State Department of Health limits the flows to a IWS at a rate of less than 400 gallons per day per 5,000 square feet of ultimate development. In lieu of IWS, a private sewage treatment plant (STP) could be built provided a suitable effluent disposal method was available. As recent as 1985, the five private STPs in Ewa Beach, now abandoned, were sources of nuisances and threaten public health because of poor operation and maintenance practices, and malfunctioning injection disposal wells.

As a general practice, the Department of Health will require that proposed developments in the pass zone be connected to municipal sewers if there is an existing regional wastewater treatment facility irregardless whether existing sewers are located nearby. If existing sewers are not located at the property line of the proposed development, the developers will be obligated to construct a new sewer line to the nearest adequate municipal sewers, or directly to the wastewater treatment

Map of Oahu

ACCEPTABLE WASTE DISPOSAL AREAS



PASS ZONE

Areas where landfills and shallow waste disposal systems (limited to a maximum depth of 30 feet) are generally permitted.

NO PASS ZONE

Areas where landfills and waste disposal systems are generally not permitted.



No Pass Area "A"



No Pass Area "B"

Kahuku Point



Kaena Point

NO PASS ZONE

HONOLULI DISTRICT

NO PASS LINE

PASS ZONE

Makapuu Point

PASS ZONE

Barbers Point

Board of Water Supply
City and County of Honolulu
October 1985

FIGURE V - 17

plant. The City and County is not obligated to construct sewer lines to proposed developments or subdivisions. Section 11.2.3 of the Revised Ordinances of Honolulu (1978) states that, "the entire cost of installation of sewer system works within a subdivision and for any new construction required for connection to the public sewers shall be borne by the subdivider or developer".

In certain urban areas, where the street improvements are not dedicated to the City and County, usually leasehold tracts like the James Campbell Industrial Park (JCIP), municipal sewer service is frequently not available. Within the JCIP, each individual leaseholder or fee owner is required to provide for their own wastewater system. Most firms employed cesspools or injection wells since the area is located in the "pass zone" and makai of the DOH's Underground Injection Control (UIC) Line. One of the exceptions is the Chevron USA Barbers Point Refinery which discharges treated process wastewater through an ocean outfall sewer. The Pacific Resources Incorporated (PRI) refinery uses injection wells for the disposal of its wastewater.

There is an influence of public wastewater facilities on urban activities and land use pattern within the tributary areas of the Honouliuli sewer system. The expenditure of public funds to expand the treatment capacity of the plant, and/or to construct trunk and interceptor sewers do constitute secondary impact on land use pattern or urban activities.

Although the construction of trunk and interceptor sewers is not germane to the expansion of the Honouliuli WWTP, public funds as stated previously are not used for the construction of connecting lines from a new development or subdivision to the nearest existing adequate municipal sewers. The construction of the proposed West Beach interceptor sewer from the Waianae Coast to the treatment plant site by private parties is an example of the above. The same is true with the proposed connecting sewers from Ewa Marina, Phase II.

The potential secondary impact of the Honouliuli WWTP expansion beyond 25 mgd involves industry and commercial activities, housing, and population. The existing capacity of Unit 1 of the plant was based on a projected 1990 population of 178,900 and a projected flow of 24 mgd which included an industrial flow of 1.1 mgd from the defunct Hawaii Brewery (Primo). The 25 mgd capacity was anticipated to be reached in 1992.

The initial projected population prepared as part of the Water Quality Program for Oahu (WQPO 1978) did not include the Milliani-Waipio Acres tributary area which was part of a separate system in the Central Oahu Sewer District. The WQPO population projection was based on the 1964 General Plan of the City and County of Honolulu which envisioned a resident population of 820,000 for the year 1980 for all of Oahu (actual 762,565) and 161,000 for Leeward Oahu. The resident population of the present service areas of the plant was 170,718 in 1980 and 190,401 in 1984.

To promote consistent planning, public agencies are required to follow population projections prepared by the State Department of Business and Economic Development (DBED). The present DBED projection, "M-F" Series, applicable to the year 2005, estimated a population of 954,500 residents for the City and County of Honolulu.

The Department of General Planning is the City Agency responsible for the preparation of population projections by Development Plan Area according to the distribution criteria of population in the 1982 General Plan (GP) (Policy 4, Objective C, in the area of population in the GP). Based on the current DGP population projections for the Primary Urban Center, Ewa and Central Oahu, the 2005 resident population in the service areas of the treatment plant was determined to be 269,400. The visitor population based on the "M-F" Series was estimated to be 10,000 for the year 2005 out of a projection of 97,600 for Oahu.

The expansion of the Honouliuli WWTP will be funded through the Capital Improvement Program (capital budget program) of the City and County. The Revised Charter of the City and County (1983) under Section S-412.3 requires a public improvement or project to conform and implement the development plan for that area. Hence, the expansion of the Honouliuli WWTP has to be consistent with and supportive of the land use policies of the General Plan of the City and County and the development plans for Ewa, Central Oahu and the Primary Urban Center.

Most of the wastewater from industrial and commercial areas in the tributary areas are of domestic origin. There is no process wastewater exceeding 50,000 gallons per day from a single source; such as, the defunct brewery in Waimalu.

2. Potential Impact on Industrial Activity

In 1983, there were seven (7) existing industrial parks in the drainage area of the Honouliuli WWTP with a total acreage of about 1,626 acres. The total acreage includes 1,314 acres of the James Campbell Industrial Park which is not within the service area of the plant. Thus, there are about 312 acres in the service area that have access to municipal sewers. However, 83 acres of the industrial parks were vacant in 1983, but the current status on vacancy is unknown.

If the vacant 83 acres at Gentry Waipio and Pearl City were utilized for general industrial type activities, they would generate a flow of 0.66 mgd. If the vacant industry lands were used for warehousing, the flows would more likely be about 0.26 mgd.

There are three (3) large undeveloped industrial areas in the drainage district that are designated urban on the State Land Use Map and industrial on the Ewa DP Area Land Use Map. The Campbell Industrial Park expansion of 322 acres, the State Deep Draft Harbor of 240 acres and the Camp Malakole Industrial Subdivisions of 69 acres are located outside of the service areas of the plant and will not be served by municipal sewers.

The Hawaii Technology Park at Mililani is being developed as a industrial subdivision for advanced technology firms. The 256-acre industrial park will be served by municipal sewers and will generate a flow of about 0.85 mgd over a span of 10-15 years. Within five years after construction of the first phase is completed (113 acres), a flow of 0.33 mgd could be generated. There is sufficient capacity in Unit 1 of the plant to accommodate these flows. The remaining flows of 0.52 mgd could be treated by Unit 2 units after the plant is expanded.

If general industrial type activity increases within the service area of the plant within the next five years, a wastewater flow of between 0.60 to 1.0 mgd could be generated. This flow range can be accommodated by the remaining capacity of 4 mgd at the treatment plant (design flow of 25 mgd less present incoming flow of 21 mgd). The remaining 0.52 mgd flow from the Hawaii Technology Park could be served by the proposed expansion of the treatment plant, based not so much on the availability of treatment capacity, but according to the developer's schedule of occupancy of twenty acres per year, which may be highly optimistic.

Based on available information, it is surmised that the impact of industrial activity within the service areas of the Honouliuli WWTP will be minimal. Development of industrial parks in the drainage district outside the service area, including the State Barbers Point Harbor, the expansion of the James Campbell Industrial Park and Camp Malakole, will not be affected by the lack of municipal sewers. Based on their scenario, the plant expansion does not appear to encourage or discourage industrial expansion in the service area.

3. Potential Impact on Business and Commercial Activities

Business and commercial centers in the tributary areas are concentrated along or near Kamehameha Highway between Aiea and Pearl City, and along or near Farrington Highway between Kunia Road and Waipahu Field. Neighborhood shopping centers are located in Ewa Beach, Mililani and other large developments. All of the existing commercial centers and neighborhood shopping centers are served by municipal sewers in the tributary areas with the possible exception of Ewa Beach. Ewa Beach Shopping Center will soon have sewer service since Ewa Beach Sewer, Section 3, I.D. has just been completed.

Currently, there are about 293 acres of commercial sites that have been proposed in the tributary areas. If all sites were approved, they could generate a potential flow of 1.46 mgd. Added to the already approved commercial areas in West Beach, the total estimated flow of 1.66 mgd could be generated. If the full occupancy of the proposed commercial areas is extended over a 15-year period, the additional flows generated from commercial developments would be approximately 0.67 mgd by 1994.

Based upon the preceding scenario, it appears that the Honouliuli WWTP will have sufficient capacity to serve proposed commercial developments in the service areas when the plant expansion is completed on or about 1994. Connecting municipal sewers are available in the tributary areas located in the Central Oahu and Primary Urban Center Development Plan Areas. Within the Ewa Development Plan Area, the Ewa Beach neighborhood shopping center will be sewerred shortly. The commercial areas proposed at Ewa Marina, Kapolei Town Center, and West Beach cannot be developed until connecting sewers are constructed at the developer's expense.

Hence, the expansion of the Honouliuli WWTP will not encourage nor expedite commercial developments in the service areas. For areas without connecting sewers which are the responsibility of developers, no commercial developments can proceed although plant capacity may be available. Therefore, the secondary impact of the plant expansion on business and commercial activities is considered nil.

4. Potential Impact on Housing and Population

The design capacity of Unit 2 of the Honouliuli WWTP was based on the existing population in the service areas; and projected population increases in developing urban areas and approved developments shown in the Development Plans. Table II-3, depicts developments by tributary areas that are proposed to be eventually served by the Honouliuli sewer system. Although the estimated population in ongoing and approved developments is an important factor in the design of Unit 2, the projected population ceiling imposed by the City and County General Plan by Development Plan areas limits plant capacity. Many of the housing projects will be constructed in increments and some may be built beyond the year 2005 because of market conditions and demands. In addition, some developments are stalled or not built because of financial reasons.

The DP projected population presently extend to the year 2005. Within the DP areas, the distribution of the projected population in sewer districts, subdistricts or tributary areas is left to the discretion of the facility planning agency. As long as the sum of the projection equals the totals in the DP areas, considering the DP land use pattern, the projection by the facility planning agency will be considered in conformance with the DPs.

The list of ongoing, approved, or proposed developments is shown in Table II-3. Table V-12 is a summary of proposed housing units and estimated population from ongoing and approved developments by Development Plan areas and tributary areas derived from Table II-3. Within the tributary areas of the plant, there are 32,911 proposed new housing units with an estimated population of 102,200. In contrast, the projected population increase in the tributary areas from 1984 to 2005 is 79,000 using the General Plan population guideline. If all of the proposed housing units were constructed by 2005 and occupied by new residents from outside of the drainage areas, the 2005 projected GP population could be increased hypothetically by an additional 23,200 people (102,200 - 79,000).

TABLE V-12

PROPOSED HOUSING DESIGNATED* IN DEVELOPMENT PLAN AREAS
HONOULIULI TRIBUTARY AREAS

<u>Development Plan Area</u> <u>Tributary Area</u>	<u>Proposed Housing</u>		<u>Projected Population</u> <u>Increase/GP</u> <u>(1984-2005)</u>
	<u>Units (#)</u>	<u>Population (#)</u>	
Primary Urban Center			
Pearl City - Halawa	760	1,800	8,285
Central Oahu	10,200	33,700	23,731
Waipahu-Crestview	5,100	15,900	
Waipahu-Kunia	2,300	8,200	
Mililani-Waipio Acres	2,500	8,600	
Waiawa	300	1,000	
Ewa	21,951	66,660	46,982
Ewa	1,950	7,800	
Ewa Beach	1,672	6,000	
Ewa Village	5,851	18,300	
Barbers Point	5,200	14,560	
Makakilo	3,700	9,900	
Puuloa	3,578	10,100	
Total**	32,911	102,200	79,000

*As of July 25, 1986.

**Population estimates are rounded

The highest concentration of proposed new housing is in the Ewa DP area with an estimated 21,951 units, followed by Central Oahu with 10,200 units, and the Primary Urban Center (Pearl City-Halawa) with 760 units. An additional 29,712 housing units are also proposed in the tributary areas in the Central Oahu and Ewa DP areas; 18,800 and 10,912 respectively. If all 62,623 housing units from ongoing, approved or proposed developments were constructed and occupied by the year 2005, the present population could be doubled.

The designated resident population within the tributary areas is shown by DP areas in Table V-14. The 2005 population is projected to increase from 190,400 in 1984 to 269,400 in the year 2005. Projected increases are 8,285 for the PUC, 23,731 for Central Oahu, and 47,054 for Ewa for a total of 79,000. On the basis of 2005 resident population of 269,400, a design flow of 35.4 mgd was derived. Another 1.0 mgd allowance for a visitor population of 10,000 brought the total anticipated flow to 36.4 mgd.

The General Plan was amended in June 1987 to allow growth of a population of 19,000 people in the Ewa or Primary Urban Center. If the entire 19,000 people was assigned to Ewa, a flow of 1.9 mgd could be generated. If this flow was added, the anticipated flows will amount to 38.3 mgd, exceeding the plant design flow of 38 mgd by less than one percent.

If the Honouliuli WWTP was designed on the basis of ongoing and proposed approved housing developments, the proposed anticipated flow would have been $(36.4 + 2.3)$ 38.7 mgd. Another 10 mgd would be added, if the estimated population from proposed housing development was added in the design resident population, bringing the total to 48.7 mgd. Secondary impact, in the form of encouraging or expediting the construction of housing units in the tributary areas would be evident, if the treatment plant was designed for an anticipated flow of 48.7 mgd.

TABLE V-13

PROPOSED HOUSING DEVELOPMENTS
NOT DESIGNATED* ON DEVELOPMENT PLAN AREA
HONOULIULI TRIBUTARY AREA

<u>Development Plan Area</u>	<u>Proposed Housing</u>	
	<u>Unit #</u>	<u>Population</u>
Primary Urban Center	-	-
Pearl City - Halawa	-	-
Central Oahu	19,400	58,100
Waipahu-Crestview	1,500	7,500
Waipahu-Kunia	3,400	10,700
Mililani-Waipio Acres	6,600	21,000
Waiawa	7,900	18,900
Ewa	4,906	19,444
Ewa Village	900	3,420
Ewa	4,006	16,024
 Total**	 24,306	 77,500

*As of July 25, 1986.

**Estimated population is rounded

TABLE V-14

PROJECTED RESIDENT POPULATION BY DEVELOPMENT PLAN (DP) AREA

<u>DP Area</u>	<u>Population</u>		<u>Projected Population Increase</u>
	<u>1984</u>	<u>2005</u>	
Primary Urban Center	436,439	480,008	43,569
Honouliuli Tributary Area	82,515	90,800	8,285
Non-Tributary Area	353,924	389,208	35,284
Central Oahu	114,381	139,849	25,468
Honouliuli Tributary Area	71,769	95,500	23,731
Non-Tributary Area	42,612	44,349	1,737
Ewa	36,042	83,096	47,054
Honouliuli Tributary Area	36,118	83,100	46,982
Total Resident Population*	190,400	269,400	79,000
Honouliuli Tributary Areas			

*Rounded

E. Potential Beneficial Impact

The construction of the Honouliuli sewer system resulted in the elimination of all municipal wastewater discharges into Pearl Harbor including streams draining into East Loch, Middle Loch and West Loch. In addition, the near-shore discharges serving Iroquois Point Housing and Barbers Point NAS have been terminated. Consequently, water quality in Pearl Harbor, the Pearl Harbor streams, and the bathing waters at Ewa Beach, Oneula Beach and Barbers Point Beach have been improved.

The availability of sewerage facilities in Ewa has corrected many wastewater-related health problems at Ewa Beach. Until 1986, there were five privately-owned and operated sewage treatment plants at Ewa Beach serving a population of over 2,000 persons in horizontal condominiums. The plants were poorly operated which resulted in failure of their injection wells disposal systems. Consequently, there was occasional overflow and spill onto the ground and diversions to the storm drain channels. After completion of the collection system under the sewer improvement district program, the five plants have been abandoned and the health problems created by sewage spills were eliminated.

No new cesspools have been allowed to be constructed above the Pearl Harbor aquifer and the Board of Water Supply "No Pass Zone." However, there are still about 400 existing cesspools in Pearl City, Aiea and Waipahu which have the potential of contaminating the groundwater. Sufficient capacity has been provided in the treatment plant to serve all unsewered areas within the tributary area.

The resident population in the tributary areas is projected to increase from 190,400 in 1984 to 269,400 by the year 2005. The population projection is in consonance with the City Department of General Planning population projection by Development Plan areas and the State Department of Business and Economic Development population projection "M-F" series for the City and County. The capacity of the treatment plant will be expanded to serve a projected de facto population of 279,200. Without a plant expansion, the objectives of the land use policies of the City and County of Honolulu for the affected Development Plan areas cannot be met.

If the capacity of the Honouliuli WWTP is grossly oversized, it could accelerate developments in the tributary areas. On the other hand, oversizing may be desirable to provide adequate redundancy in the process and pumping units during maintenance or equipment failures.

F. Potential Economic Impact

The proposed project will provide job opportunities in the construction and service industries. Material and equipment suppliers will be benefited. Additional electric power and water will be consumed.

The City and County is expected to finance the entire cost of the treatment plant expansion. Unit 1 of the treatment plant and the ocean disposal system were financed under the Construction Grant Program (Section 201) of the Federal Water Pollution Control Act Amendment of 1972 as amended by subsequent Clean Water Act Amendments. Under the Federal and State grants program, the City's share of the eligible construction cost was 15 percent. The Federal and State's shares were 75 percent and 10 percent, respectively.

The City and County sewer service charge does not generate sufficient revenue to finance large treatment works. A consultant report has suggested that facility connection charges be adopted. If the facility connection charges are adopted, new home owners, commercial and industrial establishments, and/or developers will be required to pay for such charges before connection to the municipal sewer system is allowed.

There is a short term economic impact on the construction of Unit 2 which is scheduled for the 1990 Fiscal Year. Based on the preliminary estimated cost of \$23 million, the economic impacts on output on sales, household income and employment are estimated based on the current State DBED Input-Output Model.

The direct, indirect and induced sales are estimated using the output multiplier of 2.0. Sales are estimated at (\$23 million x 2.0) \$46 million.

Household income derived from the construction of Unit 2 is obtained using the income coefficient of 0.7 or (\$23 million x 0.70) \$16.1 million.

The number of construction jobs that will be created for the project is estimated, using \$83,000 (1986 State Data Book) for each direct job. The estimated number of construction jobs created for the project is (\$23 million ÷ \$83,000) 277. The total number of jobs created in the economy as the result of the project, using the multiplier of 2.5 is (277 x 2.5) 692 jobs.

The long-term impact on employment at the plant when Unit 2 becomes operational is an estimated 15 additional jobs (25% increase). The present work force is 60 employees.

The cost of operating and maintaining the Honouliuli WWTP in Fiscal 1987 was \$2.72 million or about \$370 per million gallons treated. This cost is estimated to increase to \$4.2 million (in 1987 dollars) by the year 2005 based on the estimated average cost of \$300 per million gallons treated.

G. Potential Impact on Energy

Large municipal regional wastewater treatment plants are the most cost-effective system because they exhibit "economies of scale" when operating near their design capacity. The Sand Island (82 mgd) and the Honouliuli (25 mgd) WWTPs are large primary plants with total operating costs in 1985 of \$194 and \$344 per million gallons (mg) treated respectively compared to the smaller primary plant at Waianae (1.72 mgd) with total costs of \$606/mg.

The cost and amount of electrical energy consumed by a wastewater treatment plant depends on the type and degree of treatment, plant design capacity, percent of incoming flow versus design capacity, and unit cost of electricity. The cost of electricity in proportion with total operating and maintenance costs varied between 10 to 15 percent, irregardless of size and type of treatments with plants operated by the City and County in the past years.

In 1986, the State Department of Health (DOH) collected data on energy consumption costs of wastewater treatment facilities in the State of Hawaii. According to the DOH's evaluation, primary plants used the least amount of electrical energy per million gallons treated depending on their design capacities and percent of incoming flow. Plants employing the trickling filter process had lower energy cost per million gallons treated among secondary plants. Secondary plants using the rapid block and oxidation ditch processes tended to have the highest energy cost. In general, plants with flows approaching design capacity are apt to have less treatment unit cost per million gallons. The energy cost evaluation for wastewater treatment plants on Oahu by the DOH is shown in Table V-15.

Based on the DOH data in Table V-15, the unit cost for electric energy was \$52 per million gallon (mg) for Honouliuli WWTP compared to the Sand Island facility of \$20 per mg. The Sand Island unit cost is much lower because it does not include the cost of energy at the two influent pumping stations at Ala Moana Boulevard and Hart Street. In the case of Honouliuli, the influent pump station is located within the plant; hence, the influent pumping costs are included.

If the energy at both Sand Island influent pumping stations is included, the unit cost per million gallons is \$39, which is still 31 percent lower than Honouliuli. The 1987 energy cost for Honouliuli WWTP is \$43 per mg based on a flow of 21 mgd and an average daily consumption of 15,300 KWH. Current cost for energy at Sand Island is \$37/mg (70 mgd) at a daily consumption of 37,819 KWH.

Another positive method of expressing energy consumption and cost is to use KWH or BTU units per capita, in place of cost of money per million gallons treated. Based on an estimated service area population of 185,000, the amount of energy expended for the treatment of wastewater per capita amounts to 282 BTU per day or 103,000 BTU per year. Total electric energy consumed at the plant is about 1.91×10^{10} BTU (5,612,000 KWH) per year based on present usage.

The projected annual energy requirement for the year 2005 based on the de facto population of 279,200 and 1987 energy usage is estimated to be 2.8762×10^{10} BTU or 8,430,000 KWH. The increase use of electric energy will slowly rise to about 50 percent greater than 1987 consumption by the year 2005. The potential impact of increased energy usage on Hawaiian Electric generation capability is believed to be minor.

If secondary treatment at Honouliuli WWTP becomes necessary in the future, energy consumption at the site will be increased. Typically, a secondary treatment plant employing the activated sludge process will consume about 2.85 more energy than a primary plant. Based on this value, the energy consumption at Honouliuli could be projected to increase to 8.1972×10^{10} BTU or 24 MKWH. The estimated cost of electric energy for secondary treatment could reach \$1.4 million per year in 2005 compared to \$0.5 million if primary treatment was continued at today's energy prices. This increase would have an adverse impact on the City and County operation and maintenance program unless sewer service charges are increased. If sewer service charges are increased, it will be a financial impact on the community.

TABLE V-15

ENERGY USE AT CITY AND COUNTY WASTEWATER TREATMENT PLANTS
(RANKED BY UNIT COST \$/DAY/MGD)
(1986)

PLANT NAME	DEGREE/ PROCESS*	DESIGN FLOW (MGD)	ACTUAL FLOW (MGD)	PERCENT DESIGN FLOW	ENERGY COST (\$/MO.)	UNIT COST (\$/DAY/ MGD)
Sand Island	P/S	82	69.67	85%	41,514	20**
Pohakupu	S/TF	0.426	0.2458	58%	371	50
Honouliuli	P/S	25	18.2	73%	29,000	52
Waianae	P/S	1.72	1.467	85%	2,680	60
Kailua	S/TF	7.0	4.468	64%	10,827	80
Kaneohe	S/TF	4.3	4.43	103%	10,890	81
Wahiawa	S/AS	2.5	1.408	56%	8,930	209
Mililani	S/RB	3.6	0.5754	16%	5,387	308
Maunawili Pk.	S/EA	0.095	0.0771	81%	727	310
Maunawili Es.	S/EA	0.145	0.078	54%	847	357
Nanaikai	S/EA	0.12	0.0793	66%	926	384
Ahuimanu	S/RB	1.4	0.5	36%	6,248	411
Whitmore	S/EA	0.2	0.1136	57%	1,560	452
Waimanalo	S/RB	1.1	0.25	23%	3,963	521
Kahuku	S/OD	0.25	0.0513	21%	826	530
Paalaa Kai	S/OD	0.144	0.0621	43%	1,761	933
Kukanono	S/EA	0.07	0.0219	31%	636	955

Legend

*Degree of Treatment/Treatment Process

P - Primary

S - Secondary

AS - Activated Sludge

EA - Extended Aeration

RB - Rapid Bloc

OD - Oxidation Ditch

S - Sedimentation

TF - Trickling Filter

**Does not include influent pumping cost.

Source: Department of Health

H. Probable Adverse Effects Which Cannot Be Avoided

There are short and long term potential adverse effects which cannot be avoided with the implementation of the proposed project. The short-term impacts are associated with the construction of Unit 2; the long-term impacts are related to the continued operation of the wastewater treatment plant and the discharge of the effluent into West Mamala Bay.

The unavoidable short-term impacts created by construction activities at the plant site are construction noise, fugitive dust, and exhaust emissions from construction equipment and vehicles. If blasting is required when hard coral strata are encountered, blast charge will create noise and vibration which may affect nearby residents. If sheet piles are required for deep excavation, the noise of pile driving activity will affect nearby residents.

The unavoidable long-term impacts at the plant site are potential odors, exhaust emission from the incinerator, and aesthetic. Mitigative measures will be provided at the plant site. The amount of wastewater treated will be increased by fifty percent by the year 2005. Sludge volume will be increased correspondingly resulting in greater mass emission of particulates. The quantity of residual ash will increase further taxing landfill capacity on Oahu.

The amount of residual pollutants in the effluent discharge into West Mamala Bay will increase. The mass emission rate of biochemical oxygen demand, suspended solids, nutrients in the form of nitrogen and phosphorus, and trace metals will increase by fifty percent by the year 2005. The discharge will, however, continue to meet applicable water quality standards and will not affect any applicable uses of the receiving waters including recreation, aesthetics and wildlife.

The expansion of the Honouliuli WWTP will indirectly affect population density in the tributary areas of the plant. Lands in conservation and agricultural uses will be altered and converted to urban developments. Vehicular traffic will be increased including exhaust emission from vehicles. Other urban ills will be added. These are the natural consequences of an expanding population and are unavoidable, however, good planning and mitigative measures can be employed to lessen the potential impacts.

VI. ALTERNATIVES CONSIDERED FOR THE PROPOSED PROJECT

A. The alternatives considered for the proposed project include: no action, delayed action, expansion to a plant capacity of 38 mgd, and expansion to a plant capacity of 51 mgd.

B. The no action alternative will limit the plant treatment capacity to an average daily flow of 25 mgd. The present plant is able to serve a resident population of 208,000 people in the tributary areas assuming all unsewered areas are connected to the municipal sewer system. Therefore, no new sewer connection will be permitted, and population growth objectives of the General Plan for the City for the tributary areas cannot be achieved.

Since the existing treatment and disposal systems were designed on the basis of an ultimate (2020) projected population of 380,000 and an average daily flow of 51 mgd, limiting the plant capacity to 25 mgd is unrealistic unless the present discharge is creating a water quality problem in the receiving waters. The no action alternative is also objectionable because it will obstruct the City and County land use policies for the tributary areas as stated in the General Plan. In addition, it will preclude housing opportunities as proposed by State and City housing agencies in Ewa.

C. The delayed action alternative would postpone the expansion of the treatment plant to an undetermined later date. One possibility is to wait until the plant reaches its designed capacity of 25 mgd. This capacity could be reached around the year 1990. At that time, planning and engineering will be initiated followed by construction of the needed units.

It would normally require a period of five to ten years to plan, design, and construct a major public works facility. For an existing facility, an expansion can be completed within a shorter period, say five to six years. By 1996, the plant could be ready to accept additional flows beyond 25 mgd.

If the delayed action alternative was adopted, it will interrupt the planned population growth in the Ewa and Central Oahu Development Plans areas. Delaying construction could also increase the cost of construction. For example, the construction cost index of the Engineering News Record rose twenty-nine percent between 1980 to 1985 for an annual average cost increase of six percent. If construction were to be delayed for three years, the construction could be increased by fifteen-twenty percent based on the 1980-85 construction cost index.

D. The alternative to expand the capacity to 38 mgd will enable the plant to serve the 2005 projected population of 269,400 plus a visitor population of 9,800. The total cost of the expansion is estimated at \$23 million.

According to the redundancy standards of the Division of Wastewater Management, if one tank is out of service, the remaining units shall have a design flow capacity of not less than 50 percent of the total design capacity of all basins. Since the design flow capacity of two tanks is 25 mgd, and fifty percent of the total design capacity of the three tanks is 19 mgd, the three-tank system meets the redundancy standards.

If prolonged outages are anticipated, the new primary sedimentation tank could be larger; e.g., a 165-foot diameter unit would provide sufficient area to meet the maximum overflow rate if one of the existing unit was out of service. If similar sized tanks are desired because of the ease of maintenance and replacement parts, two (2) 145-foot clarifiers can be provided.

E. The alternative to expand the capacity to 51 mgd, doubling the present capacity of 25 mgd, will provide sufficient capacity to the year 2020 and beyond. The excess capacity could be held in reserve to handle any land use changes currently being proposed but not approved. In addition, approved developments could be expedited. The unit cost per million gallon of treatment capacity can be expected to be less under this alternative based on "economies of scale".

If the wastewater flows from the Central Oahu sewerage districts were diverted to the Honouliuli WWTP beyond 1993, the plant will have adequate capacity under this alternative to treat all of the anticipated flows of 5.2 mgd from Wahiawa, Whitmore Village and Schofield.

F. The recommended alternative to Unit 2 is to expand the capacity of the Honouliuli WWTP from 25 mgd to 51 mgd into two phases. Phase I will increase the plant's capacity to 38 mgd, sufficient to serve a population of 269,400 residents and a visitor population of 9,800 to the year 2005.

Phase II will be constructed on or about the year 2005 and will increase the plant's capacity to 51 mgd, sufficient to serve a de factor population of 402,000 people.

If the plant's 301(h) permit is issued by EPA in 1988 and is renewed at five-year intervals thereafter, the plant will continue to discharge primary effluent into the receiving waters. If the plant effluent has to be upgraded for any reason; e.g., if the 301(h) permit is not renewed, intermediate or secondary treatment units will be constructed. The plant site has enough acreage for a secondary plant. Both plant and ocean disposal systems were designed for an average flow of 51 mgd.

VII LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY

There are no short-term uses of the plant site that will be permitted if they interfere with or jeopardize the long term planned use of the land for wastewater treatment purposes. Only about 15 acres of the 51.3-acre site are being utilized by the 25 mgd primary plant. A small portion of the site at the makai boundary is being utilized as a refuse convenience center. Any other uses that are not compatible to the wastewater treatment facilities will not be allowed.

The short-term uses of the plant's primary effluent for irrigation of sugar cane, california grass and other crops are possible if the irrigation schemes are cost-effective and environmentally acceptable. The percolate can be used to recharge the shallow Ewa aquifer. Excess effluent will continue to be discharged into West Mamala Bay. During non-irrigation periods or rainstorms, the entire flow can be discharged into the bay.

VIII IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The commitments of certain resources were made when Unit 1 of the Honouliuli WWTP and the Barbers Point ocean outfall were constructed. These commitments included natural resources; such as, the plant site and the waters of West Mamala Bay as receiving waters for the plant effluent. In addition, monies, labor and materials were expended to construct the plant and ocean disposal system.

During the construction on the facilities, no historic sites or archaeological relic were destroyed or uncovered during excavation. A small building used as a day care center was removed from the site and a replacement facility was constructed on the Barbars Point Naval Air Station.

Vegetation on the site which was removed during site preparation consisted of grass, shrubs and weeds. None of the vegetation was rare or listed as endangered. Some feral animal habitats were destroyed.

No additional lands will be acquired for the construction of Unit 2. The existing plant site has sufficient area to accommodate the additional primary treatment units needed to increase the capacity to 38 mgd or 51 mgd, the ultimate capacity. If secondary treatment is required in the future, land has been set aside for the construction of those units.

The use of the existing plant site as a treatment plant and the use of Mamala Bay as receiving waters for the plant effluent will continue under Unit 2. Monies, labor, material and energy that will be expended on the construction of Unit 2 will be irreversibly committed.

The construction of Unit 2 is a commitment by the City and County to allocate funds from its Capital Improvement Program for municipal projects that are needed to bring about the gradual development of the West Beach-Makakilo area as a secondary urban center. Without additional capacity at the treatment plants, proposed developments in the tributary areas located in Ewa, Central Oahu and portions of the Primary Urban Center will not be able to proceed.

IX. SUMMARY OF UNRESOLVED ISSUES

At the present time, there are no known unresolved issues that will interfere with the construction of Unit 2.

X. AGENCIES AND INDIVIDUALS THAT WERE CONSULTED IN THE PREPARATION OF THE EIS

A. The following governmental agencies and individuals were consulted during the preparation of the EIS.

1. Federal

U.S. Army Corps of Engineers*
U.S. Environmental Protection Agency, Region IX
U.S. Navy Base, Pearl Harbor*
U.S. Dept. of Interior - Fish & Wildlife Service*
U.S. Dept. of Agriculture - Soil Conservation Service*
U.S. Dept. of Housing and Urban Development*
U.S. Army Support Command, Hawaii*

2. State of Hawaii

Department of Accounting and General Services
(Division of Public Works)*
Department of Health*
Department of Land and Natural Resources
Department of Business and Economic Development*
Department of Transportation*
Hawaii Housing Authority*
Environmental Center, University of Hawaii
Office of Environmental Quality Control*
Water Resources Research Center,
University of Hawaii
Department of Agriculture*
Department of Education*

3. City and County of Honolulu

Board of Water Supply*
Department of General Planning*
Department of Land Utilization*
Department of Housing and Community Development*
Department of Transportation Services*
Department of Parks and Recreation*
Fire Department
Police Department*
Aiea Neighborhood Board No. 20
Pearl City Neighborhood Board No. 21
Ewa Neighborhood Board No. 23
Mililani/Waipio/Melemanu Neighborhood
Board No. 25
Waipahu Neighborhood Board No. 22
Council Member Randy Y. Iwase, C.D. I
Council Member Arnold Morgado, Jr., C.D. VIII
Council Member Donna Kim, C.D. VII
Council Member John DeSoto, C.D. IX

4. Others

Hawaiian Electric Company*
Hawaiian Telephone Company*
Gasco, Inc.
Campbell Estate*
Life of the Land
Oahu Sugar Company

*Comments received.

B. Letters received by the Department of Public Works from agencies and individuals are listed in Appendix B together with the department responses where appropriate.

XI. PREPARATION OF THE EIS

Pursuant to Section 11-200-17, (0) Chapter 11-200, EIS rules, the following person was directly involved in the preparation of the EIS:

Chew Lun Lau	Environmental Engineer, DPW
	BSCE, Professional Engineer, Civil Branch
	Sewer System Planning
	Sanitary Engineering
	Environmental Planning
	Design of Treatment Works
	Water Quality Planning
	EIS Preparation and Review

XII. AGENCIES AND INDIVIDUALS WHO COMMENTED ON THE DRAFT SUPPLEMENTAL EIS (DSEIS)

Twenty two agencies and individuals submitted letters of comments or no comments on the DSEIS. Letters and responses to comments are appended in Appendix C and become part of the Final EIS.

Commenters are listed below:

<u>Agencies/Individuals</u>	<u>Date of Comment</u>	<u>Date of Respond</u>
<u>Federal Agencies</u>		
U.S. Army Engineers District, Honolulu	5/03/88	None
U.S. DI Fish and Wildlife Service	4/05/88	None
U.S. DA Soil Conservation Service	5/03/88	5/12/88
U.S. Department of the Navy	3/24/88	None
<u>State Agencies</u>		
Department of Accounting and General Services	4/07/88	None
Department of Agriculture	5/02/88	None
Department of Business and Economic Development	4/18/88	None
DBED Housing, Finance, and Development Corp. (2)	4/25/88	5/03/88
Department of Defense	4/04/88	None
Department of Health (2)	4/11/88	None
Department of Land and Natural Resources	4/25/88	4/29/88
University of Hawaii Environmental Center	5/09/88	5/18/88
<u>City Agencies</u>		
Board of Water Supply	5/02/88	5/09/88
Building Department	4/04/88	None
Department of General Planning	4/20/88	None
Department of Housing and Community Development (2)	5/09/88	None
Department of Land Utilization	4/28/88	5/03/88
Department of Parks and Recreation	5/11/88	None
Department of Transportation Services	4/26/88	4/29/88
Ewa Beach Community Association	5/05/88	5/11/88
<u>Others</u>		
American Lung Association	5/09/88	5/18/88
	6/01/88	None
Hawaiian Electric Company	4/26/88	None

APPENDIX A

MONITORING PROGRAM OFF BARBERS POINT, OAHU

TABLE A - 1

MONITORING PROGRAM OFF BARBERS POINT, OAHU

<u>Subprogram</u>	<u>Parameters</u>	<u>Frequency</u>	<u>Barbers Point Stations</u>
1. NPDES			
Effluent	BOD ₅	Daily	Effluent Forebay
	Suspended Solids		
Influent	pH	Continuous	
	Flow		
Influent	BOD ₅	Daily	Influent Screening Building
	Suspended Soli		
2. WATER QUALITY			
Water Quality Standards	Laboratory:	Quarterly	10 Stations, including ZID, edge of ZID and control site at surface, 15m and 30m depths.
	Total Kjeldahl N		
	Ammonia N		
	Nitrate+Nitrite N		
	Orthophosphate P		
	Total P		
	Chlorophyll <u>a</u>		
	Suspended Solids		
	Turbidity		
	pH		
Fecal Coliform	Surface only		
InSitu:	Temperature		
	Salinity		
	Depth		
	Dissolved Oxygen		
Ocean Currents	Current speed and direction		5 Stations in vicinity of ZID
	Wind speed and direction	Quarterly	10 Stations
	Wave height and direction	Quarterly	10 Stations

3. TOXICS CONTROL

Effluent Toxics	Priority Pollutants and 6 Pesticides	Semi-annual during first wet and dry season. Annual thereafter during critical period.	Effluent Forebay
Influent Toxics	Priority Pollutants and 6 Pesticides identified in effluent.	Semi-annual during first wet and dry season. Annual thereafter during critical period.	Influent Screening
Collection System Toxics	Priority Pollutants and 6 Pesticides identified in inffluent higher than threshold limits.	Semi-annual during first wet and dry season. Annual thereafter during critical period.	Major Tributary area sampling points
Industrial Pretreatment and Non- Industrial Source Control	Priority Pollutants and 6 Pesticides identified in collection system major tributary areas higher than threshold limits.	Semi-annual during first wet and dry season. Annual thereafter during critical period.	Industrial and/or Non-Industrial sampling points

4. SEDIMENT

Grain Size Total Volatile Solids	Annual	8 Stations
Priority Pollutants and 6 Pesticides identified in effluent.		

5. BIOLOGICAL

Infauna	Annual	8 Stations
Fish and Epibenthic Invertebrates	Annual	Transects along outfall
Bioassay/ Bioaccumula- tion	Priority Pollutants and 6 Pesticides identified in sediments	Annual if toxics appear to be accumulating in sediments

TABLE A - 2

SUMMARY OF PREDISCHARGE WATER QUALITY DATA

Sta	Temp* (°C)		Salinity* (g/100)		DO*		NO ₃ +NO ₂ (ug/l)	NH ₄ ⁺ (ug/l)	K-N (ug/l)	T-N (ug/l)	O-P (ug/l)	T-P (ug/l)	SS (mg/l)	pH* hi mn lo	Lat Est Coef (K)	Turb (NTU)	Chlor a (ug/l)	Secchi (m)	Coliform Total Fecal (#/100 ml)
	hi	mn	lo	hi	mn	lo													
1	26.7	25.2	34.2	34.0	6.1	1.1/	1.9/	98.8/	99.5/	8.45/	3.30/	8.45/	1.5/	8.4	0.0950/	0.406/	0.0399/	20.6/	---
	25.8		34.1		7.0	1.1	1.3	1.24	1.24	1.11	1.07	1.4	1.4	8.2	1.00	1.22	1.29	1.08	---
3-7	26.7	23.9	34.3	33.9	5.6	1.1/	1.7/	75.8/	76.4/	7.62/	3.02/	7.62/	1.5/	8.5	0.0270/	0.340/	0.0390/	25.6/	3.1/
	25.7		34.1		6.3	1.1	1.3	1.19	1.19	1.08	1.19	1.4	1.4	8.2	1.07	1.36	1.43	1.08	2.2/
2, 8	26.7	24.5	34.3	33.1	5.9	1.3/	1.2/	93.6/	94.6/	7.40/	3.05/	7.40/	2.2/	8.6	0.0220/	0.360/	0.0916/	25.6	---
9, 10	25.5		34.0		6.4	1.2	1.2	1.12	1.12	1.06	1.17	1.5	1.5	8.2	1.00	1.27	1.30	1.07	---

* mn = arithmetic mean.

All other parameters reported as geometric mean x/± geometric standard deviation.

Monitoring Period: May 1981 to July 1981.

TABLE A -- 3

SUMMARY OF WATER QUALITY DATA DURING SCREENED-ONLY DISCHARGES

Sta	Temp ^a (°C)		Salinity* (o/oo)		DO ^a (mg/l)		NO ₃ -NO ₂ (ug/l)		NH ₄ ⁺ (ug/l)		X-W (ug/l)		T-N (ug/l)		O-P (ug/l)		T-P (ug/l)		SS (mg/l)		pH ^a hi mn lo		Lst Ext Coef (K)	Turb (NTU)	Chlor 2 (ug/l)	Secchi (m)	Coliform Total Fecal (#/100 ml)		
	hi	mn	lo	hi	mn	lo	hi	mn	lo	hi	mn	lo	hi	mn	lo	hi	mn	lo	hi	mn	lo	hi					mn	lo	hi
1	26.7	24.1		34.5	33.3		6.2	2.3/	2.3/	2.3/	83.4/	86.0/	3.18/	6.96/	0.7/	0.7/	0.96/	6.96/	0.425/	0.425/	0.1936/	0.1936/	18.7/	18.7/	41.0/	41.0/	6.0/	6.0/	
	25.2			34.0		6.6	1.4	1.2	1.4	1.13	1.13	1.11	1.05	1.2	1.2	1.2	1.05	1.2	1.15	1.15	1.25	1.25	1.19	1.19	1.0	1.0	1.0	1.0	
3-7	2.68	24.2		34.6	33.6		5.3	2.2/	2.2/	2.2/	87.2/	89.8/	4.31/	6.82/	0.7/	0.7/	4.31/	6.82/	0.391/	0.391/	0.0743/	0.0743/	21.8/	21.8/	38.1/	38.1/	20.6/	20.6/	
	25.2			34.1		6.3	1.2	1.2	1.2	1.16	1.16	1.18	1.12	1.2	1.2	1.2	1.12	1.2	1.22	1.22	1.08	1.08	1.14	1.14	3.6	3.6	4.2	4.2	
2, 8 9, 10	26.6	24.1		34.6	33.6		4.5	2.4/	2.1/	2.1/	76.1/	79.0/	3.93/	6.46/	0.7/	0.7/	3.93/	6.46/	0.361/	0.361/	0.1203/	0.1203/	21.3/	21.3/	6.8/	6.8/	1.9/	1.9/	
	25.2			34.2		6.3	1.2	1.2	1.3	1.16	1.16	1.10	1.11	1.2	1.2	1.2	1.11	1.2	1.28	1.28	1.44	1.44	1.22	1.22	2.6	2.6	1.5	1.5	

* mn = arithmetic mean.

All other parameters reported as geometric mean +/- geometric standard deviation.

Monitoring Period: February 1983 to October 1984.

TABLE A - 4
WATER QUALITY MONITORING PROGRAM
BARBERS POINT OCEAN OUTFALL

Station 1 - (Control Station)

Date	DEPTH (Meters)	DENSITY	TEMP. (°C)	SALINITY (0/00)	OXYGEN (mg/l)	NITROGEN (ug/l)				PHOSPHORUS (ug/l)			SS (mg/l)	PH	LIGHT EXT. COEF. (K)	TURBIDITY (NTU)	CHLORO-PHYLL a (ug/l)
						NITRATE NITRITE	AMMONIA	KJELDAHL	TOTAL	ORTHO-PHOSPHATE	TOTAL						
10/86	5	21.67	26.60	34.27	6.00	2	2	50	52	1	6	<1	8.23	.095	.14	.08	
	30	21.88	27.86	34.23	6.05	1	1	60	61	2	7	<1	8.23				
1/87	5	23.05	24.92	34.55	6.30	1	1	90	91	7	13	<1	8.32	.119	.16	.14	
	30	23.34	24.90	34.93	6.30	1	1	60	61	2	8	<1	8.34				
4/87	5	23.19	24.18	34.45	6.70	<1	8	90	90	3	10	<1	8.06	.097	.07	.04	
	30	23.26	24.04	34.49	6.70	1	8	90	91	5	11	<1	8.05				
7/87	5	22.75	26.45	34.79	6.50	<1	1	80	80	4	10	<1	8.06	-	.08	.11	
	30	23.00	25.89	34.88	6.25	1	2	100	101	4	12	<1	8.07				

Station 2

Date	DEPTH (Meters)	DENSITY	TEMP. (°C)	SALINITY (0/00)	OXYGEN (mg/l)	NITROGEN (ug/l)				PHOSPHORUS (ug/l)			SS (mg/l)	PH	LIGHT EXT. COEF. (K)	TURBIDITY (NTU)	CHLORO-PHYLL a (ug/l)
						NITRATE NITRITE	AMMONIA	KJELDAHL	TOTAL	ORTHO-PHOSPHATE	TOTAL						
10/86	5	21.89	28.44	34.50	6.00	<1	2	60	60	2	7	<1	8.25	.041	.15	.10	
	30	21.86	28.40	34.44	6.10	<1	3	50	50	1	5	<1	8.26				
1/87	5	23.31	24.90	34.89	6.30	1	2	70	71	5	10	<1	8.25	.035	.06	.04	
	30	23.31	24.90	34.89	6.20	1	2	80	81	3	7	<1	8.29				
4/87	5	23.22	24.14	34.47	6.20	<1	7	70	70	4	9	<1	8.04	.065	.07	.04	
	30	23.26	24.06	34.50	6.40	<1	6	80	80	4	9	<1	8.05				
7/87	5	22.79	26.40	34.82	6.30	<1	1	90	90	3	10	<1	8.06	-	.06	.04	
	30	22.86	26.12	34.80	6.10	<1	1	90	90	3	10	<1	8.07				

Site Stations 3, 4, 5, 6, 7

Date	DEPTH (Meters)	DENSITY	TEMP. (°C)	SALINITY (0/00)	OXYGEN (mg/l)	NITROGEN (ug/l)				PHOSPHORUS (ug/l)			SS (mg/l)	PH	LIGHT EXT. COEF. (K)	TURBIDITY (NTU)	CHLORO-PHYLL a (ug/l)
						NITRATE NITRITE	AMMONIA	KJELDAHL	TOTAL	ORTHO-PHOSPHATE	TOTAL						
10/86	5	21.73	28.51	34.32	5.95	1	1.86	55.55	56.3	2.00	6.19	<1	8.23	.018	.12	.05	
	15	21.80	29.51	34.42	6.03	1	2.45	70.00	71.0	1.41	5.48	<1	8.25				
	30	22.04	27.62	34.34	6.13	1	1.32	71.10	71.5	2.55	7.38	<1	8.24				
1/87	5	23.20	25.22	34.88	6.82	1.32	1.51	57.50	60.8	2.35	6.58	<1	8.35	.023	.07	.06	
	15	23.28	25.05	34.92	6.78	1	1.00	54.80	55.8	3.00	6.48	<1	8.35				
	30	23.31	24.99	34.93	6.64	1	1.15	53.80	54.8	2.55	6.19	<1	8.35				
4/87	5	23.23	24.10	34.47	6.37	1	6.76	77.32	77.69	4.70	10.97	<1	8.07	.029	.07	.04	
	15	23.23	24.11	34.47	6.25	1	6.48	94.86	95.39	4.47	11.83	<1	8.08				
	30	23.23	24.12	34.48	6.28	1	6.97	83.60	84.41	5.11	11.93	<1	8.07				
7/87	5	22.71	26.51	34.76	6.12	1	1.58	90.25	90.85	3.78	9.71	<1	8.10	-	.09	.04	
	15	22.78	26.38	34.79	6.00	1	1.00	83.65	83.65	3.95	9.68	<1	8.10				
	30	23.00	25.80	34.85	6.04	1	1.24	71.31	71.32	3.26	9.29	<1	8.09				

TABLE A - 4
WATER QUALITY MONITORING PROGRAM
BARBERS POINT OCEAN OUTFALL

Station 8

Date	DEPTH (Meters)	DENSITY	TEMP. (°C)	SALINITY (0/00)	OXYGEN (mg/l)	NITROGEN (ug/l)				PHOSPHORUS (ug/l)			SS (mg/l)	PH	LIGHT EXT. COEF. (K)	TURBIDITY (NTU)	CHLORO-PHYLL a (ug/l)
						NITRATE NITRITE	AMMONIA	KJELDHALS	TOTAL	ORTHO-PHOSPHATE	TOTAL	TOTAL					
10/86	5	21.12	28.55	34.32	6.00	< 1	3	60	60	2	6	< 1	8.29		.11	.13	
	30	21.97	27.27	34.33	6.10	< 1	2	60	60	4	7	< 1	8.29	.077	.15	.16	
1/87	5	23.29	24.90	34.87	6.60	1	2	70	71	3	7	< 1	8.35		.07	.06	
	30	23.31	24.90	34.89	6.60	2	1	100	102	4	7	< 1	8.35	.027	.07	.15	
4/87	5	23.45	24.05	34.48	6.30	2	5	100	102	6	12	< 1	8.07		.08	.08	
	30	23.26	24.05	34.49	6.30	2	7	90	92	7	11	< 1	8.07	.013	.06	.08	
7/87	5	22.67	26.68	34.78	5.75	< 1	2	50	50	4	8	< 1	8.09		.09	.05	
	30	23.05	25.62	34.84	6.15	< 1	8	70	70	4	9	< 1	8.09		.09	.08	

Station 9

Date	DEPTH (Meters)	DENSITY	TEMP. (°C)	SALINITY (0/00)	OXYGEN (mg/l)	NITROGEN (ug/l)				PHOSPHORUS (ug/l)			SS (mg/l)	PH	LIGHT EXT. COEF. (K)	TURBIDITY (NTU)	CHLORO-PHYLL a (ug/l)
						NITRATE NITRITE	AMMONIA	KJELDHALS	TOTAL	ORTHO-PHOSPHATE	TOTAL	TOTAL					
10/86	5	21.82	28.40	34.38	6.00	1	2	60	61	2	6	< 1	8.29		.14	.13	
	15	21.76	28.38	34.30	6.05	1	2	70	71	1	6	< 1	8.27	.041	.12	.04	
	30	22.08	28.00	34.30	6.10	< 1	2	90	90	1	6	< 1	8.28		.09	.04	
1/87	5	23.30	24.95	34.90	6.90	1	2	90	91	3	8	< 1	8.29		.09	.06	
	15	23.29	24.95	34.89	6.90	2	1	90	92	3	7	< 1	8.29	.063	.08	.05	
	30	23.30	24.90	34.88	6.90	1	1	90	91	3	6	< 1	8.30		.07	.06	
4/87	5	23.24	24.10	34.48	6.35	1	7	100	101	6	10	< 1	8.09		.07	.04	
	15	23.21	24.10	34.48	6.35	1	6	80	81	7	11	< 1	8.08	.011	.07	.04	
	30	23.13	24.06	34.44	6.30	1	5	100	101	6	9	< 1	8.07		.08	.04	
7/87	5	22.74	26.58	34.82	6.00	< 1	4	100	100	4	8	< 1	8.09		.07	.04	
	15	22.78	26.40	34.80	5.90	< 1	2	50	50	4	9	< 1	8.10		.08	.05	
	30	22.98	25.92	34.87	5.80	< 1	1	40	40	4	8	< 1	8.09		.07	.05	

Station 10

Date	DEPTH (Meters)	DENSITY	TEMP. (°C)	SALINITY (0/00)	OXYGEN (mg/l)	NITROGEN (ug/l)				PHOSPHORUS (ug/l)			SS (mg/l)	PH	LIGHT EXT. COEF. (K)	TURBIDITY (NTU)	CHLORO-PHYLL a (ug/l)
						NITRATE NITRITE	AMMONIA	KJELDHALS	TOTAL	ORTHO-PHOSPHATE	TOTAL	TOTAL					
10/86	5	21.37	28.78	33.95	5.80	1	2	140	140	3	6	< 1	8.23		.17	.35	
1/87	5	23.19	25.10	34.81	6.35	1	1	50	51	3	8	< 1	8.32		.33	.18	
4/87	5	23.14	24.82	34.32	6.60	3	6	100	103	10	13	< 1	8.07	.236	.18	.18	
7/87	5	22.73	26.44	34.75	5.80	< 1	1	60	60	4	9	< 1	8.10		.08	.09	

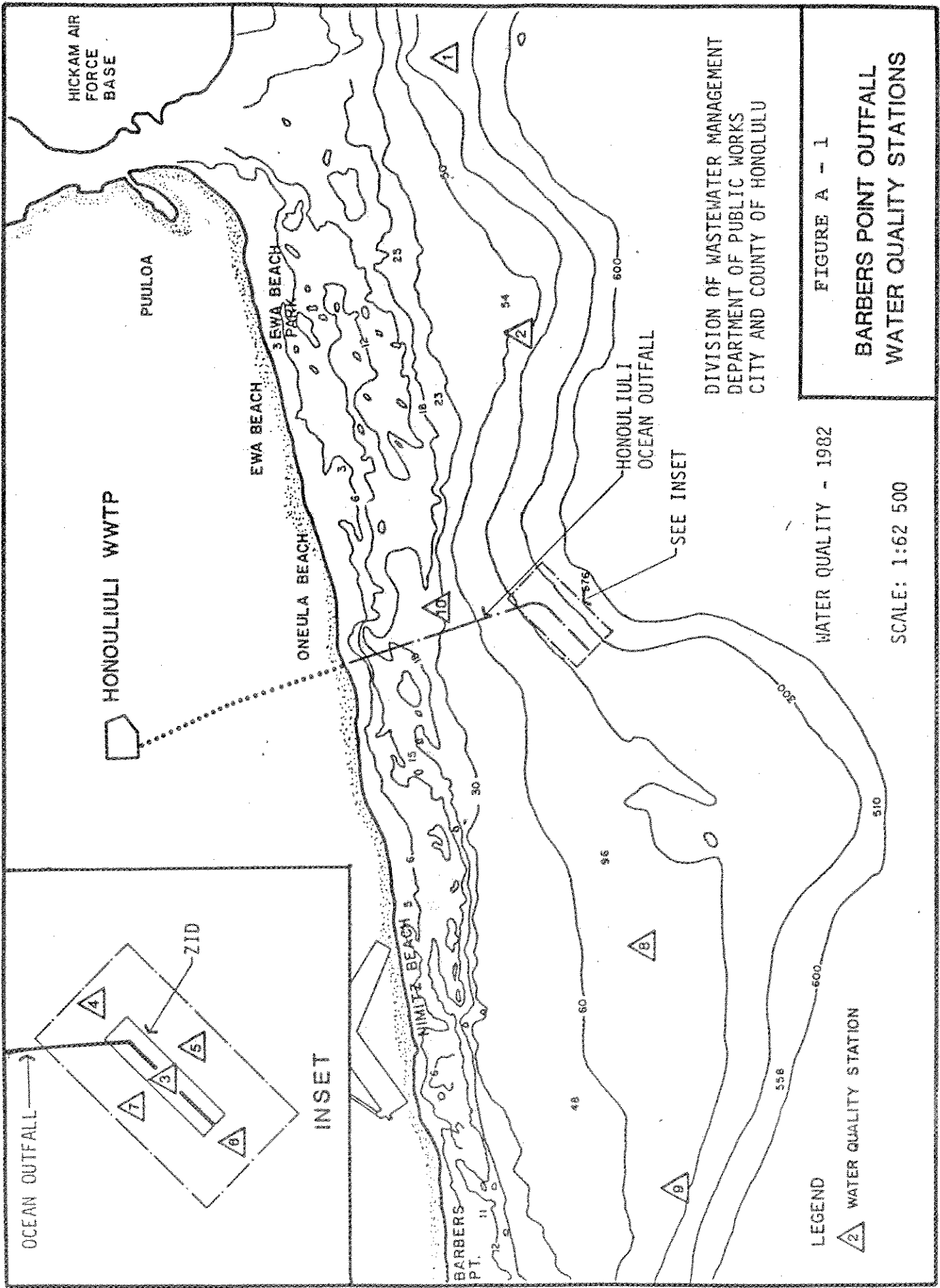


FIGURE A - 1

**BARBERS POINT OUTFALL
WATER QUALITY STATIONS**

WATER QUALITY - 1982

SCALE: 1:62 500

LEGEND
 ▲ WATER QUALITY STATION

DIVISION OF WASTEWATER MANAGEMENT
 DEPARTMENT OF PUBLIC WORKS
 CITY AND COUNTY OF HONOLULU

MAKAKILO



EWA

HONOULIULI WWTP



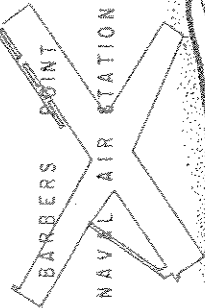
HICKAM AIR FORCE BASE

Maipo Point

PUULOA

Hammer Point

Keahi Pt.



BARBERS POINT NAVAL AIR STATION

EWA BEACH

ONEULA BEACH

3 Ewa Beach Park

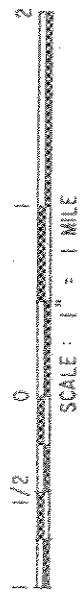
BARBERS PT.

Nimitz beach

DIVISION OF WASTEWATER MANAGEMENT
 DEPARTMENT OF PUBLIC WORKS
 CITY AND COUNTY OF HONOLULU
 FIGURE A - 2

**BARBERS POINT OUTFALL
 BENTHIC STATIONS**

WATER QUALITY - SEPT. 1986 SCALE: 1:62,500

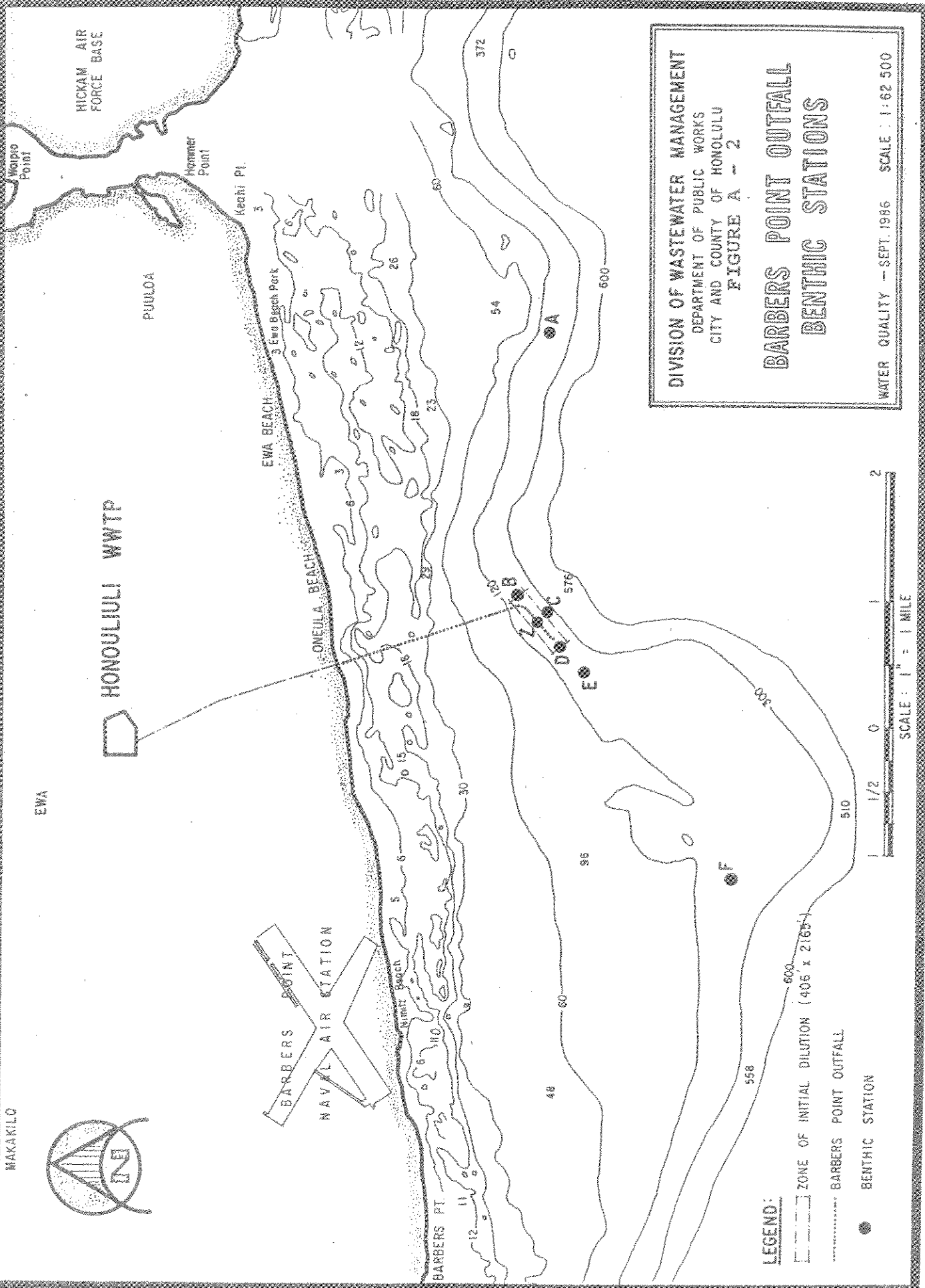


LEGEND:

▭ ZONE OF INITIAL DILUTION (406' x 2165')

⋯ BARBERS POINT OUTFALL

● BENTHIC STATION



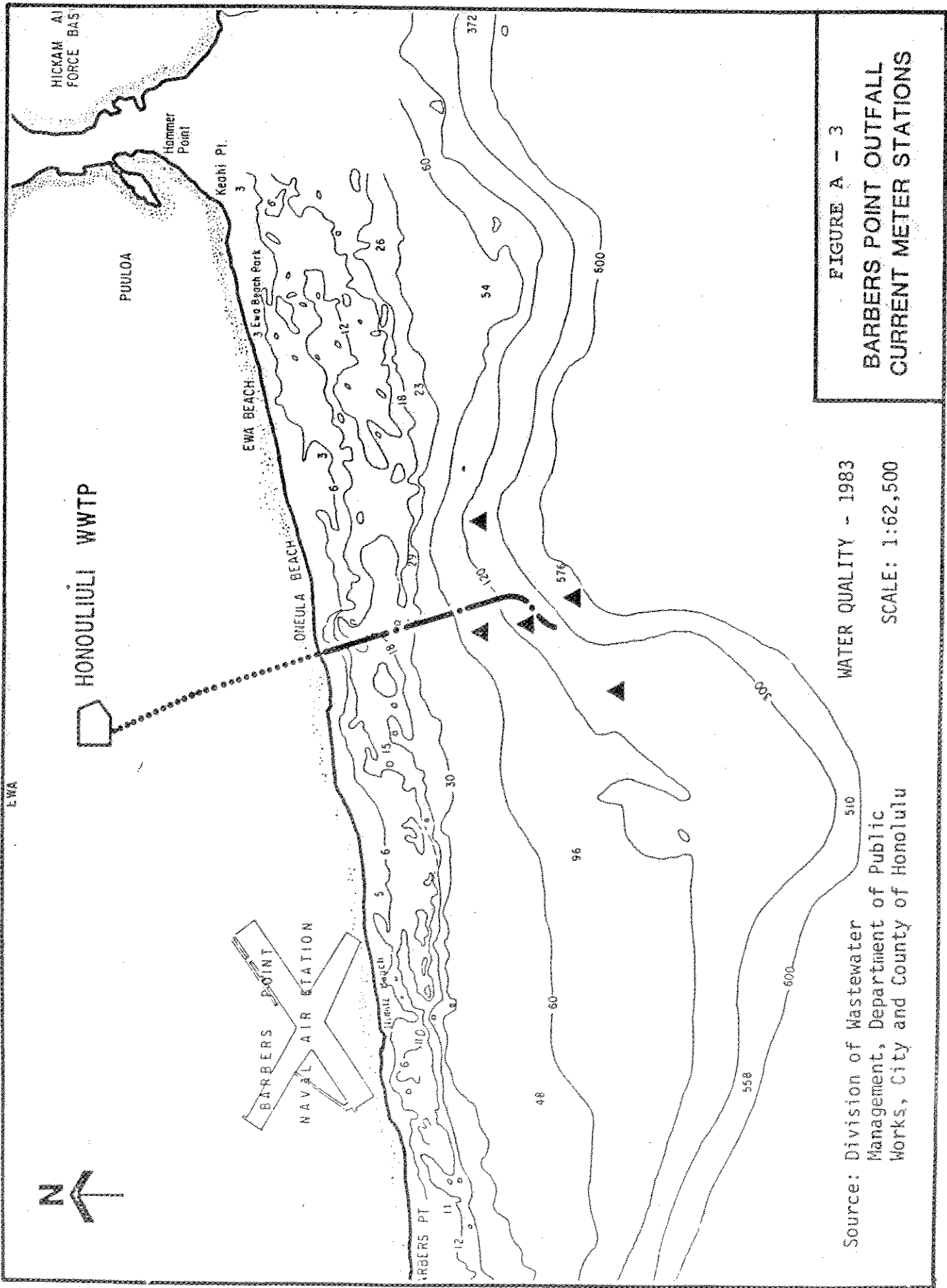


FIGURE A - 3

**BARBERS POINT OUTFALL
CURRENT METER STATIONS**

WATER QUALITY - 1983

SCALE: 1:62,500

Source: Division of Wastewater
Management, Department of Public
Works, City and County of Honolulu

APPENDIX B

LETTERS RECEIVED BY THE DEPARTMENT OF PUBLIC WORKS
FROM AGENCIES AND INDIVIDUALS TOGETHER WITH THE
DEPARTMENT RESPONSES WHERE APPROPRIATE
DURING THE PREPARATION OF THE EIS



DEPARTMENT OF THE ARMY
 U. S. ARMY ENGINEER DISTRICT, HONOLULU
 BUILDING 230
 FT. SHAFTER, HAWAII 96858-5444
 August 27, 1987

815629

RECEIVED
 DEPT OF PUBLIC WORKS
 AUG 31 9 37 AM '87

REPLY TO
 ATTENTION OF:

TO _____
 ENV/col
 w/1 WWM

Alfred J. Thiede
 Director and Chief Engineer
 Department of Public Works
 City and County of Honolulu
 650 South King Street
 Honolulu, Hawaii 96813

Dear Mr. Thiede:

Thank you for the opportunity to review and comment on the Supplemental Environmental Impact Statement Preparation Notice (EISPN) for Unit 2, Honolulu Wastewater Treatment Plant (WWTP), Ewa, Oahu, Hawaii. The following comments are offered:

- a. A Department of the Army permit is not required for the proposed improvements.
- b. Flood hazard classification of the project area is described on page III-3 of the EISPN.

Sincerely,

[Signature]
 Klauk Cheung
 Chief, Engineering Division

DEPARTMENT OF PUBLIC WORKS
 CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
 HONOLULU, HAWAII 96813

FORM F 7431
 00000



ALFRED J. THIEDE
 DIRECTOR AND CHIEF ENGINEER

ENV 87-144

September 1, 1987

Mr. Klauk Cheung, Chief
 Engineering Division
 Pacific Ocean Division
 Corps of Engineers
 U.S. Department of the Army
 Building 230
 Fort Shafter, Hawaii 96858-5440

Dear Mr. Cheung:

Subject: Supplemental EISPN for Unit 2,
Honolulu WWTP

The following comments on the subject EISPN as stated in your letter of August 27, 1987, are acknowledged:

- a. A DAR permit is not required for the proposed improvements.
- b. The flood hazard classification for the project site is correctly stated in the EISPN on page III-3.

Very truly yours,

[Signature]
 ALFRED J. THIEDE
 Director and Chief Engineer

8756w

DEPARTMENT OF THE ARMY
HEADQUARTERS UNITED STATES ARMY SUPPORT BRYM-OF PUBLIC WORKS
CAMP MCGUIRE HALL (6688-300)
FORT SHAFTER, HAWAII
25 AUG 1987 AUG 28 2 15 PM '87

FOR TO
ATTENTION OF:

Directorate of Facilities Engineering

ENVA
P/100UM

If you have any questions, please call our
Environmental Management Office at 655-0691.

Sincerely,

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

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

Dear Mr. Thiede:

The following are our review comments for the
Supplemental Environmental Impact Statement
Preparation Notice (EISPN) for Unit 2, Honolulu
Wastewater Treatment Plant (WWTP), Ewa, Oahu, Hawaii:

a. On page I-2 (fourth paragraph), the tributary
areas include Schofield - Wheeler. It is requested
that the Helemano Military Reservation also be
included in the tributary area. In the event the
present irrigation reuse of the wastewater in the area
is eliminated, it is requested that the Schofield -
Wheeler and Helemano areas be included with the
considered diversion of the flows from the Wahiawa -
Whitmore Village areas to the Honolulu WWTP -
Barbers Point Outfall.

b. On page II-25 (first paragraph), the Central
Oahu sewage district does not include Schofield -
Wheeler. Here again, it is requested that the
district include Schofield - Wheeler and Helemano.

Thank you for letting us comment on the EISPN. We
would appreciate being consulted throughout the
development of the final Environmental Impact
Statement.

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813



FRANK P. PAI
NATION

September 15, 1987

ALFRED A. THIEDE
DIRECTOR AND CHIEF ENGINEER
RMV 87-168

Colonel Joseph Wasielewski
Director of Facilities Engineering
U.S. Army Support Command, Hawaii
Fort Shafter, Hawaii 96858-5000

Attention: Environmental Management Office
Dear Colonel Wasielewski:

Subject: Supplemental EISPN for Unit 2, Honolulu WWTP

We are responding to the comments in your letter dated August 25, 1987, on
the subject EISPN.

a. At the present time, the City's Central Oahu Sewerage District, including
military wastewater facilities located therein, cannot be considered a
part of the Honolulu sewer system because of the conditions of the
Pending Section 301(h) waiver of secondary treatment for the Barbers
Point ocean discharge. The discussion in the EISPN considered the
possibility of diverting the flows from Wahiawa-Whitmore Village and
Schofield-Wheeler in the event the wastewater flows from these areas
cannot be discharged into Waiialua Sugar Company irrigation system. The
diversion of Central Oahu flows into the Honolulu sewer system is a
conceptual plan which may or may not occur.

Hence, the addition of the flow from Helemano Military Reservation to the
Schofield-Wheeler flows is acceptable. However, mentioning of the U.S.
Army flows in the conceptual diversion plan for Central Oahu in the EIS
does not represent a commitment on the part of the City and County to
accept the U.S. Army flows.

September 14, 1987

If the conceptual plan for diversion of the U.S. Army flows into Honolulu is to be developed in depth and be discussed in the draft EIS, more information will be required from your office for each facility or installation. The following information and data will be helpful in evaluating the impact of the diversion plan on the Honolulu sewer system and the receiving waters of West Mamala Bay:

1. Name of the installation or facility.
 2. Acreage of the sewered area and population.
 3. The present and future (2005) average daily flow and peak wet weather flow.
 4. The type of wastewater treated; domestic sewage, industrial wastes, RCRA hazardous waste, etc.
 5. The complete analysis of the wastewater constituents of both raw wastewater and effluent based on a 24-hour flow weighted composite sample including but not limited to the following: BOD5, suspended solids, total solids, pH, grease, total nitrogen, total phosphorus, heavy metals, organics, pesticides, etc. Test procedures should follow Standard Methods and/or EPA 40CFR Part 136 and be conducted by a certified (EPA or State) laboratory.
 6. Treatability of the wastewater may also be desirable if substantial amount of industrial wastes are presently being treated.
- b. The Schofield-Wheeler complex is part of the Central Oahu Development Plan (DP) area and also within the Central Oahu sewerage district. Helemano Military Reservation is a part of the North Shore DP area and within the Waialua-Haleiwa sewerage district. Within the Central Oahu and Waialua-Haleiwa sewerage districts, the army and navy sewerage systems are independently operated and maintained.

- c. For the purpose of the discussion in the EIS, we will state that there is a possibility of diverting the flows from Helemano Military Reservation located in the Waialua-Haleiwa sewerage district together with the Schofield-Wheeler flows to the Honolulu sewer system.
- c. The proposed diversion of flows from the Central Oahu sewerage district including Helemano Military Reservation to the Honolulu sewer system poses some major obstacles which will have to be resolved. As stated earlier, the present proposed Section 301(h) waiver document for Honolulu does not include any areas that are presently not part of the tributary areas of the plant. The duration of the waiver is for a period of five years and is limited to 25 mgd.

September 14, 1987

At the end of the five year-period, the waiver document could be amended to include the areas that are presently not listed as tributary areas of the plant subject to EPA approval. Since, the disposal system was designed for an average flow of 51 mgd, we do not anticipate any water quality problems in the receiving waters at West Mamala Bay.

The proposed expansion of the plant to 38 mgd under alternative "D" in the EISPN is based on three equal 12.75 mgd increments of the 51 mgd ultimate flow. By using same-sized tanks, plant operation and maintenance are simplified. The proposed 38 mgd plant include sufficient capacity to serve the 2005 de-facto population in the tributary areas; however, there are no excess treatment capacity to serve any areas outside of the present designated tributary areas.

If the wastewater flows from Central Oahu were to be treated at the Honolulu WTP, the plant would reach its proposed design capacity of 38 mgd by about the year 1995 instead of 2005. The proposed treatment capacity will not be adequate to serve already approved developments in the tributary areas to the year 2005, the end of the present planning period. Reduction of the planning period is not considered desirable and the expansion to the full 51 mgd capacity may be considered growth inducing, especially since there is no assurance or present need to divert the flows from Central Oahu to the Honolulu sewer system.

Very truly yours,

J. Alfred J. Thiede
 J. ALFRED J. THIEDE
 Director and Chief Engineer



U.S. Department of Housing and Urban Development
 Honolulu Office, Region IX
 300 Ala Moana Blvd., Room 3318, Box 50007
 Honolulu, Hawaii 96850-4997

87-5509
 ENVU
 8/25 WWM
 87-200

RECEIVED
 DEPT. OF PUBLIC WORKS
 AUG 24 11 49 AM '87

August 19, 1987

Mr. Alfred J. Thiede, Director
 and Chief Engineer
 Department of Public Works
 City and County of Honolulu
 650 South King Street
 Honolulu, HI 96813

Dear Mr. Thiede:

SUBJECT: Unit 2 Honouliuli Wastewater Treatment Plant (WWTP)
 Supplemental Environmental Impact Statement
 Preparation Notice (EISPN)

We have reviewed the EISPN for the subject project that will increase the capacity of the Honouliuli Wastewater Treatment Plant. The Notice states that the expansion of the Treatment Plant will be adequate to treat the wastewater flows for the projected resident population of 269,400 to the year 2005.

We find that the proposed action will not adversely impact any of our HUD programs or projects in the area.

We appreciate the opportunity to participate in the environmental review process and look forward to receiving a copy of the Draft EIS.

Very sincerely yours,

Calvin Lew
 Director
 Community Planning and
 Development Division

DEPARTMENT OF PUBLIC WORKS
 CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
 HONOLULU, HAWAII 96813

FRANK F. FASE
 TAYLOR



ALFRED J. THIEDE
 DIRECTOR AND CHIEF ENGINEER

ENV 87-138

August 25, 1987

Mr. Calvin Lew
 Director
 U.S. Department of Housing and
 Urban Development
 Honolulu Office, Region IX
 300 Ala Moana Boulevard, Room 3318, Box 50007
 Honolulu, Hawaii 96850-4991

Dear Mr. Lew:

Subject: Supplemental EISPN for Unit 2,
Honouliuli WWTP

Receipt of your letter dated August 19, 1987, on the subject EISPN is acknowledged. We note in your letter that the proposed expansion of the Honouliuli WWTP will not have an adverse impact on any of HUD programs or projects in the area.

Very truly yours,

ALFRED J. THIEDE
 Director and Chief Engineer



RECEIVED

'87 AUG 24 AM 8:29 DEPARTMENT OF THE NAVY
COMMANDER
NAVAL BASE PEARL HARBOR
BOX 110
PEARL HARBOR, HAWAII 96880-2020
DIV OF WASTEWATER MANAGEMENT

815471
WWM [Signature]

IN REPLY REFER TO:
5090
Ser N5B/1923
17 AUG 1987

Mr. Alfred J. Thiede
Director and Chief Engineer
Department of Public Works
City and County of Honolulu
650 South King Street
Honolulu, HI 96813

Dear Mr. Thiede:

SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE
(EISPN) FOR UNIT 2, HONOULIULI WASTEWATER TREATMENT PLANT

The EISPN for Unit 2, Honouliuli Wastewater Treatment Plant has been reviewed and we have no comments to offer.

Thank you for the opportunity to review the Notice.

Sincerely,
[Signature]
T. L. FERRIER
Captain, U.S. Navy
Chief of Staff

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AUG 20 1 50 PM '87

UNITED STATES
DEPARTMENT OF
AGRICULTURE

SOIL
CONSERVATION
SERVICE

P. O. BOX 30004
HONOLULU, HAWAII
96850

87-5507
WWM [Signature]

August 20, 1987

Mr. Alfred Thiede, Director
Department of Public Works
City and County of Honolulu
650 South King Street
Honolulu, HI 96813

RECEIVED
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AUG 24 11 49 AM '87

Dear Mr. Thiede:

Subject: Supplemental Environmental Impact Statement Preparation Notice
for Unit 2, Honouliuli Wastewater Treatment Plant, Ewa, Oahu, HI

We have no comments to offer at this time, but would appreciate the opportunity to review the draft EIS on this project.

Sincerely,

[Signature]
ACTING
RICHARD N. DUNCAN
State Conservationist

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DIV OF WASTEWATER MANAGEMENT
AUG 25 PM 2 10 '87

cc:
Mr. John P. Whalen, Director, Department of Land Utilization, City and County of Honolulu, 650 So. King St., Honolulu, HI 96813



United States Department of the Interior

ENV 8715689
9/2 WWM

FISH AND WILDLIFE SERVICE

300 ALA MOANA BOULEVARD
P. O. BOX 25187
HONOLULU, HAWAII 96820

IN REPLY REFER TO:
88
Room 6307
SEP 1 1987

Mr. Alfred J. Thiede
Director and Chief Engineer
Department of Public Works
City and County of Honolulu
880 South King Street
Honolulu, HI 96813

Re: Supplemental Environmental Impact Statement Preparation
Notice for Unit 2, Honolulu Wastewater Treatment Plant,
Ewa, Oahu

Dear Mr. Thiede:

We have reviewed the referenced document and have no comments to offer at this time.

We appreciate the opportunity to comment.

Sincerely,

Ernest Koseka
Project Leader, Environmental Services
Pacific Islands Office

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SEP 2 1 26 PM '87



Save Energy and You Serve America!

Mr. Alfred J. Thiede
Page 2
August 26, 1987

87580
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DEPARTMENT OF PUBLIC WORKS
AND ECONOMIC DEVELOPMENT
ALFRED J. THIEDE, DIRECTOR
ROGER A. ULVELING, DEPUTY DIRECTOR
MURRAY E. TOWILL, DEPUTY DIRECTOR
BARBARA KIM STANTON, DEPUTY DIRECTOR



DEPARTMENT OF BUSINESS
AND ECONOMIC DEVELOPMENT

MAILING ADDRESS: P.O. BOX 2359, HONOLULU, HAWAII 96804
TELEPHONE: 535-2000

Thank you for the opportunity to review this EISPN.

Sincerely,

Roger A. Ulveling
Roger A. Ulveling

DEPARTMENT OF PUBLIC WORKS

CITY AND COUNTY OF HONOLULU

350 SOUTH KING STREET
HONOLULU, HAWAII 96813



FRANK F. FARR
MAYOR

ALFRED J. THIEDE
DIRECTOR AND CHIEF ENGINEER
ENV #7-151

September 3, 1987

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

Dear Mr. Thiede:

Subject: Supplemental Environmental Impact Statement Preparation
Notice (EISPN) for the Honolulu Waste Water Treatment
Plant (WWTP) Expansion, Ewa, Oahu, Hawaii

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

The EIS should include a discussion of relevant objectives and
policies of the Hawaii Coastal Zone Management (CZM) Program as specified in
Chapter 205A, Hawaii Revised Statutes. As part of this discussion, we
recommend that additional attention be given to the following areas of concern:

Recreational Resources

A CZM policy is to regulate point sources of pollution to protect
the recreational value of coastal waters. On land, Nimitz Beach and Oneula
Beach Park are situated in close proximity to the wastewater outfall. In
nearby ocean waters, there are fish aggregation buoys and an artificial reef
maintained by the Department of Land and Natural Resources. Since they
support substantial recreational activities, the EIS should describe potential
impacts the proposed project will have on these recreation and associated
resources.

Coastal Ecosystems

Another CZM policy is to promote water quality planning practices
which reflect the tolerance of marine ecosystems and prohibit land and water
uses which violate State water quality standards. The State Department of
Health has classified the receiving waters as Class A (i.e., to be used for
recreational purposes, aesthetic enjoyment, in other ways compatible with the

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

Dear Mr. Ulveling:

Subject: Supplemental EISPN for Unit 2,
Honolulu WWTP

We have received by letter dated August 26, 1987 (Reference
No. P-7121) your comments on the subject EISPN.

The draft EIS which we are preparing will include a discussion
on the relevant objectives and policies of the Hawaii Coastal
Zone Management (HCZM) Program as specified in Chapter 205A,
Hawaii Revised Statutes (HRS) as well as the Hawaii State Plan
(Chapter 226 HRS) and the State Health Functional Plan.

Additional attention will be given to your area of concern
regarding recreational resources and coastal ecosystems in
West Mamala Bay as part of the HCZM Program.

Very truly yours

Alfred J. Thiede
ALFRED J. THIEDE
Director and Chief Engineer

JOHN WAHNEE
GOVERNOR OF HAWAII

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AUG 26 10 16 AM '87



TO
STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3370
HONOLULU, HAWAII 96804

875584

ENV 87-140
abc WWTM
JOHN G. LEWIN, M.D.
DIRECTOR OF HEALTH

In reply, please refer to:
EPH80

August 20, 1987

MEMORANDUM

To: Mr. Alfred J. Thiede, Director and Chief Engineer
Department of Public Works, City & County of Honolulu

From: Deputy Director for Environmental Health

Subject: Supplemental Environmental Impact Statement Preparation Notice
(EISPN) for Unit 2, Honolulu Wastewater Treatment Plant (WWTP),
Ewa, Oahu, Hawaii

Thank you for allowing us to review and comment on the subject supplemental EISPN.

Noise from the wastewater treatment plant, such as electric motors, centrifuges, blower, drives, air compressor pumps and emergency generators must be attenuated to meet the allowable noise levels as stated in Title 11, Administrative Rules Chapter 43, Community Noise Control for Oahu.

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

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

590 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. YABE
MAYOR



ALFRED J. THIEDE
DIRECTOR AND CHIEF ENGINEER

ENV 87-140

August 27, 1987

Mr. Bruce S. Anderson, Ph.D.
Deputy Director for Environmental Health
Department of Health
State of Hawaii
P. O. Box 3370
Honolulu, Hawaii 96804

Dear Dr. Anderson:

Subject: Supplemental EISPN for Unit 2,
Honolulu WWTP

We received your comments on the subject EISPN by memorandum dated August 20, 1987. New noise sources within the treatment plant site will be attenuated in the same manner as existing equipments were given during the construction of Unit 1. Allowable noise levels as stated in Chapter 11-43, Community Noise Control per Oahu will be met.

Very truly yours.

Alfred J. Thiede
ALFRED J. THIEDE
Director and Chief Engineer

815602

Mr. Alfred Thiede
August 24, 1987
Page 2

Thank you for requesting our comments on your EIS
Preparation Notice.

Sincerely,

Marvin T. Myers
Marvin T. Myers, Ph.D.
Interim Director

Roy Sakamoto
Roy Sakamoto
Environmental Technical Specialist



STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

365 SOUTH KING STREET, ROOM 104
HONOLULU, HAWAII 96813

Marvin T. Myers, Ph.D.
DIRECTOR

TELEPHONE NO.
548-8515

ENV 44
9/28 WUM

RECEIVED
DEPT OF PUBLIC WORKS
AUG 27 4 07 PM '87

August 19, 1987

The Honorable Alfred J. Thiede
Director and Chief Engineer
Department of Public Works
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Thiede:

SUBJECT: COMMENTS ON THE SUPPLEMENTAL EIS PREPARATION
NOTICE FOR UNIT 2, HONOLULULI WASTEWATER
TREATMENT PLANT

Your Environmental Impact Statement Preparation Notice is well prepared and covers many aspects of the impact the proposed expansion will have on the area. However, we would like to see additional discussion of the following areas:

1. The odor control technology that will be used and the impact the odors will have on upcoming developments in the vicinity of the plant.
2. The buffer zone between the plant and surrounding developments.
3. The effect of proposed dual-water systems on Honolulu's operation, especially if secondary treatment is employed.
4. A brief discussion of the ability of the effluent outfall to handle the additional waste water.

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

350 SOUTH KING STREET
HONOLULU, HAWAII 96813



FRANK F. FULI
MAYOR

ALFRED J. AHIEDE
DIRECTOR AND CHIEF ENGINEER
ENV 87-166

Mr. Marvin T. Miura, Ph.D.

-2-

September 11, 1987

The use of primary effluent for the incinerator wet scrubber should be considered an interim measure. The present thinking is to utilize groundwater from a proposed well at the plant site for the wet scrubber operation and for lawn maintenance. Analysis of the groundwater at the plant site indicates that its water quality is excellent for these purposes. Primary effluent is not used for lawn irrigation.

4. The ocean disposal system was designed to handle an average daily wastewater flow of 51 mgd and a peak wet weather flow of 112 mgd. The proposed design flows of Unit 2 are well within these designed capabilities.

September 11, 1987

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

Dear Dr. Miura:

Subject: Supplemental EISPN for Unit 2, Honolulu WTP

We are responding to your comments on the subject EISPN, transmitted to this office by letter dated August 13, 1987.

1. Activated carbon scrubbers are presently being employed at the plant site to treat odors at the influent screens, gravity thickeners, decant tanks and blend tanks. The scrubbers are effective in destroying hydrogen sulfide odors completely. The same technology will probably be utilized for Unit 2 units, except the scrubbers will be equipped with a pretreatment unit consisting of a wet scrubber to remove the bulk of the hydrogen sulfide. The pretreatment unit selected will be the most cost effective device in reducing the maintenance cost of the odor control operation.
2. The general buffer zone between the plant site and surrounding developments were stated in the EISPN on page III-1. Additional information will be provided in the Draft EIS.
3. It was proposed initially to use secondary effluent in the incinerator wet scrubber. When secondary treatment units were not constructed pending the approval of the Section 501(h) waiver by EPA, potable water was used in the scrubber. Because of the need to conserve potable water, primary effluent was substituted on a trial basis in place of potable water, and its usage has thus far been successful without causing plugging problems. A contributing factor has been the higher than usual removal efficiency of suspended solids by the plant.

Very truly yours,


ALFRED J. AHIEDE
Director and Chief Engineer

875641

SUZANNE D. PETERSON
CHAIRPERSON, BOARD OF AGRICULTURE
TABASHI TOJO
DEPUTY TO THE CHAIRPERSON



State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 So. King Street
Honolulu, Hawaii 96814-2512
August 28, 1987

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JOHN WAHNEE
GOVERNOR

EDWARD Y. HIRATA
DIRECTOR

WUUM
DEPUTY DIRECTORS
JOHN K. UCHIMA
RONALD N. HIRANO
DAN T. KICHI

IN REPLY REFER TO:
STEP 8. 2264

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DIV. OF
WASTEWATER
MANAGEMENT

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

August 5, 1987

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

Dear Mr. Thiede:

Supplemental Environmental Impact Statement
Unit 2, Honouliuli Wastewater Treatment Plant
Ewa, Oahu

We have no objections to the proposed action to expand the existing Honouliuli Wastewater Treatment Plant.

Thank you for this opportunity to provide comments.

Very truly yours,

Edward Y. Hirata
Director of Transportation

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

Subject: Supplemental Environmental Impact Statement
Preparation Notice (EISP) for Unit 2, Honouliuli
Wastewater Treatment Plant (WWTP), Ewa, Oahu, Hawaii
TMK: 9-1-12: 26; 9-1-13: 7 51.3 acres

Dear Mr. Thiede:

We have reviewed the subject document and do not have any comments to offer at this time. We do look forward to receiving the draft EIS which will discuss any substantial secondary impacts, such as population changes, that the proposed capacity of Unit 2 may enhance.

Thank you for the opportunity to comment.

SUZANNE D. PETERSON
Chairperson, Board of Agriculture

cc: OEQC
DLU

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

540 SOUTH KING STREET
HONOLULU, HAWAII 96813



September 11, 1987

ALFRED J. HIEDZ
DIRECTOR AND CHIEF ENGINEER
ENV 87-166

Mr. Marvin T. Miura, Ph.D.

-2-

September 11, 1987

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

Dear Dr. Miura:

Subject: Supplemental EISN for Unit 2, Honolulu WTP

We are responding to your comments on the subject EISN, transmitted to this office by letter dated August 19, 1987.

1. Activated carbon scrubbers are presently being employed at the plant site to treat odors at the influent screens, gravity thickeners, decant tanks and blend tanks. The scrubbers are effective in destroying hydrogen sulfide odors completely. The same technology will probably be utilized for Unit 2 units, except the scrubbers will be equipped with a pretreatment unit consisting of a wet scrubber to remove the bulk of the hydrogen sulfide. The pretreatment unit selected will be the most cost effective device in reducing the maintenance cost of the odor control operation.
2. The general buffer zone between the plant site and surrounding developments were stated in the EISN on page III-1. Additional information will be provided in the Draft EIS.
3. It was proposed initially to use secondary effluent in the incinerator wet scrubber. When secondary treatment units were not constructed pending the approval of the Section 301(h) waiver by EPA, potable water was used in the scrubber. Because of the need to conserve potable water, primary effluent was substituted on a trial basis in place of potable water, and its usage has thus far been successful without causing plugging problems. A contributing factor has been the higher than usual removal efficiency of suspended solids by the plant.

4. The ocean disposal system was designed to handle an average daily wastewater flow of 51 mgd and a peak wet weather flow of 112 mgd. The proposed design flows of Unit 2 are well within these designed capabilities.

Very truly yours,

ALFRED J. HIEDZ
Director and Chief Engineer

JOHN WARDER
GOVERNOR



STATE OF HAWAII
DEPARTMENT OF EDUCATION
P. O. BOX 2360
HONOLULU, HAWAII 96813

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CHARLES T. TOGUCHI
SUPERINTENDENT

August 5, 1987

FRANK F. FARM
MAILER

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



August 12, 1987

ALFRED J. THIEDE
DIRECTOR AND CHIEF ENGINEER
ENV 97-132

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

Dear Mr. Thiede:

Subject: Supplemental EISPN for Unit 2
Honouliuli Wastewater Treatment Plant

Our review of your proposed project indicates that it
will not have any adverse effect on our area schools.

Thank you for the opportunity to comment.

Sincerely,

Charles T. Toguchi
CHARLES T. TOGUCHI
Superintendent of Education

CTT:MRI:th

cc Mr. E. Imai
Leeward District

Mr. Charles T. Toguchi
Superintendent
Department of Education
State of Hawaii
P. O. Box 2360
Honolulu, Hawaii 96808

Dear Mr. Toguchi:

Subject: Supplemental EISPN for Unit 2.
Honouliuli WWTP

We acknowledge receipt of your letter dated August 5, 1987,
commenting that the proposed project will not have any adverse
effect on your area schools.

Very truly yours,

Alfred J. Thiede
ALFRED J. THIEDE
Director and Chief Engineer

875184

RECEIVED
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JOHN WAINES
DIRECTOR

DIV OF
WASTE WATER
MANAGEMENT



STATE OF HAWAII
Department of Human Services
HAWAII HOUSING AUTHORITY

P. O. BOX 17807
HONOLULU, HAWAII 96817

AUGUST 11, 1987

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

Dear Mr. Thiede:

Re: Supplemental Environmental Impact Statement
Preparation Notice (EISP) for Unit 2, Honouliuli
Wastewater Treatment Plant (WWTP), Ewa, Oahu

Thank you for the opportunity to review the Supplemental
EISP for the proposed Honouliuli WWTP, Unit 2.

Although we have no comments to offer at this time we would
like to be consulted during the preparation of the EIS.

Sincerely,

Russell N. Furumoto
RUSSELL N. FURUMOTO
Acting Executive Director

875346

WWM
RUSSELL N. FURUMOTO
EXECUTIVE DIRECTOR

RE WWTB REFER

ALL
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STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
DIVISION OF PUBLIC WORKS

P. O. BOX 115, HONOLULU, HAWAII 96810

AUG 6 1987

Mr. Alfred J. Thiede
Director and Chief Engineer
Department of Public Works
650 South King Street, 11th Floor
Honolulu, Hawaii

Dear Mr. Thiede:

Subject: Supplemental Environmental Impact
Statement Preparation Notice for the
Proposed Honouliuli Wastewater
Treatment Plant, Unit 2

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

Very truly yours,

Teuane Tomimaga
TEUANE TOMINAGA
State Public Works Engineer

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RUSSELL J. MASATA
COMPTROLLER
DEPT. REVENUE
SPORTS COMPLEX

LETTER NO. (P) 1643

DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
DEPT OF PUBLIC WORKS
850 SOUTH KING STREET
HONOLULU, HAWAII 96813 © 16001 528-4422

AUG 31 10 17 AM '87

TO _____



ENV 111
9/31 WUM
JOHN P. WHALEN
DIRECTOR
LU7/87-3991(BWM)
87/EIS-8

FRANK F. FASI
MAYOR

August 28, 1987

MEMORANDUM

TO: ALFRED J. THIEDE, DIRECTOR & CHIEF ENGINEER
DEPARTMENT OF PUBLIC WORKS

FROM: JOHN P. WHALEN, DIRECTOR

SUBJECT: SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT PREPARATION
NOTICE (EISPN) FOR UNIT 2, HONOULIULI WASTEWATER
TREATMENT PLANT (WWTP), EWA, OAHU, HAWAII
TAX MAP KEY: 9-1-12: 26 AND 9-1-13: 7

Thank you for the opportunity to comment. We suggest the following:

In the introduction, a brief description of the difference between primary treatment and secondary treatment might be in order.

If you have any questions, please contact Bennett Mark of our staff at 527-5038.

Very truly yours,

John P. Whalen
JOHN P. WHALEN
Director of Land Utilization

JPW:s1
1250B

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

850 SOUTH KING STREET
HONOLULU, HAWAII 96813



ALFRED J. THIEDE
DIRECTOR AND CHIEF ENGINEER

ENV 87-145

FRANK F. FASI
MAYOR

September 1, 1987

MEMORANDUM

TO: JOHN P. WHALEN, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM: ALFRED J. THIEDE, DIRECTOR AND CHIEF ENGINEER

SUBJECT: SUPPLEMENTARY EISPN FOR UNIT 2, HONOULIULI WWTP

We are responding to your memorandum LU7/87-3991(BWM) dated August 28, 1987, commenting on the subject EISPN.

As your office has suggested, the difference between primary treatment and secondary treatment will be discussed in the introduction of the draft EIS.

Alfred J. Thiede
ALFRED J. THIEDE
Director and Chief Engineer

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

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FRANK F. ASKE
 DIRECTOR

MIKE MOON
 DIRECTOR
 ROBERT MYAGATO
 DEPUTY DIRECTOR

September 2, 1987

MEMORANDUM

TO: Alfred J. Thiede, Director and Chief Engineer
 Department of Public Works

FROM: Mike Moon

SUBJECT: Supplemental Environmental Impact Statement
 Preparation Notice for Unit 2
 Honolulu Wastewater Treatment Plant
 Tax Map Key: 9-1-12: 26; 9-1-13: 7

Thank you for the opportunity to comment on the subject draft EIS.

We understand that the treatment capacity of the proposed plant will be increased from 25 mgd to 51.0 mgd and will accommodate the 2005 resident population of 269,400.

The proposal will be designed and constructed to provide adequate sewer capacity and will minimize health hazards, maintenance costs and related adverse effects. We believe the project is a necessary one whose long-term benefits far outweigh the inconveniences.

We support the proposal.

Robert Myagato
 for MIKE MOON
 Director

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

690 SOUTH KING STREET
 HONOLULU, HAWAII 96813



FRANK F. ASKE
 DIRECTOR

ALFRED J. THIEDE
 DIRECTOR AND CHIEF ENGINEER
 RMY 87-157

September 8, 1987

MEMORANDUM

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

FROM: ALFRED J. THIEDE, DIRECTOR AND CHIEF ENGINEER

SUBJECT: SUPPLEMENTAL EISEN FOR UNIT 2, HONOLULU WWTPL

We received your comments on the subject EISPN by memorandum dated September 2, 1987.

One of the alternatives that is being considered is the expansion of the plant capacity to 51.0 mgd for the 2020 population. Since the current planning period extends only to the year 2005, coinciding with the Department of Business and Economic Development and the Department of General Planning's residents population projections, a 2020 resident population projection for the service area cannot be ascertained.

Only if there are overriding reasons based on "economies of scale", or the enlargement of the service area will this alternative be selected.

The alternative to expand the plant capacity to 38 mgd to serve an estimated resident population of 269,400 at the year 2005 appears to be the most promising at this time. However, no decision on the recommended alternative will be made now.

Alfred J. Thiede
 ALFRED J. THIEDE
 Director and Chief Engineer

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



875124

FRANK F. FASI, Mayor
DONNA B. GOCH, Chairman
ERNEST A. WATARI, Vice Chairman
MILTON J. AGADER
SISTER M. DAULYN AH CHICK, O.S.F.
EDWARD Y. HIRATA
ALFRED J. THIEDE
EDWARD Y. HIRATA
ALFRED J. THIEDE
WUWIKI
WUWIKI
KAZU HAYASHIDA
Manager and Chief Engineer

August 4, 1987

TO: ALFRED J. THIEDE, DIRECTOR AND CHIEF ENGINEER
DEPARTMENT OF PUBLIC WORKS

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

SUBJECT: YOUR MEMORANDUM OF JULY 29, 1987 ON THE SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE FOR UNIT 2, HONOLULU WASTEWATER TREATMENT PLANT (TMR: 9-1-12: 26, 9-1-13: 7)

Thank you for the opportunity to review and comment on the proposed expansion at the Honouliuli Wastewater Treatment Plant.

The project is not anticipated to have significant impacts to potable groundwater resources and to our water system facilities in the area.

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

Lawrence Whang
for KAZU HAYASHIDA

TO
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DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

630 SOUTH KING STREET
HONOLULU, HAWAII 96813



FRANK F. FASI
Mayor

ALFRED J. THIEDE
DIRECTOR AND CHIEF ENGINEER
ENV 87-127

August 6, 1987

MEMORANDUM

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

FROM: ALFRED J. THIEDE, DIRECTOR AND CHIEF ENGINEER

SUBJECT: SUPPLEMENTARY EISP FOR UNIT 2, HONOLULU WTP

We acknowledge receipt of your memorandum dated August 4, 1987, concerning the subject matter.

Alfred J. Thiede
ALFRED J. THIEDE
Director and Chief Engineer

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

AUG 19 10 59 AM '87



FRANK F. FABI
MAYOR

DONALD A. CLEGG
CHIEF PLANNING OFFICER
GENE CONNELL
DEPUTY CHIEF PLANNING OFFICER

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Alfred J. Thiede, Director and Chief Engineer
Department of Public Works
Page 2
August 18, 1987

If you have any questions, call Keith Kurahashi at extension 6051.

KK/DOP 7/87-2580

AUGUST 18, 1987

Donald Clegg
DONALD A. CLEGG
Chief Planning Officer

MEMORANDUM

TO: ALFRED J. THIEDE, DIRECTOR AND CHIEF ENGINEER
DEPARTMENT OF PUBLIC WORKS

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

SUBJECT: SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT
PREPARATION NOTICE (EISP/N) FOR UNIT 2, HONOLULU
WASTEWATER TREATMENT PLANT (WWTP), EWA, OAHU, HAWAII
(TRM MAP KEY: 9-1-12: 25, 9-1-13: 7)

We have the following comments to offer on the supplemental EISP/N for Unit 2, Honouliuli WWTP in Ewa:

1. The acreage, housing units and resident population figures on pages II-15 to II-24 and II-30 should be updated. Please contact Mr. Steve Young at extension 6080 in our Planning Information Branch for assistance.
2. Alternative D would be consistent with the present Development Plan Land Use and Public Facilities Map for Ewa and the Land Use Map for Central Oahu.
3. Alternative E may be acceptable if the economic savings of overizing the plant capacity can be shown. The time value of money should be considered in the evaluation of construction and operating cost savings. This would meet the objective of fiscal responsibility in the Government Operations and Fiscal Management section of the General Plan.
4. The General Plan was recently amended to allow growth of an additional 2% of the islandwide population (19,000 persons) in the Ewa or Primary Urban Center areas when supported by economic development (jobs). If the additional population growth were placed in Ewa, then an increase in capacity may be needed for the Honouliuli Plant.

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

680 SOUTH KING STREET
HONOLULU, HAWAII 96813



FRANK P. FINE
DIRECTOR

Donald A. Clegg

-2-

August 27, 1987

19,000 population was assigned to the Ewa DP area, the preliminary required plant capacity for the year 2005 will be increased to 38.32 mgd. This will exceed the proposed plant capacity of 38 mgd by less than one percent.

ALFRED J. THIEDE
DIRECTOR AND CHIEF ENGINEER

ENV 87-141

August 27, 1987

MEMORANDUM

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

FROM: ALFRED J. THIEDE, DIRECTOR AND CHIEF ENGINEER

SUBJECT: SUPPLEMENTAL EISEN FOR UNIT 2, HONOLULU WTP

Alfred J. Thiede
ALFRED J. THIEDE
Director and Chief Engineer

We are responding to your memorandum KK/DGP 7/87-2580 dated August 18, 1987, commenting on the subject EISEN.

1. Table II-2, Wastewater Flows Generated By Ongoing, Approved and Proposed Developments; and Table II-3, Tributary Population and Average Flow will be updated as needed with the assistance of your Planning Information Branch.
2. Alternative "D", the plan to expand the plant capacity to 38 mgd for a 2005 General Plan population of 269,400 appears to be the most logical choice at this stage of the planning process.
3. A comparative evaluation of present worth costs of construction, and operation/maintenance between alternatives "D" and "E" has not been developed. If there are economic savings based on present worth costs, availability of funds, and no adverse secondary impacts, alternative "E" may become the preferred choice. However, no selection will be made at this time on the recommended alternative.
4. Resolution No. 87-211 dated June 24, 1987, amending the 1982 General Plan does allow growth of an additional two percent of the islandwide population (19,000 persons) in the Ewa or Primary Urban Center DP areas to support the area's business or economic development. If the entire

816971

DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU

630 SOUTH KING STREET
HONOLULU, HAWAII 96813



DIV OF
WASTEWATER
MANAGEMENT

FRANK P. PAXI
MAYOR

RECEIVED

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU

1435 SOUTH BERTRAMA STREET
HONOLULU, HAWAII 96814 - AREA CODE (808) 534-3111



DIV OF
WASTEWATER
MANAGEMENT

HIRAM K. KAMAKA
DIRECTOR

815561

DOUGLAS G. GIBB
CHIEF
HARRDEN DEPARTMENT
DEPUTY CHIEF

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AUGUST 13, 1987

AUGUST 20, 1987

TO: ALFRED J. THIEDE, DIRECTOR AND CHIEF ENGINEER
DEPARTMENT OF PUBLIC WORKS

FROM: HIRAM K. KAMAKA, DIRECTOR

SUBJECT: SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE (ESPN)
FOR UNIT 2, WASTEWATER TREATMENT PLANT, HONOLULU, EWA, OAHU
TAX MAP KEY 9-1-12: 26 AND 9-1-13: 7

TO: ALFRED J. THIEDE, DIRECTOR AND CHIEF ENGINEER
DEPARTMENT OF PUBLIC WORKS

FROM: DOUGLAS G. GIBB, CHIEF OF POLICE
HONOLULU POLICE DEPARTMENT

SUBJECT: SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT
PREPARATION NOTICE (EISPN) FOR UNIT 2, HONOLULU
WASTEWATER TREATMENT PLANT (WWTP), EWA, OAHU,
HAWAII (TAX MAP KEY: 9-1-12:26, 9-1-13:7)

We have no concerns or comments to offer to the Supplemental Environmental Impact Statement Preparation Notice for the Wastewater Treatment Plant in Honolulu, Ewa, Oahu, Hawaii.

Thank you for the opportunity to review and comment on the EIS.

Hiram K. Kamaka
HIRAM K. KAMAKA, Director

HKK:e1

We have reviewed the Supplemental Environmental Impact Statement for Unit 2 of the Honolulu WWTP, and we find nothing in it that requires comment.

Douglas G. Gibb
DOUGLAS G. GIBB
Chief of Police

875404

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



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FRANK F. PARI
DIRECTOR

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DIV. OF
WASTEWATER
MANAGEMENT

WAM
JOHN E. HIRTEN
DIRECTOR
JOSEPH M. MAGALLO, JR.
DEPUTY DIRECTOR

TE-6076
PL1-0744

August 14, 1987

MEMORANDUM

TO: ALFRED J. THIEDE, DIRECTOR AND CHIEF ENGINEER
DEPARTMENT OF PUBLIC WORKS

FROM: JOHN E. HIRTEN, DIRECTOR

SUBJECT: SUPPLEMENTAL ENVIRONMENTAL STATEMENT
FOR UNIT 2, HONOLIULI TREATMENT PLANT
DNR: 9-1-12: 26, 9-1-13: 7

This is in response to your July 29, 1987 memorandum.
We have no comments regarding this project.

John E. Hirten
JOHN E. HIRTEN

Hawaiian Electric Company, Inc. • PO Box 2750 • Honolulu, HI 96840-0001

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August 17, 1987

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

850 SICHEN AND STREET
HONOLULU, HAWAII 96813



FRANK F. FASE
DIRECTOR

ALFRED J. THIEDE
DIRECTOR AND CHIEF ENGINEER
ENV 87-150

September 3, 1987

Mr. Alfred J. Thiede
Department of Public Works
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Mr. Brenner Murgel, Ph.D., P.E.
Manager
Environmental Department
Hawaiian Electric Company, Inc.
P. O. Box 2750
Honolulu, Hawaii 96840-0001

Dear Mr. Thiede:

Subject: Supplemental Environmental Impact Statement Preparation Notice (EISP) for Unit 2, Honolulu Wastewater Treatment Plant (WWTP), Ewa, Oahu, Hawaii

We have reviewed the subject EISP and have the following comments:

1. The existing HECO substation serving the wastewater treatment facility has an existing load of 1 MVA and an overall capacity of 5 MVA. When the second increment to the wastewater plant is added, additional 1 MVA will be required which is well below the 5 MVA capacity.
2. The substation is presently served by only one 46 KV line. If this second increment of load should require the additional service reliability of another 46 KV line, then it would have to be included in the EIS.
3. There are no existing transmission facilities in this area. However, the proposed Waiau-CIP 138 KV line routing may have an impact on this project.

Sincerely,

Brenner Murgel

An HEI Company

Dear Dr. Murgel:

Subject: Supplemental EISP for Unit 2, Honolulu WWTP

Your letter of August 17, 1987, was received, commenting on the subject EISP. We respond to your comments as follows:

1. The existing HECO substation at the plant site was originally designed to provide power for a 25 mgd secondary treatment plant for Unit 1, and 51 mgd for the ultimate capacity. So it is not surprising that the present power load from the existing primary plant at the flow of 21 mgd is much less than originally expected. Unit 2 will continue to provide primary treatment, and the total load should be about twice the present load of one MVA or less.
 2. Originally, two 46 KV feeder lines were planned to serve the plant; one 46 KV line from Ewa Village at the northern boundary, and the second from Geiger Road at the south. The second 46 KV line from Geiger Road and a second transformer were not constructed during the construction of Unit 1 because of the cost constraints. In addition, it was thought the one 46 KV line was sufficient to serve a primary plant; however, two lines would have been desirable for a secondary plant. Also, the outage record of the Ewa Beach substation indicated that interruptions were highly unlikely or would be of short duration.
- A second 46 KV feeder line for Unit 2 may be constructed for added reliability, but the actual needs have not been determined yet because no advanced design work has been initiated.

TABLE II - 2 (Cont'd.)

WASTEWATER FLOWS GENERATED BY ONGOING, APPROVED AND PROPOSED DEVELOPMENTS
BY TRIBUTARY AREAS
(Source: DGP 1986, DPW Files)

Developments	Year Start	Area (Acs)	No. of Housing Units	Resident- Population	Wastewater Generation (mgd)			
					1985-1990	1990-1995	1995-2000	2000-2005
<u>Mililani-Waipio Tributary Area</u>								
Hawaii Technology Park	N.A.	256	-	-	0.8500			
Mililani (Various)	1987	228	2,500	8,600		0.8600 ²		
Mililani (Mauka) ³	1992	1,200	6,600	21,000			2.7600	
TOTAL FOR TRIBUTARY AREA			9,100	29,600	0.8500	0.8600	2.7600	

81-II

1. Data not available (NA).
2. Based on 100 gpcpd and include normal infiltration and commercial establishment flows when not otherwise known.
3. Proposed Developments not designated on Development Plans.

TABLE II - 2 (Cont'd.)

WASTEWATER FLOWS GENERATED BY ONGOING, APPROVED AND PROPOSED DEVELOPMENTS
BY TRIBUTARY AREAS
(Source: DGP 1986, DPW Files)

Developments	Year Start	Area (Acs)	No. of Housing Units	Resident- Population	Wastewater Generation (mgd)			
					1985-1990	1990-1995	1995-2000	2000-2005
<u>Ewa Beach Tributary Area</u>								
Ewa Marina, Unit 1	1990		8,350	21,400	0.080 ¹			
6. Portion of Unit 2	1988	180	4,225	4,900	0.4900 ²	10.9760 ²	0.2690 ²	0.2000 ²
Ewa Beach (Various)	Ongoing	51	400	1,100	0.1100 ²			
Ewa Beach Sewer I.D.	Existing	882	N.A.	14,369	1.87			
Luhia	1991		1,815	3,300		10.1320 ²	0.1980 ²	
TOTAL FOR TRIBUTARY AREA			6,575	40,389	2.4700	11.7280	7.0620	0.2000

61-II

1. Data not available (NA).
2. Based on 100 gpcpd and include normal infiltration and commercial establishment flows when not otherwise known.
3. Proposed Developments not designated on Development Plans.

TABLE II - 2 (Cont'd.)

WASTEWATER FLOWS GENERATED BY ONGOING, APPROVED AND PROPOSED DEVELOPMENTS
BY TRIBUTARY AREAS
(Source: DCP 1986, DPW Files)

Developments	Year Start	Area (Ac)	No. of		Wastewater Generation (mgd)			
			Housing Units	Resident- Population	1985-1990	1990-1995	1995-2000	2000-2005
<u>Ewa Village</u>								
<u>Tributary Area</u>								
Fernandez Village	Ongoing	23	135	400	0.0400 ²			
Hoakea Expandable/ Elderly	Ongoing	22	241	700	0.0700 ²			
Honouliuli	Ongoing	55	350	1,000	0.1000 ²			
<i>Gentry-Ewa- Atcha- Stato</i>	<i>E 1988 -1987</i>	223	<i>17,781 -3,300</i>	<i>27,233 -9,900</i>	0.5250	<i>10.9750 8,8900</i>	0.8750	0.4484
Ewa Village	<i>1991 Existing</i>	N.A.	<i>1825 -376</i>	<i>7,300 -1,537</i>		<i>10.182 -1537</i>	0.4040	0.1440
Honouliuli	Existing	N.A.	N.A.	729		.0729		
<i>West Loch Hsg. Phase II³</i>	<i>N.A.</i>	<i>165.8</i>	<i>1,060</i>	<i>3,240</i>	0.3240 ²			
<i>Included on sheet II-17</i>								
TOTAL FOR TRIBUTARY AREA			<i>5,465</i>	<i>16,566</i>	<i>0.6340</i>	<i>2,1165</i>	<i>1.2790</i>	<i>0.5924</i>
			<i>11,412</i>	<i>40,602</i>	<i>1.0590</i>	<i>1,1299</i>		

1. Data not available (NA).
2. Based on 100 gpcpd and include normal infiltration and commercial establishment flows when not otherwise known.
3. Proposed Developments not designated on Development Plans.

TABLE II - 2 (Cont'd.)

WASTEWATER FLOWS GENERATED BY ONGOING, APPROVED AND PROPOSED DEVELOPMENTS
BY TRIBUTARY AREAS
(Source: DCP 1986, DPW Files)

Developments	Year Start	Area (Ac)	No. of		Wastewater Generation (mgd)			
			Housing Units	Resident- Population	1985-1990	1990-1995	1995-2000	2000-2005
<u>EWA Tributary Area</u>								
<i>Kapolei</i>								
<i>Ewa Town Center (A)</i>	<i>E 1988 -1995</i>	47.3			0.466	<i>0.0584</i>		
Commercial/Industrial		195.0	<i>1,900</i>	<i>7,600</i>		<i>0.656</i>	0.3196	
Residential			<i>81,200</i>	<i>4,800</i>				
<i>Kapolei</i>								
<i>Ewa Town Center (B)</i>	1995	50			0.560	<i>0.2550</i>		
Commercial		115.6	<i>1,100</i>	<i>4,400</i>		<i>0.374</i>		
Residential			<i>1,750</i>	<i>3,000</i>				
HMA ⁴ (Kapolei Village) ²	1989	600	<i>5,000</i>	<i>20,000</i>	<i>0.1938</i>	<i>0.6810</i>	0.4872	
			<i>14,000</i>	<i>16,024</i>		<i>1,700</i>		
TOTAL FOR TRIBUTARY AREA			<i>15,950</i>	<i>20,814</i>	<i>0.1938</i>	<i>2,7270</i>	<i>0.9506</i>	<i>10.3196</i>
			<i>8,000</i>	<i>32,900</i>		<i>2,7460</i>	<i>1,0200</i>	

1. Data not available (NA).
2. Based on 100 gpcpd and include normal infiltration and commercial establishment flows when not otherwise known.
3. Proposed Developments not designated on Development Plans.
4. Based on 85 gpcpd and include normal infiltration.

TABLE II - 2 (Cont'd.)

WASTEWATER FLOWS GENERATED BY ONGOING, APPROVED AND PROPOSED DEVELOPMENTS
BY TRIBUTARY AREAS
(Source: DGP 1986, DPM Files)

Developments	Year Start	Area (Acs)	No. of Housing Units	Resident- Population	Wastewater Generation (mgd)			
					1985-1990	1990-1995	1995-2000	2000-2005
Barbers Point Tributary Area								
West Beach Residential	1989	187	19,200	25,760 ¹	0.6581	11.3007 ²		
Commercial/Resort	1987	455	-	14,560	0.300	2376 ⁴		10.2309
Nanakai-Honokai	Existing	53	286	1,287		0.1094 ³		
JCIP Expansion	1988	1178	19,486	27047	0.9581	2.0852		
TOTAL FOR TRIBUTARY AREA			5,486	15,487	0.300	2.0221		0.2309

TI-22

1. Data not available (NA).
2. Based on 100 gpcpd and include normal infiltration and commercial establishment flows when not otherwise known.
3. Proposed Developments not designated on Development Plans.
4. Based on 85 gpcpd and include normal infiltration.

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

350 SOUTH KING STREET
HONOLULU, HAWAII 96813



ALFRED J. THROE
DIRECTOR AND CHIEF ENGINEER
ENV 87-176

September 23, 1987

Mr. Oswald K. Stender
Chief Executive Officer
The Estate of James Campbell
828 Fort Street Mall, Suite 500
Honolulu, Hawaii 96813-4380

Dear Mr. Stender:

Subject: Supplemental EISPN for Unit 2, Honolulu WWP

We are responding to your comments transmitted to this office by letter dated September 4, 1987.

1. Our preliminary schedule for Unit 2 calls for the completion of the facility in about five (5) years, assuming funding will be available.
2. Table II-2 of the EISPN include a tabulation of projected flows within 5-year time periods from developments by tributary areas. The developments consist of existing, ongoing, approved, and proposed developments. Approved developments are those that have been designated on the Development Plans (DPA) as of June 1986. Proposed developments have not been designated in the DPs as of June 1986.

Unless developments are approved, their population and flows have no relevancy in the design of the treatment plant. These developments are subject to modification during the approval processes and are listed for informational sake.

With regards to your specific changes to Table II-2, we offer the following explanations:

- a. Maipahu-Kunia Tributary Area (page II-17). The West Loch Estate Hsg., Phase I, and Gentry-Rosee are proposed developments that appear to be in the same area. The 420 units in West Loch Estate Hsg., Phase I, were derived from the EISPN for that project. Clarification is needed.

Mr. Oswald K. Stender

-2-

September 23, 1987

- b. Ewa Beach Tributary Area (page II-19). Portions of Ewa Beach Marina (Unit 1 and portion of Unit 2) will be served by the Ewa Beach sewers. Unit 2 is part of the Puuloa tributary area (page II-23) and will be served by a proposed separate sewer system. The number of housing units and population was derived from the project's EIS. We assume that the number of proposed housing units must be compatible to the EIS document. Department of General Planning's data showed a total of 4,900 housing units, the same as EIS sources.
- The Lusk Hawaii development was formerly called Puuloa Homes. The rezoning application for Puuloa Homes stated that 460 units would be constructed. Lusk Hawaii also appears to be a duplication of Ewa Beach (various). An ongoing project of 400 units on 51 acres as shown on page II-19. Clarification is needed to substantiate the higher 825 units for this development.

- c. Ewa Village Tributary Area (page II-20). West Loch Hsg., Phase II, is not part of the Waipahu-Kunia tributary area (page II-17) and is correctly shown on page II-20. The data were derived from the project's EISPN.

The sewer master plan for Ewa Plantation Development (Aloha State) showed a total of 2,140 housing units, including 1,640 units in the Ewa Village area. The number of units and population for Aloha State on page II-20 was derived from DGP files. These figures are substantially lower than the data you provided for Century-Ewa. Clarification is urgently needed because the design of existing and proposed sewers may be affected.

- d. Ewa Tributary Area (page II-21). The number of housing units for Kapolei (Ewa) Town Center (AEB) was obtained from the project's EISPN and modified by data from the engineering reports on the proposed West Beach Interceptor sewer. According to your data, the number of residential units will be reduced from 3,000 to 1,950 units; however, the acreage for commercial and commercial/industrial uses are being maintained. DGP's data are also different.

The number of housing units and population for MHA (Kapolei Village) was derived from the engineering report on the proposed West Beach Interceptor sewer. DGP's preliminary data indicate a population of 24,100 from 9,000 housing units. The State Housing Finance Development Corporation is currently preparing an EIS for the proposed development which will consist of a total of 4,905 residential units which is the same as your data.

- e. Barbers Point Tributary Area (page II-22). The number of housing units and population for West Beach was derived from the project's EIS and the engineering report for the proposed West Beach Interceptor sewer. Housing units and population do not include hotel units and visitor population. Incremental flows are different because of project phasing but total flows are the same.

Mr. Oswald K. Stender

-3-

September 23, 1987

The JCIP Expansion was never considered a part of the Hanouliuli tributary area.

3. The current General Plan projected population for the Ewa DPs area is 83,996 residents for the year 2005. This projected population together with the General Plan projections to other tributary areas in the Central Oahu and Primary Urban Center DP area is being used in the design of the Hanouliuli WUPP. In June 1987, the General Plan's distribution of residential population was amended to permit a two percent (2%) adjustment to the population of the Ewa and Primary Urban Center DP areas to support an area's business or economic development. If the entire 2% increase was placed in Ewa, the General Plan projected population for the year 2005 will increase by 19,000 residents to 102,996 people.
4. The Ewa Water Master Plan (Revised) which was attached to your letter was informative.
5. The Department of General Planning is currently assisting us in updating the data in Table II-2. Your comments will assist us in the preparation of the revision.

Very truly yours,


ALFRED J. THIEDE
Director and Chief Engineer

cc: Department of General Planning

THE ESTATE OF JAMES CAMPBELL

November 17, 1987

RECEIVED
OFFICE OF PUBLIC WORKS

NOV 17 1987

Mr. Alfred J. Thiede
Department of Public Works
City and County of Honolulu
650 South King Street
Honolulu, HI 96813

Dear Mr. Thiede:

Supplemental EISPN for Unit 2
Honouliuli WWTP

This is in response to your letter of September 23, 1987, in which you provided explanations to our comments on Table II-2 contained in our letter of September 4, 1987. We apologize for the delay in responding to your questions and again appreciate the opportunity to comment further.

We offer the following comments and clarifications to your explanation of Table II-2, Pages II-17, 19, 20, 21, 22, and 23.

a. Waipahu-Kunia Tributary Area (Page II-17).

Page II-17 is correct as presented in the EISPN. The number of housing units for West Loch Estate housing, Phase I, is 420. Gentry-Hoaeae is actually the same as West Loch Estate housing, Phase II, and is shown on Page II-20.

b. Ewa Beach Tributary Area (Page II-19).

Explanation of tributary areas clarifies the distribution of Ewa Beach Marina. The number of housing units (1,225) shown on Page II-19 is an acceptable figure for Unit 1 and a portion of Unit 2. The remainder of Unit 2, Page II-23, would appear to be 4,125 housing units. This data was obtained from the developer, MSM & Associates.

Lusk Hawaii.

It is recognized that Lusk Hawaii and Ewa Beach (various) could be a duplication. However, the developer for Lusk Hawaii has advised that the total number of housing units is 825. By accepting the Ewa Beach (various) as part of Lusk, an additional 425 housing units should be shown on Page II-19 for Lusk Hawaii.

Mr. Alfred J. Thiede
November 17, 1987
Page 2

c. Ewa Village Tributary Area (Page II-20).

The clarification for (a), Page II-17, also applies to Page II-20. The West Loch Estate housing, Phase II, is acceptable as shown.

Gentry Ewa (Ewa Plantation Development).

For clarification, the developer, Gentry, has provided the number of housing units: 7,781. It is understood that an EIS is currently being prepared. Ewa Village is not included in the Gentry-Ewa development. The number of housing units is 1,825. This is a Campbell Estate number used for anticipated development in the Ewa Village area. Another Campbell Estate planned development in this tributary area is termed "Golf Course Residential." The number of housing units projected is 600, beginning in 1989.

d. Ewa Tributary Area (Page II-21).

The number of housing units was reduced by Campbell Estate. The acreage for commercial and commercial/industrial has been revised upward to account for the reduction in residential units.

HHA (Kapolei Village).

The number of housing units, 4,006, is agreed.

e. Barbers Point Tributary Area (Page II-22).

Page II-22 of the EIS is correct. The number of housing units for West Beach should be 5,200 as shown.

JCIP Expansion.

The JCIP expansion should be included since it is planned by Campbell Estate, and should be shown in one of the tributary areas. The expansion area, 679 acres, includes 375 acres for JCIP, 144 acres for the Deep Draft Harbor, 40 acres for the Camp Malakole Industrial Subdivision, and 120 acres for the Amfac Visitor Attraction.

Mr. Alfred J. Thiede
 November 17, 1987
 Page 3

Pages II-17, 19, 20, 21, 22, and 23 are resubmitted with appropriate comments or clarifications.

Please feel free to contact us if you have any questions.

Sincerely,



O. K. Stender
 Chief Executive Officer

dr:28371

TABLE II - 2 (Cont'd.)

WASTEWATER FLOWS GENERATED BY ONGOING, APPROVED AND PROPOSED DEVELOPMENTS
 BY TRIBUTARY AREAS
 (Source: DGP 1986, DPW Files)

Developments	Year Start	Area (Acs)	No. of Housing Units	Resident- Population	Wastewater Generation (mgd)			
					1985-1990	1990-1995	1995-2000	2000-2005
<u>Ewa Beach</u>								
<u>Tributary Area</u>								
✓ Ewa Marina, Unit 1 & Portion of Unit 2	90 1988	180	1,225	4,900	0.4900 ²			
✓ Ewa Beach (Various)	Ongoing	51	400	1,100	0.1100 ²			
II-19 Ewa Beach Sewer I.D.	Existing	882	N.A.	14,369	1.87			
Lush Hawaii	1996		415					
TOTAL FOR TRIBUTARY AREA				20,369	2.4700			

1. Data not available (NA).
2. Based on 100 gpcpd and include normal infiltration and commercial establishment flows when not otherwise known.
3. Proposed Developments not designated on Development Plans.

TABLE II - 2 (Cont'd.)

WASTEWATER FLOWS GENERATED BY ONGOING, APPROVED AND PROPOSED DEVELOPMENTS
BY TRIBUTARY AREAS
(Source: DGP 1986, DPW Files)

Developments	Year Start	Area (Acs)	No. of Housing Units	Resident- Population	Wastewater Generation (mgd)			
					1985-1990	1990-1995	1995-2000	2000-2005
<u>Ewa Village</u>								
<u>Tributary Area</u>								
Fernandez Village	Ongoing	23	135	400	0.0400 ²			
Hoakoa Expandable/ Elderly	Ongoing	22	241	700	0.0700 ²			
Honouliuli	Ongoing	55	350	1,000	0.1000 ²			
<i>Century-Ewa</i> <i>Aloha State</i>	<i>88</i> 1987	223	<i>7,781</i> 2,300	8,900		0.8900 ²		
Ewa Village	Existing	N.A.	<i>1,815</i> 370	1,537		.1537 ²		
<i>Golf Course Residential</i> Honouliuli	<i>1989</i> Existing	N.A.	<i>600</i> N.A.	729		.0729		
West Loch Hsg. Phase II ³ <i>Century Ewa</i>	N.A.	165.8	1,080	3,240	0.3240 ²			
TOTAL FOR TRIBUTARY AREA			5,484	16,406	0.5340	1.1166		

1. Data not available (NA).
2. Based on 100 gpcpd and include normal infiltration and commercial establishment flows when not otherwise known.
3. Proposed Developments not designated on Development Plans.

TABLE II - 2 (Cont'd.)

WASTEWATER FLOWS GENERATED BY ONGOING, APPROVED AND PROPOSED DEVELOPMENTS
BY TRIBUTARY AREAS
(Source: DGP 1986, DPW Files)

Developments	Year Start	Area (Acs)	No. of Housing Units	Resident- Population	Wastewater Generation (mgd)			
					1985-1990	1990-1995	1995-2000	2000-2005
<u>EWA Tributary Area</u>								
<i>Kapolei</i> Ewa Town Center (A)	<i>89</i> 1995	<i>110.9</i> 42.3	<i>1,200</i> 1,000	7,600		0.486	0.656 ⁴	
Commercial/Industrial Residential		<i>143.0</i> 195.0						
<i>Kapolei</i> Ewa Town Center (B)	<i>89</i> 1995	<i>68.5</i> 50	<i>700</i> 1,100	4,400		0.560	0.374 ⁴	
Commercial Residential		<i>115.0</i> 85.0						
HHA ³ (Kapolei) Village	1989	600	<i>4,000</i> 5,000	20,000		1.700 ⁴		
TOTAL FOR TRIBUTARY AREA			8,000	32,000	2.7460	1.0200		

1. Data not available (NA).
2. Based on 100 gpcpd and include normal infiltration and commercial establishment flows when not otherwise known.
3. Proposed Developments not designated on Development Plans.
4. Based on 85 gpcpd and include normal infiltration.

TABLE II - 2 (Cont'd.)

WASTEWATER FLOWS GENERATED BY ONGOING, APPROVED AND PROPOSED DEVELOPMENTS
BY TRIBUTARY AREAS
(Source: DCP 1986, OPW Files)

Developments	Year Start	Area (Acs)	No. of Housing Units	Resident- Population	Wastewater Generation (mgd)			
					1985-1990	1990-1995	1995-2000	2000-2005
<u>Barbers Point</u>								
<u>Tributary Area</u>								
West Beach								
Residential	1989	107	5,200	14,560				1.2376 ⁴
Commercial/Resort	1987	455	-	-	0.300			.6751
Nanakai-Honokai	Existing	53	286	1,287				0.1094 ⁴
WLP Expansion		<u>679</u>						
TOTAL FOR TRIBUTARY AREA			5,486	15,847	0.300			2.0221

1. Data not available (NA).
2. Based on 100 gpcpd and include normal infiltration and commercial establishment flows when not otherwise known.
3. Proposed Developments not designated on Development Plans.
4. Based on 85 gpcpd and include normal infiltration.

TABLE II - 2 (Cont'd.)

WASTEWATER FLOWS GENERATED BY ONGOING, APPROVED AND PROPOSED DEVELOPMENTS
BY TRIBUTARY AREAS
(Source: DCP 1986, OPW Files)

Developments	Year Start	Area (Acs)	No. of Housing Units	Resident- Population	Wastewater Generation (mgd)			
					1985-1990	1990-1995	1995-2000	2000-2005
<u>Makakilo City</u>								
<u>Tributary Area</u>								
Makakilo Expansion	Ongoing	490	3,700	9,900	0.9900 ²			
<u>Puuloa Tributary Area</u>								
Ewa Marina, Unit 2	90 1988	556	3,578 4,257	10,100				1.1760

1. Data not available (NA).
2. Based on 100 gpcpd and include normal infiltration and commercial establishment flows when not otherwise known.
3. Proposed Developments not designated on Development Plans.

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APPENDIX C

LETTERS OF COMMENTS AND RECOMMENDATIONS
RECEIVED ON THE DRAFT EIS TOGETHER WITH
RESPONSES WHERE APPROPRIATE



DEPARTMENT OF THE ARMY
 U. S. ARMY ENGINEER DISTRICT, HONOLULU
 BUILDING 220
 FT. SHAFTER, HAWAII 96888 -5440

884970

MAY 3, 1988

ENCL
 y9 WDM

REF: TO
 ATTENTION OF:

Planning Branch

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

Dear Dr. Miura:

Thank you for the opportunity to review the Draft Supplemental Environmental Impact Statement (DSEIS) for the proposed Honolulu Wastewater Treatment Plant, Unit 2, Honolulu, Ewa, Oahu. Appendix B of the DSEIS incorporates our earlier review comments on this project. We have no additional comments at this time.

Sincerely,

ORIGINAL SIGNED MAY 0 5 1988

Clarence Fujii
 Acting Chief, Engineering
 Division

Copy Furnished:

Mr. Alfred J. Thiede, Director
 Department of Public Works
 City and County of Honolulu
 650 South King Street
 Honolulu, HI 96813



DEPARTMENT OF THE NAVY
 OFFICE OF THE ASSISTANT BASE ENGINEER
 209 29th Street, Honolulu, HI 96800-5000

882057

WUM 7/2/88
 4/6-ENV meet refer to (P.12)

5090 (248)
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24 MAR 1988

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

Mr. John P. Whalen, Director
 Department of Land Utilization
 City and County of Honolulu
 650 South King Street
 Honolulu, HI 96813

Dear Sirs:

DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT
 PROPOSED HONOLULUI WASTEWATER TREATMENT PLANT, UNIT 2

The Draft Supplemental Environmental Impact Statement for the Proposed Honolulu Wastewater Treatment Plant, Unit 2 has been reviewed and we have no comments to offer. Since we have no further use for the EIS, it is being returned to the Office of Environmental Quality Control.

Thank you for the opportunity to review the Draft.

Sincerely,

W. E. ERF

W. E. ERF
 Assistant Base Civil Engineer
 In Direction of
 The Commander

Enclosure

Copy to:
 Mr. Alfred J. Thiede, Director
 Department of Public Works
 City and County of Honolulu
 Honolulu, Hawaii 96813



United States Department of the Interior

BUREAU OF PUBLIC WORKS AND WILDLIFE SERVICE

465 SOUTH KING STREET, ROOM 104
 HONOLULU, HAWAII 96813

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 ROOM 6307

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

Re: Supplemental EIS for Proposed Honolulu Wastewater Treatment Plant, Unit 2, Honolulu, Ewa, Oahu

Dear Dr. Miura:

We have completed our review of the referenced document and find that it has adequately addressed fish and wildlife resources concerns within our jurisdiction.

No appreciate this opportunity to comment.

Sincerely yours,

Ernest Kosaka

Ernest Kosaka, Field Supervisor
 Office of Environmental Services
 Pacific Islands Office

cc: DLU, C&C of Honolulu
 Dept. of Public Works, C&C of Honolulu

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 DEPARTMENT OF THE NAVY



Save Energy and You Serve America!

UNITED STATES
DEPARTMENT OF
AGRICULTURE

SOIL
CONSERVATION
SERVICE

P. O. BOX 50004
HONOLULU, HAWAII
96850

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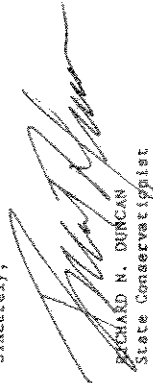
Dr. Marvin T. Miura, Director
Office of Environmental Quality Control
465 S. King St., Rm. 104
Honolulu, HI 96813

Dear Dr. Miura:

Subject: Supplemental EIS - Proposed Honolulu Wastewater Treatment
Plant, Unit 2, Honolulu, Ewa, Oahu

We have no comments to offer at this time, however, we would appreciate the
opportunity to review the final EIS.

Sincerely,



RICHARD N. DUNCAN
State Conservationist

cc: Mr. Alfred J. Thieme, Director, Dept. of Public Works, City and County of
Honolulu, 650 S. King Street, Honolulu, HI 96813

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

550 SOUTH KING STREET
HONOLULU, HAWAII 96813



FRANK P. FAR
MAYOR

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ALFRED J. THIEDE
DIRECTOR AND CHIEF ENGINEER

In reply refer to:
ENV 88-128

May 12, 1988

Mr. Richard N. Duncan
State Conservationist
Soil Conservation Service
U.S. Department of Agriculture
P.O. Box 50004
Honolulu, Hawaii 96850

Dear Mr. Duncan:

Subject: Draft Supplemental Environmental Impact Statement
(DSEIS) for Unit 2, of the Honolulu Wastewater
Treatment Plant (WWTP)

We are responding to your letter dated May 3, 1988 regarding the
DSEIS for Unit 2, of the Honolulu WWTP.

A copy of the Final Supplemental EIS will be sent to you for your
information and files. Chapter 343, Hawaii Revised Statute (State
EIS Statute) does not provide for the public review of final EISs.

Very truly yours,


ALFRED J. THIEDE
Director and Chief Engineer

cc: OEQC
DLU

JOHN WAHNEE
GOVERNOR

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MAY 6 11 47 AM 1988

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4/11/88

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4/11/88

SUZANNE D. PETERSON
CHAIRPERSON, BOARD OF AGRICULTURE

ROBERT Y. TSUYENHIRA
ACTING DEPUTY
TO THE CHAIRPERSON

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

Mailing Address:
P. O. Box 22155
Honolulu, Hawaii 96822-0159



May 2, 1988

COPY

MEMORANDUM

To: Dr. Marvin T. Miura, Director
Office of Environmental Quality Control

Subject: Draft Supplemental Environmental Impact Statement
(DSEIS) for Proposed Honolulu Wastewater Treatment
Plant, Unit 2
Department of Public Works
City and County of Honolulu
TKW: 9-1-12: 28
9-1-13: 7
Area: 51.3 acres

The Department of Agriculture has reviewed the subject
DSEIS and has no comments to offer.

Thank you for the opportunity to comment.

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

Very truly yours,

Teuane Tomimaga

TEUANE TOMINAGA
State Public Works Engineer

MY:jk
cc: Mr. Alfred J. Thiede

cc: Mr. Alfred J. Thiede, Director
Department of Public Works

Mr. John P. Whalen, Director
Department of Land Utilization

Suzanne D. Peterson

for SUZANNE D. PETERSON
Chairperson, Board of Agriculture





DEPARTMENT OF BUSINESS AND ECONOMIC DEVELOPMENT

JOHN WAHIEZ GOVERNOR
ROGER A. ULVELING DIRECTOR
BARBARA KIM STANTON DEPUTY DIRECTOR
LESLIE S. MATSUDA DEPUTY DIRECTOR

HONOLULU, HAWAII 96813
TELEPHONE: 535-2100
FACSIMILE: 535-2100
MAILING ADDRESS: DEPT. OF BUSINESS AND ECONOMIC DEVELOPMENT
150 SOUTH KING STREET, HONOLULU, HAWAII 96813

862577

Ref. No. P-8282

April 18, 1988

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CIV. OF WASHINGTON
WASHINGTON

TO

APR 1 1988

Engineering Office

The Honorable Alfred J. Thiede
Director and Chief Engineer
Department of Public Works
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Thiede:

Subject: Draft Supplemental Environmental Impact Statement (EIS)
for Proposed Honolulu Wastewater Treatment Plant, Unit 2

We have reviewed the subject Draft Supplemental EIS with respect to the Hawaii Coastal Zone Management (CZM) Law, Chapter 205A, Hawaii Revised Statutes, and find that the concerns raised in our previous review of the EISPN for the project have been adequately addressed. We have no further comments to offer at this time.

Sincerely,
Roger A. Uiveling
Roger A. Uiveling

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

Dear Dr. Miura:

Supplemental EIS for Proposed Honolulu Wastewater Treatment Plant, Unit 2
Honolulu, Ewa, Oahu

Thank you for providing us the opportunity to review the above subject project.

We have no comments to offer at this time regarding this project.

Sincerely,

Jerry M. Matsuda
Major, Hawaii Air
National Guard
Contr & Engr Officer

Enclosure

cc: Mr. Alfred Thiede ✓

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Joseph K. Conant
Executive Director

TO: STATE OF HAWAII
Department of Business and Economic Development
Housing Finance and Development Corporation

P. O. BOX 17937
HONOLULU, HAWAII 96813

April 25, 1988

TO: 88:PLNG/1879JT

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

Dear Mr. Miura:

Re: Draft Supplemental Environmental Impact Statement
(EIS) for the Proposed Honolulu Wastewater
Treatment Plant, Unit 2

We have reviewed the subject draft EIS and have the following comment.

Phase I of the proposed Honolulu WTP expansion to 36.0 mgd is estimated to commence in 1990, with completion on or about 1994. How will further expansion (to the eventual capacity of 51.0 mgd) be phased? For example, will the phasing be coordinated with the projected development schedules of the approved and proposed housing projects such as Kapolei Village, Waikale, Gentry Soda Creek and West Loch Estates? Our concern is that housing development may not be able to proceed as scheduled if further expansion of the Honolulu WTP is delayed or on a slower timetable.

Sincerely,

JOSEPH K. CONANT
Executive Director

cc: Mr. Alfred J. Thiede, Director
Dept. of Public Works



88-2785

EJW/CL
4/29 WJW/M

Joseph K. Conant
Executive Director

STATE OF HAWAII
Department of Business and Economic Development
Housing Finance and Development Corporation

P. O. BOX 17937
HONOLULU, HAWAII 96813

April 25, 1988

TO: 88:PLNG/1879JT

Mr. John P. Whalen, Director
Department of Land Utilization
City and County of Honolulu
550 South King Street
Honolulu, Hawaii 96813

Dear Mr. Whalen:

Re: Draft Supplemental Environmental Impact Statement
(EIS) for the Proposed Honolulu Wastewater
Treatment Plant, Unit 2

We have reviewed the subject draft EIS and have the following comment.

Phase I of the proposed Honolulu WTP expansion to 36.0 mgd is estimated to commence in 1990, with completion on or about 1994. How will further expansion (to the eventual capacity of 51.0 mgd) be phased? For example, will the phasing be coordinated with the projected development schedules of the approved and proposed housing projects such as Kapolei Village, Waikale, Gentry Soda Creek and West Loch Estates? Our concern is that housing development may not be able to proceed as scheduled if further expansion of the Honolulu WTP is delayed or on a slower timetable.

Sincerely,

JOSEPH K. CONANT
Executive Director

cc: Mr. Alfred J. Thiede, Director
Dept. of Public Works

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

550 SOUTH KING STREET
HONOLULU, HAWAII 96813



FRANK F. FARI
MAYOR

ALFRED J. THRESE
DIRECTOR AND CHIEF ENGINEER

In reply refer to:
ENV 88-108

May 3, 1988

Mr. Joseph K. Conant
Executive Director
Housing Finance and Development Corporation
Department of Business and Economic Development
State of Hawaii
P.O. Box 17907
Honolulu, Hawaii 96817

Dear Mr. Conant:

Subject: Draft Supplemental Environmental Impact Statement (DSEIS)
for Unit 2, Honolulu Wastewater Treatment Plant (WWTP)

We are responding to your letter 88:PLAG/1879JT regarding the DSEIS for Unit 2 of the Honolulu WWTP.

Large wastewater regional plants, such as the Honolulu WWTP, are built incrementally for a planning period of 20 years. To the extent possible, the planning period coincides with the State DBED's 20-year population projection with some overlapping years. For example, Unit 1 of the Honolulu WWTP was designed for 25 million gallons per day (mgd) based on the 1970-1990 projected population of 179,000 people living in the tributary areas of the plant.

Phase 1 of Unit 2 will increase the plant capacity from 25 mgd to 38 mgd based on the 1985-2005 projected population of 269,400 people. The "designed" population of 269,400 is based on the Department of General Planning (DGP) population projection by Development Plan (DP) areas in the tributary area for the year 2005. The number of new housing units in approved proposed developments should be consistent with DGP population projection by DP areas.

Based on our current planning, Phase 2 of Unit 2 which will increase the plant capacity to 51.0 mgd will be constructed on or about the year 2005. If the population and the wastewater flow increase at a faster rate than projected, construction of Phase 2 can begin earlier. These scenarios, of course, are based on the assumption that City funds will be sufficient to fund the entire cost of the two construction phases.


Mr. Joseph K. Conant

-2-

May 3, 1988

If the State concern is the timely expansion of the Honolulu WWTP to serve its housing program in Ewa, one positive action it should consider is to assist the City in funding the construction of Phase 1 and 2 of Unit 2. These two phases are not eligible to receive Federal and State financial assistance under the provisions of Section 201 of the Federal Clean Water Act.

Very truly yours,


ALFRED J. THRESE
Director and Chief Engineer

cc: OEQC
DLU

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4/15 WJW/m



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JOHN WARREN
DIRECTOR OF HEALTH

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

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3374
HONOLULU, HAWAII 96811
April 11, 1988

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3374
HONOLULU, HAWAII 96811
April 11, 1988

IN REPLY, PLEASE REFER TO:
EPIH20

IN REPLY, PLEASE REFER TO:
EPIH20

MEMORANDUM

To: Mr. John P. Whalen, Director
Department of Land Utilization, City & County of Honolulu

From: Deputy Director for Environmental Health

Subject: Comments to Supplemental EIS for Proposed Honolulu Wastewater Treatment Plant, Unit 2

To: Dr. Marvin T. Miura, Director
Office of Environmental Quality Control

From: Deputy Director for Environmental Health

Subject: Comments to Supplemental EIS for Proposed Honolulu Wastewater Treatment Plant, Unit 2

Thank you for allowing us to review and comment on the subject EIS. We have no comments to make at this time.

Thank you for allowing us to review and comment on the subject EIS. We have no comments to make at this time.

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

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

cc: Mr. Alfred J. Thiede ✓

cc: Mr. Alfred J. Thiede ✓

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TO STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

P. O. BOX 521
HONOLULU, HAWAII 96805

APR 25 1988

DOC. NO.: 3235E
FILE NO.: 88-440

WILLIAM W. PATY, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
LIBERT K. LANDORAP
SECRETARY
AGRICULTURE DEVELOPMENT
AQUATIC RESOURCES
CONSERVATION AND
ENVIRONMENTAL AFFAIRS
CONSERVATION ENFORCEMENT
CONSERVATION ENFORCEMENT
FORESTRY AND WILDLIFE
HAWAIIAN HERITAGE
STATE PARKS
WATER AND LAND DEVELOPMENT

DR. MARVIN T. MIURA

APR 25 1988

3. The status of Barbers Point Archaeological District (site 80-12-2888) is not known. It has been determined to be eligible for inclusion on the National Register, a recognized category of significance.

Thank you for the opportunity to comment on this project.

Very truly yours,

William W. Paty
WILLIAM W. PATY, Chairperson
Board of Land and Natural Resources

cc: Honorable John P. Whalen
Honorable Alfred J. Thiede

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

850 SOUTH KING STREET
HONOLULU, HAWAII 96813



ALFRED J. THIEDE
DIRECTOR AND CHIEF ENGINEER

In reply refer to:
ENV 88-107

April 29, 1988

FRANK E. JAR
MAYOR

Mr. William W. Paty
Chairperson
Board of Land and Natural Resources
State of Hawaii
P. O. Box 521
Honolulu, Hawaii 96809

Dear Mr. Paty:

Subject: Draft Supplemental Environmental Impact Statement (DSIS) for the Proposed Honolulu Wastewater Treatment Plant (WWTP), Unit 2

We are responding to your letter (File No. 88-440) dated April 25, 1988, concerning the DSIS for Unit 2 of the Honolulu WWTP.

The archaeological review in Section 3, Item G, Pages III-4 and III-5, concerning historic sites has been revised to reflect the information you have provided us. We appreciate your comments.

Based on your evaluation, and our information on recent land surface grading, the construction of the proposed plant expansion should have "no effect" on significant historic sites. Nevertheless, should any historic relics be uncovered during excavation, construction will be halted, and the State Historic Preservation officer will be called.

Very truly yours,

Alfred J. Thiede
ALFRED J. THIEDE
Director and Chief Engineer

cc: OEGC
DLU

SUBJECT: Supplemental EIS for Proposed Honolulu Wastewater Treatment Plant, Unit 2; Ewa, Oahu

We have reviewed the document cited above and have the following comments to offer:

Given the history of recent land surface grading, we believe that the applicant is correct in stating that there are at present no remaining significant historic sites present in the project parcels. Thus, the project should have "no effect" on significant historic sites.

However, in the archaeological review (Item G., page III-4), there are several incorrect statements and assumptions which should be corrected in the Final EIS.

1. Site 146 as defined by McAllister (1933) clearly applies to all of the karst areas of the Ewa Plains. The stone walls near the Puuloa Salt Works were only one type of feature mentioned as an example. Other features, with which we are more familiar today, include the sink holes which have produced extinct avifaunal remains as well as evidence of occupation and agricultural use. The distribution of these features was not mapped in detail by McAllister. Thus, to indicate that "site 146" is located about 2-1/2 miles from the present project site is highly inaccurate.
2. The Oahu Railroad and Land Company right of way (site 80-12-9714) is not the only historic property in Ewa. Also present within the area is site 80-12-2873, the One'ula Archaeological District, which has been recommended to the National Register. This District is comprised of the 107 cultural features recorded by Davis (1979) which are mentioned on page III-5. One further site (80-12-2722) is listed on the Hawaii Register of Historic Places.



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Environmental Center
 University of Hawaii at Manoa

Environmental Center
 685 Waimanalo 317 • 2590 Campus Road
 Honolulu, Hawaii 96822
 Telephone (808) 948-7301

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Dr. Marvin Miura
 and Mr. John P. Whalen -2- May 9, 1988

We note that an additional sludge incinerator may be added (p. II-12). Since there is no quantitative analysis of air quality impacts associated with additional sludge incineration, either the Final EIS should include such an analysis or a supplemental statement should be required prior to installing an additional incinerator.

Thank you for the opportunity to comment on this Supplemental Draft EIS. We hope our comments will be helpful in preparing the final document.

Yours truly,
Jacquelin Miller
 Jacquelin Miller
 Associate Environmental Coordinator

cc: GEVC
 L. Stephen Lau
 Alfred J. Thiede, DPW ✓
 Steve Dollar
 Bertell Davis
 Yu-Si Fok
 Edwin Murabayashi
 Henry Gee
 Nancy Kanyuk

May 9, 1988
 RE:0497

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

Mr. John P. Whalen, Director
 Department of Land Utilization
 City and County of Honolulu
 650 South King Street
 Honolulu, Hawaii 96813

Dear Dr. Miura and Mr. Whalen:

Supplemental Draft Environmental Impact Statement
 Honolulu Wastewater Treatment Plant, Unit 2
 Honolulu, Ewa, Oahu

The Environmental Center has reviewed the above referenced Supplemental Environmental Impact Statement (SEIS) with the assistance of Bertell Davis, Anthropology; Steve Dollar, Hawaii Institute of Marine Biology; Yu-Si Fok, Edwin Murabayashi, and Henry Gee, Water Resources Research Center; and Nancy Kanyuk, Environmental Center. The project proposes the expansion of the treatment capacity of the existing Honolulu wastewater treatment plant (WWTP) from 25 million gallon per day (mgd) to 51 mgd, the Unit 2 master plan capacity.

Based on the information in the document, it appears that the proposed action will not cause any negative environmental alteration to the marine ecosystem. It is unfortunate, however, that the document does not include results of Dr. Steve Dollar's PhD dissertation, and of the EPA report prepared by Dr. Stephen Smith and Dr. Dollar entitled "Response of benthic ecosystems to deep ocean sewage outfalls in Hawaii: A nutrient cycling approach to biological impact assessment and monitoring, EPA Rpt. No. EPA/600/3-87/006 ERIN-NX02". The results presented in these documents describe the effects to benthic ecosystem nutrient dynamics in response to the Sand Island and Honolulu outfalls. These results would have strengthened the City and County's position of present impacts of the outfalls and expected impacts from the proposed expansion.

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

690 SOUTH KING STREET
HONOLULU, HAWAII 96813



FRANK P. PARK
MAYOR

Ms. Jacquelin Miller

-2-

May 18, 1988

Currently, the Department of Health is addressing the State sludge management strategy in response to EPA-proposed State Sewage Sludge Management Regulations. It is believed that sludge disposal requirements will be inserted into the permits already issued when they become up for renewal.

Because the sewage sludge program is in a period of transition, future plans for sludge disposal at all municipal treatment plants have been held in abeyance. Alternative systems being considered are landfilling, composting, and off-site codisposal incineration with municipal refuse with energy recovery.

If an incinerator is ever constructed in the future at the plant site, a quantitative analysis of air quality impact will be made and incorporated in a supplemental statement. Reference to a second incinerator will be deleted in the Final EIS.

Very truly yours,

Alfred J. Thiede

ALFRED J. THIEDE
Director and Chief Engineer

cc: /OEQC
DLU

In reply refer to:
ENV 88-129

ALFRED J. THIEDE
DIRECTOR AND CHIEF ENGINEER

May 18, 1988

Ms. Jacquelin Miller
Associate Environmental Coordinator
Environmental Center
University of Hawaii at Manoa
2550 Campus Road, Crawford 317
Honolulu, Hawaii 96822

Dear Ms. Miller:

Subject: Draft Supplemental Environmental Impact Statement (DSEIS)
for Unit 2 of the Honouliuli Wastewater Treatment Plant (WWTP)

We are responding to your letter RE: 0497 dated May 9, 1988, regarding the DSEIS for Unit 2 of the Honouliuli WWTP.

One of our references to the benthos at the Honouliuli discharge was Water Resource Research Center Special Report 4-02:87, "Benthic Infaunal Sampling Near Barbers Point Ocean Outfall, O'ahu, Hawaii" (Helson W.C., et al. 1987) which referred to Dr. Dollar's work on nutrient fluxes at the Sand Island and Barbers Point outfall (page 45). Although we were not able to obtain a copy of Dr. Dollar's complete dissertation during the preparation of the DSEIS, we are familiar with his work.

A future second sludge incinerator at the Honouliuli WWTP is premature. The existing incinerator was designed on the basis of secondary treatment and is expected to have sufficient capacity for the anticipated flows.

Currently, we are gathering information on alternative sludge disposal methods for the entire municipal systems in anticipation of the development of technical sludge standards by EPA under Section 405 of the Clean Water Act. The complete technical standards have not been developed or published yet by EPA to our knowledge. The sludge technical standards to be codified in 40 CFR Part 403 will specify limits on pollutants of concern in sewage sludge, and address the land application, landfilling, and incineration processes of disposal. Hence, the technical standards will affect previously planned alternative disposal systems.

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

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MAY 5, 1988

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DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

810 SOUTH KING STREET
HONOLULU HAWAII 96813



FORM NO. 7-72
JAN 1978

ALFRED J. THIEDE
DIRECTOR AND CHIEF ENGINEER

In reply refer to:
ENV 88-122

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

Dear Dr. Miura:


Subject: Draft Supplemental EIS for the Proposed Honolulu
Wastewater Treatment Plant, Unit 2, TMR: 9-1-12: 26;
9-1-13: 7

Thank you for allowing us to review and comment on the
proposed project.

The increase in the treatment capacity of the proposed plant
is not anticipated to affect potable groundwater resources or
our future water development plans for the area. We concur
with the steps proposed to conserve potable water by utilizing
non-potable water, where possible, for the operations of the
proposed plant.

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

Very truly yours,


KAZU HAYASHIDA
Manager and Chief Engineer

cc: Alfred J. Thiede

MEMORANDUM

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

FROM: ALFRED J. THIEDE, DIRECTOR AND CHIEF ENGINEER

SUBJECT: DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT (DSEIS)
FOR UNIT 2, HONOLULU WASTEWATER TREATMENT PLANT (WETP).

We are responding to your letter dated May 5, 1988 concerning the DSEIS for
Unit 2 of the Honolulu WETP.

Your comment that Unit 2 is not anticipated to affect potable groundwater
resources or Board of Water Supply's future water development plans for the
area is acknowledged.

The utilization of non-potable water for the sludge incinerator and other
in-plant activities will continue.


ALFRED J. THIEDE
Director and Chief Engineer

cc: OSEC
DLU/Attach.
bcc: WSP

DEPARTMENT OF GENERAL PLANNING
CITY AND COUNTY OF HONOLULU
 550 SOUTH KING STREET, 8TH FLOOR
 HONOLULU, HAWAII 96813 DEPT. OF PUBLIC WORKS

882620

EN/ud
4/22 WJOM



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DONALD A. CLEGG
 CITY PLANNING OFFICER
 GENE CONNELL
 DEPT. CHIEF PLANNING OFFICER

KK/DGP 3/88-1245

FRANK F. FARI
 DIRECTOR

April 20, 1988

MEMORANDUM

TO: JOHN P. WHALEN, DIRECTOR
 DEPARTMENT OF LAND UTILIZATION

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

SUBJECT: CHAPTER 343, HAWAII REVISED STATUTES
 DRAFT ENVIRONMENTAL IMPACT STATEMENT
 FOR THE PROPOSED HONOLULU WASTEWATER
 TREATMENT PLANT UNIT 2, EWA, OAHU

We have reviewed the subject Draft Environmental Impact Statement (EIS) and have found that the concerns we presented on the EIS Preparation Notice have been addressed.

Thank you for giving us an opportunity to comment on this matter.

Donald Clegg
 DONALD A. CLEGG
 Chief Planning Officer

cc: Department of Public Works
 DEQC

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PB 88-332

April 4, 1988

MEMO TO: JOHN P. WHALEN, DIRECTOR
 DEPARTMENT OF LAND UTILIZATION

FROM: HERBERT K. MURAKA
 DIRECTOR AND BUILDING SUPERINTENDENT

SUBJECT: DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT FOR
PROPOSED HONOLULU WASTEWATER TREATMENT PLANT UNIT 2

We have reviewed the Draft Supplemental Environmental Impact Statement for the proposed Honouliuli Wastewater Treatment Plant, Unit 2, and have no comments.

Thank you for the opportunity to review the document.

Herbert K. Muraka
 HERBERT K. MURAKA
 Director and Building Superintendent

TH:lo
 cc: Public Works Dept.
 J. Harada

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

DEPT. OF PUBLIC WORKS
650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 522-4181

MAY 11 10 30 AM '88



FRANK F. FAH
MAYOR

MIKE MOON
DIRECTOR
ROBERT HIFASATO
DEPUTY DIRECTOR

May 9, 1988

Mr. John P. Whalen, Director
Department of Land Utilization
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Whalen:

Subject: Draft Supplemental Environmental Impact Statement
for Unit 2, Honolulu Wastewater Treatment Plant

We have reviewed the subject Draft Supplemental Environmental
Impact Statement and support the development of the proposed
project.

Sincerely,

MIKE MOON
Director

cc: Mr. Alfred J. Thiede

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

DEPT. OF PUBLIC WORKS
650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 522-4181

MAY 11 10 30 AM '88



FRANK F. FAH
MAYOR

MIKE MOON
DIRECTOR
ROBERT HIFASATO
DEPUTY DIRECTOR

May 9, 1988

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

Dear Dr. Miura:

Subject: Draft Supplemental Environmental Impact Statement
for Unit 2, Honolulu Wastewater Treatment Plant

We have reviewed the subject Draft Supplemental Environmental
Impact Statement and support the development of the proposed
project.

Sincerely,

MIKE MOON
Director

cc: Mr. Alfred J. Thiede

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

880 SOUTH KING STREET
HONOLULU, HAWAII 96813



ALFRED J. THIEME
DIRECTOR AND CHIEF ENGINEER
In reply refer to:
ENV 88-108

May 3, 1988

DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU

880 SOUTH KING STREET
HONOLULU, HAWAII 96813 • (808) 533-4432



JOHN P. WHALEN
DIRECTOR
BERNARD S. LEE
DEPUTY DIRECTOR
88/EIS-2 (BWM)

April 28, 1988

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

Dear Dr. Miura:

Draft Supplemental Environmental Impact
Statement (EIS) for
Proposed Honolulu WTP, Unit 2
Honolulu, Ewa, Oahu, Hawaii
Tax Map Keys: 9-1-12: 26; 9-1-13: 7
March 1988

We have reviewed the Draft EIS for the proposed Honolulu WTP, Unit 2, and have no further comments to offer on the document's content.

We would appreciate being kept informed if a final decision is made by the U. S. Environmental Protection Agency on granting the City and County of Honolulu a variance from secondary treatment requirements of the Clean Water Act for wastewater discharge into the Pacific Ocean through the Honolulu WTP and outfall.

Very truly yours,

John P. Whalen
JOHN P. WHALEN
Director of Land Utilization

JPW:s1
17988

cc: DPW, Alfred J. Thieme

MEMORANDUM:

TO: JOHN P. WHALEN, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM: ALFRED J. THIEME, DIRECTOR AND CHIEF ENGINEER

SUBJECT: DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT (DSEIS) FOR
UNIT 2 OF THE HONOLULU WASTEWATER TREATMENT PLANT (WWTP)

We are responding to your memorandum [88/EIS-2(BWM)] dated April 28, 1988, regarding the subject DSEIS.

Upon receipt of a 301(h) NPDES Permit (Waiver of Secondary Treatment) for the Honolulu discharge from the U.S. Environmental Protection Agency, your office will be informed.

cc: DEQC

Alfred J. Thieme
ALFRED J. THIEME
Director and Chief Engineer

DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU

850 SOUTH KING STREET
HONOLULU, HAWAII 96813

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FRANK J. FERN
MAYOR

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5/11/88

HIRAH K. KAMAKA
DIRECTOR

WALTER M. SZABLA
DEPUTY DIRECTOR

May 11, 1988

Dr. Marvin I. Miura, Director
Office of Environmental Quality Control
State of Hawaii
485 South King Street, Room 104
Honolulu, Hawaii 96813

Dear Dr. Miura:

We have no concerns or comments to offer to the Supplemental Environmental Impact Statement for the Wastewater Treatment Plant in Honolulu, Ewa, Oahu, Hawaii.

Thank you for the opportunity to review and comment on the EIS.

Sincerely,

HIRAH K. KAMAKA, Director

HKK:el

cc: John Whalen, Department of Land Utilization
✓ Alfred Ihiede, Department of Public Works

copy in public works

DEPARTMENT OF TRANSPORTATION SERVICES
HONOLULU MUNICIPAL BUILDING
485 SOUTH KING STREET
HONOLULU, HAWAII 96813

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JOHN E. HIRTEN
DIRECTOR
JOSEPH N. HADALOU, JR.
DEPUTY DIRECTOR

ENVI 4/27 WUM

PL 1.1072
TE-2054

April 26, 1988

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

Dear Dr. Miura:

Subject: Honolulu Wastewater Treatment Plant - Unit 2
Draft Supplemental Environmental Impact Statement
TRK: 9-1-12: 26
9-1-13: 7

This is in response to your letter of March 22, 1988 requesting our comments on the above subject.

The area on both sides of the driveway at Geiger Road should be kept clear to provide sufficient sight distance for both egressing and ingressing of vehicles.

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

Yours truly,

[Signature]
(for) JOHN E. HIRTEN

cc: Department of Public Works
Department of Land Utilization

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



THOMAS F. FAH
MAYOR

ALFRED J. THIEDE
DIRECTOR AND CHIEF ENGINEER

In reply refer to:
ENV 88-106

April 29, 1988

MEMORANDUM

TO: JOHN E. HIRTEN, DIRECTOR
DEPARTMENT OF TRANSPORTATION SERVICES

FROM: ALFRED J. THIEDE, DIRECTOR AND CHIEF ENGINEER

SUBJECT: DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT (DSEIS) FOR
UNIT 2 OF THE HONOLULU WASTEWATER TREATMENT PLANT (WWTP)

We are responding to your letter (TE-2054) dated April 26, 1988, concerning the DSEIS for Unit 2, Honolulu WWTP.

The present landscaping at the driveway of the plant site on Geiger Road does not interfere with sight distance for both egressing and ingressing vehicles. There are no plans to alter the present landscape with tall shrubbery; e.g., oleanda, at the plant driveway.

[Signature]
ALFRED J. THIEDE
Director and Chief Engineer

cc: DEQC
DLU



EWA BEACH COMMUNITY ASSOCIATION
P.O. BOX 3, EWA BEACH, HAWAII 96786

884966

EN04
7/9 2/20/84

May 5, 1988

Mr. John P. Whalen, Director
Dept. of Land Utilization
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Sir:

I have reviewed the Supplemental EIS for the proposed Honolulu
Wastewater Treatment Plant, Unit 2.

1. I am concerned that the proposed increased discharge of waste in the West Manala Bay may affect Ewa Beach Park, Nimitz and Onueia Beaches as well as other recreational facilities under a 301 (b) permit. What measures will be taken if the discharge interferes with recreational activities in the area prior to the end of the five year permit?
2. The present odor control measures have not been effective in the past. I would like to be assured that better odor control technology will be installed when the plants capacity is increased.
3. I support the proposed increased capacity to 51.0 mgd; most CIP projects too often fall short of needs and must be expanded at a high cost, i.e., H-1 Freeway.

Sincerely,

Charles "Dick" Beamer, Ph.D.
President
Ewa Beach Community Association

cc: Mr. Alfred J. Thiede
Dr. Marvin T. Mura

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

850 SOUTH KING STREET
HONOLULU, HAWAII 96813



WARRANT F. CASE
DIVISION

ALFRED J. THIEDE
DIRECTOR AND CHIEF ENGINEER

In reply refer to:
EMW 88-127

May 11, 1988

Mr. Charles Beamer, Ph.D.
President
Ewa Beach Community Association
P.O. Box 3
Ewa Beach, Hawaii 96786

Dear Dr. Beamer:

Subject: Draft Supplemental Environmental Impact Statement (DSEIS) for
Unit 2 of the Honolulu Wastewater Treatment Plant (WWTP)

We are responding to your letter dated May 5, 1988, regarding the DSEIS for Unit 2 of the Honolulu WWTP.

1. Currently 28+ million gallons per day (mgd) of primary effluent is discharged into the receiving waters, approximately 9,000 feet off Onueia Beach Park. Under the worst case conditions with shoreward currents, the theoretical coliform concentration is about 2 organisms per 100 milliliter (2/100 ml), off Onueia Beach Park, well below the State criterion of 200/100 ml. The theoretical coliform at Ewa Beach Park and Nimitz Beach would be less because of the longer travel time from the area of discharge.

Since 1984, when primary effluent was being discharged, the average geometric means of fecal coliform bacteria was less than 2/100 ml within the zone of initial dilution (immediate discharge area). Based on this value, the beach parks will not be affected by the Honolulu discharge (see Figures V-14 and IV-15 and Table V-10 of the EIS and related text).

In the event the discharge interferes with recreational activities in the receiving waters, the effluent can be disinfected by standby chlorinators at the plant site. If the effluent does not meet the requirements of the 301(b) permit prior to the end of the 5-year permit period, the permit may not be renewed and secondary units may have to be constructed.

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April 26, 1988



Brenner Mungel, Ph.D., PE
Manager
Environmental Department
(808) 548-6880

May 11, 1988

Mr. Charles Beamer, Ph.D.

-2-

2. The odor control measures utilized at the existing Honolulu WTP consist of good housekeeping and treatment of odors collected within enclosures by activated carbon scrubbers. The activated carbon in the existing scrubbers requires frequent regeneration because of the higher than anticipated concentration of the inlet hydrogen sulfide. Hence, the scrubbers are currently not being operated at the most optimum level.

The existing scrubbers at the plant are planned to be replaced by two-stage scrubbers. The first stage will consist of a wet chemical scrubber, followed by the activated carbon scrubber operating as the polishing unit. The two-stage scrubbers will be more effective in reducing odor levels within the plant site than the current scrubbers.

3. Unit 2 of the Honolulu WTP will be constructed in two phases. Phase I will expand the plant's capacity to 38 mgd, sufficient to serve a de facto population of 279,200 people. The construction of phase II will take place about the year 2005 and increase the plant capacity to 51 mgd, sufficient to serve a de facto population of 402,000 people.

Very truly yours,

Alfred J. Thiede
ALFRED J. THIEDE
Director and Chief Engineer

cc: O&E
DLU

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

Subject: Draft Supplemental Environmental Impact Statement (EIS) for Proposed Honolulu Wastewater Treatment Plant, Unit 2, Honolulu, Ewa, Oahu

We have reviewed the above subject document and have no comments.

Sincerely,

Brenner Mungel

cc: Mr. John P. Whalen, Director
Dept. of Land Utilization

Mr. Alfred J. Thiede, Director
Dept. of Public Works

CITY AND COUNTY OF HONOLULU

690 SOUTH KING STREET
HONOLULU, HAWAII 96813



FRANK P. RAU
MAYOR

For Information

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5/9/88
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WWM

May 9, 1988

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

Dear Dr. Miura:

Subject: Supplemental EIS for Proposed Honolulu
Wastewater Treatment Plant, Unit 2

We have reviewed the subject EIS with particular attention to those sections addressing air quality impacts and have the following comments to offer.

The EIS indicates that "a second multiple hearth incinerator will be added in Unit II or at a later date" (p. II-6). The air quality impact analysis (pp. V-1 to V-7) presents a good description of the existing facility, odor sources, odor controls, etc., but fails to provide a detailed analysis of the anticipated impact of a new incinerator, either individually or cumulatively with the existing incinerator unit. There are no emissions estimates for pollutants regulated pursuant to federal or state law, nor are there ambient concentration estimates to demonstrate compliance with federal and state ambient air quality standards. If, in fact, a new stationary source of air pollution is being proposed in this action, then the failure to thoroughly analyze the impact is a serious omission and should be rectified before this EIS is accepted. Even if, as suggested on page II-6, the incinerator will be added at a later date, it should be assessed in this document since it is simply another phase in the overall expansion of the facility and such assessment is required by State EIS Rules (11-200-17(i)).

Thank you for providing the opportunity to review this draft EIS.

Sincerely yours,

Helene Takemoto
Chairman
Environmental Health Committee

HT:ct
L8623

cc: DOH
UR-Environmental Center

ALFRED J. THEIDE
DIRECTOR AND CHIEF ENGINEER

In reply refer to:
ENV 88-130

May 18, 1988

Ms. Helene Takemoto
Chairperson
Environmental Health Committee
American Lung Association of Hawaii
245 North Kukui Street
Honolulu, Hawaii 96817

Dear Ms. Takemoto:

Subject: Draft Supplemental Environmental Impact Statement (DSEIS)
for Unit 2 of the Honolulu Wastewater Treatment Plant (WWTP)

We are responding to your letter dated May 9, 1988, regarding the DSEIS of Unit 2 of the Honolulu WWTP.

A future second sludge incinerator at the Honolulu WWTP was under consideration at one time but is being deleted as part of Unit 2 since the need for one has not been established. Currently, the Division of Wastewater Management is reviewing its entire sludge management program in anticipation of the development of sludge technical standards by EPA under Section 405 of the Clean Water Act. Under the technical standards, still to be established in 40 CFR Part 503, EPA will specify limits on pollutants of concern in sewage sludge, and address the land application, landfilling, and incineration process of disposal. Under the circumstances, future plans for sludge disposal at all municipal plants have been held in abeyance.

Several sludge disposal alternatives have been suggested in the staff review including off-site codisposal of sludge with municipal refuse for energy recovery, composting, and landfilling. It may be a while before an alternative system will be recommended subject to the adoption of EPA sludge technical standards.

If a future incinerator is ever constructed, a quantitative analysis of air quality impact will be prepared and incorporated in a separate supplemental statement. The existing incinerator is expected to be adequate for the anticipated flows since it was originally designed to handle primary and secondary sludges.

Ms. Helene Takemoto

-2-

May 18, 1988

Emission estimate for regulated pollutants under 40 CFR 60.150 Subpart "O" will be added in the Final EIS. In addition, reference to a future incinerator will be deleted in the Final EIS.

Very truly yours,

ALFRED J. THEIDE
Director and Chief Engineer

cc: OEOC
DLU

245 North Kukui Street, Honolulu, Hawaii 96817, Telephone (808) 537-5966

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WJW/AC

AMERICAN LUNG ASSOCIATION of Hawaii
The Christmas Seal People

June 1, 1988

Mr. Alfred J. Thiede
Director and Chief Engineer
Department of Public Works
City & County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Thiede:

Subject: Draft Supplemental EIS for Unit 2 of the
Honouliuli Wastewater Treatment Plant

Thank you for your letter of May 18, 1988 responding to our
comments on the subject EIS. Your informative response with
regard to the second sludge incinerator was most appreciated.

Sincerely yours,

Helene Takemoto

Helene Takemoto
Chairman
Environmental Health
Committee

BT:ct
18025

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TO
STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 2072
HONOLULU, HAWAII 96820
April 11, 1988

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

IN REPLY, PLEASE REFER TO:
EPK000

882472
APR 15 10 42 AM '88



TO
STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 2072
HONOLULU, HAWAII 96820
April 11, 1988

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

IN REPLY, PLEASE REFER TO:
EPK000

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TO
STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 2072
HONOLULU, HAWAII 96820
April 11, 1988

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

IN REPLY, PLEASE REFER TO:
EPK000

MEMORANDUM

To: Mr. John P. Whalen, Director
Department of Land Utilization, City & County of Honolulu

From: Deputy Director for Environmental Health

Subject: Comments to Supplemental EIS for Proposed Honolulu Wastewater Treatment Plant, Unit 2

To: Dr. Marvin T. Mure, Director
Office of Environmental Quality Control

From: Deputy Director for Environmental Health

Subject: Comments to Supplemental EIS for Proposed Honolulu Wastewater Treatment Plant, Unit 2

Thank you for allowing us to review and comment on the subject EIS. We have no comments to make at this time.

Thank you for allowing us to review and comment on the subject EIS. We have no comments to make at this time.

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

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

cc: Mr. Alfred J. Thiede ✓

cc: Mr. Alfred J. Thiede ✓

DR. MARVIN T. MIURA

APR 2 5 1988

3. The status of Barbers Point Archaeological District (site 80-12-2988) is not unknown. It has been determined to be eligible for inclusion on the National Register, a recognized category of significance.

Thank you for the opportunity to comment on this project.

Very truly yours,
William W. Paty

WILLIAM W. PATY, Chairperson
Board of Land and Natural Resources

cc: Honorable John P. Whalen
Honorable Alfred J. Thielen

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

830 SOUTH KING STREET
HONOLULU, HAWAII 96813



ALFRED J. THIELEN
DIRECTOR AND CHIEF ENGINEER

In reply refer to:
ENV 88-107

April 29, 1988

101

88-704
ENV 88-107
r/c lw/m

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 821
HONOLULU, HAWAII 96809
DOC. NO.: 3235E
FILE NO.: 88-440

APR 2 5 1988

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

Dear Dr. Miura:

SUBJECT: Supplemental EIS for Proposed Honolulu Wastewater Treatment Plant, Unit 2; Ewa, Oahu

We have reviewed the document cited above and have the following comments to offer:

Given the history of recent land surface grading, we believe that the applicant is correct in stating that there are at present no remaining significant historic sites present in the project parcels. Thus, the project should have "no effect" on significant historic sites.

However, in the archaeological review (Item G, page III-4), there are several incorrect statements and assumptions which should be corrected in the final EIS.

1. Site 146 as defined by McAllister (1933) clearly applies to all of the karst areas of the Ewa Plains. The stone walls near the Puuloa Salt Works were only one type of feature mentioned as an example. Other features, with which we are more familiar today, include the sink holes which have produced extinct avifaunal remains as well as evidence of occupation and agricultural use. The distribution of these features was not mapped in detail by McAllister. Thus, to indicate that "site 146" is located about 2-1/2 miles from the present project site is highly inaccurate.
2. The Oahu Railroad and Land Company right of way (site 80-12-9714) is not the only historic property in Ewa. Also present within the area is site 80-12-2873, the One'ula Archaeological District, which has been recommended to the National Register. This District is comprised of the 107 cultural features recorded by Davis (1979) which are mentioned on page III-5. One further site (80-12-2722) is listed on the Hawaii Register of Historic Places.

Mr. William W. Paty
Chairperson
Board of Land and Natural Resources
State of Hawaii
P. O. Box 821
Honolulu, Hawaii 96809

Dear Mr. Paty:

Subject: Draft Supplemental Environmental Impact Statement (SEIS) for the Proposed Honolulu Wastewater Treatment Plant (WWTP), Unit 2

We are responding to your letter (File No. 88-440) dated April 25, 1988, concerning the SEIS for Unit 2 of the Honolulu WWTP.

The archaeological review in Section 3, Item G, pages III-4 and III-5, concerning historic sites has been revised to reflect the information you have provided us. We appreciate your comments.

Based on your evaluation, and our information on recent land surface grading, the construction of the proposed plant expansion should have "no effect" on significant historic sites. Nevertheless, should any historic relics be uncovered during excavation, construction will be halted, and the State Historic Preservation officer will be called.

Very truly yours,

Alfred J. Thielen
ALFRED J. THIELEN
Director and Chief Engineer

cc: OEQC
DLJ



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MAY 10 1988

UNIVERSITY OF HAWAII AT MANOA

Environmental Center
Newford 317 • 2550 Campus Road
Honolulu, Hawaii 96822
Telephone (area) 946-7161

883017

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Dr. Marvin Miura
and Mr. John P. Whalen -2-

May 9, 1988

We note that an additional sludge incinerator may be added (p. II-12). Since there is no quantitative analysis of air quality impacts associated with additional sludge incineration, either the Final EIS should include such an analysis or a supplemental statement should be required prior to installing an additional incinerator.

Thank you for the opportunity to comment on this Supplemental Draft EIS. We hope our comments will be helpful in preparing the final document.

May 9, 1988
RE:0497

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

Mr. John P. Whalen, Director
Department of Land Utilization
City and County of Honolulu
630 South King Street
Honolulu, Hawaii 96813

Dear Dr. Miura and Mr. Whalen:

Supplemental Draft Environmental Impact Statement
Honouliuli Wastewater Treatment Plant, Unit 2
Honouliuli, Ewa, Oahu

The Environmental Center has reviewed the above referenced Supplemental Environmental Impact Statement (SEIS) with the assistance of Bertell Davis, Anthropology; Steve Dollar, Hawaii Institute of Marine Biology; Yu-Si Fok, Edwin Murabayashi, and Henry Gee, Water Resources Research Center; and Nancy Kanyuk, Environmental Center. The project proposes the expansion of the treatment capacity of the existing Honouliuli wastewater treatment plant (WWTP) from 25 million gallon per day (mgd) to 51 mgd, the Unit 2 master plan capacity.

Based on the information in the document, it appears that the proposed action will not cause any negative environmental alteration to the marine ecosystem. It is unfortunate, however, that the document does not include results of Dr. Steve Dollar's PhD dissertation, and of the EPA report prepared by Dr. Stephen Smith and Dr. Dollar entitled "Response of benthic ecosystems to deep ocean sewage outfalls in Hawaii: A nutrient cycling approach to biological impact assessment and monitoring, EPA Rpt. No. EPA/600/3-87/006 ERIN-NX02". The results presented in these documents describe the effects to benthic ecosystem nutrient dynamics in response to the Sand Island and Honouliuli outfalls. These results would have strengthened the City and County's position of present impacts of the outfalls and expected impacts from the proposed expansion.

Yours truly,
Jacquelin Miller

Jacquelin Miller
Associate Environmental Coordinator

cc: ERVC
L. Stephen Lau
Alfred J. Thiede, DPW ✓
Steve Dollar
Bertell Davis
Yu-Si Fok
Edwin Murabayashi
Henry Gee
Nancy Kanyuk

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

930 SOUTH KING STREET
HONOLULU, HAWAII 96813



FRANK F. FAGE
MAYOR

Ms. Jacquelin Miller

-2-

May 18, 1988

Currently, the Department of Health is addressing the State Sludge Management Strategy in response to EPA-proposed State Sewage Sludge Management Regulations. It is believed that sludge disposal requirements will be inserted into the permits already issued when they become up for renewal.

Because the sewage sludge program is in a period of transition, future plans for sludge disposal at all municipal treatment plants have been held in abeyance. Alternative systems being considered are landfilling, composting, and off-site codisposal incineration with municipal refuse with energy recovery.

If an incinerator is ever constructed in the future at the plant site, a quantitative analysis of air quality impact will be made and incorporated in a supplemental statement. Reference to a second incinerator will be deleted in the Final EIS.

Very truly yours,

Sam Collyer

ALFRED J. THORPE
Director and Chief Engineer

cc: /OSEOC
DLU

ALFRED J. THORPE
DIRECTOR AND CHIEF ENGINEER
EAV 88-129

May 18, 1988

Ms. Jacquelin Miller
Associate Environmental Coordinator
Environmental Center
University of Hawaii at Manoa
2550 Campus Road, Crawford 317
Honolulu, Hawaii 96822

Dear Ms. Miller:

Subject: Draft Supplemental Environmental Impact Statement (DSEIS)
for Unit 2 of the Honouliuli Wastewater Treatment Plant (WWTP).

We are responding to your letter RE: 0497 dated May 9, 1988, regarding the DSEIS for Unit 2 of the Honouliuli WWTP.

One of our references to the benthos at the Honouliuli discharge was Water Resource Research Center Special Report 4-02:87, "Benthic Infaunal Sampling Near Barber's Point Ocean Outfall, O'ahu, Hawaii" (Nelson W.G., et al. 1987) which referred to Dr. Doller's work on nutrient fluxes at the Sand Island and Barber's Point outfall (page 45). Although we were not able to obtain a copy of Dr. Doller's complete dissertation during the preparation of the DSEIS, we are familiar with his work.

A future second sludge incinerator at the Honouliuli WWTP is premature. The existing incinerator was designed on the basis of secondary treatment and is expected to have sufficient capacity for the anticipated flows.

Currently, we are gathering information on alternative sludge disposal methods for the entire municipal systems in anticipation of the development of technical sludge standards by EPA under Section 405 of the Clean Water Act. The complete technical standards have not been developed or published yet by EPA to our knowledge. The sludge technical standards to be codified in 40 CFR Part 503 will specify limits on pollutants of concern in sewage sludge, and address the land application, landfilling, and incineration processes of disposal. Hence, the technical standards will affect previously planned alternative disposal systems.

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

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DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

800 SOUTH KING STREET
HONOLULU, HAWAII 96813



FORM 7 (REV. 1-78)

ALFRED J. THIEDE
DIRECTOR AND CHIEF ENGINEER

In reply refer to:
ENV 88-122

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

Dear Dr. Miura:

Subject: Draft Supplemental EIS for the Proposed Honolulu
Wastewater Treatment Plant, Unit 2, TMR: 9-1-12: 26;
9-1-13: 7

Thank you for allowing us to review and comment on the
proposed project.

The increase in the treatment capacity of the proposed plant
is not anticipated to affect potable groundwater resources or
our future water development plans for the area. We concur
with the steps proposed to conserve potable water by utilizing
non-potable water, where possible, for the operations of the
proposed plant.

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

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Alfred J. Thiede

May 9, 1988

MEMORANDUM

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

FROM: ALFRED J. THIEDE, DIRECTOR AND CHIEF ENGINEER

SUBJECT: DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT (DSEIS)
FOR UNIT 2, HONOLULU WASTEWATER TREATMENT PLANT (WWTP)

We are responding to your letter dated May 5, 1988 concerning the DSEIS for
Unit 2 of the Honolulu WWTP.

Your comment that Unit 2 is not anticipated to affect potable groundwater
resources or Board of Water Supply's future water development plans for the
area is acknowledged.

The utilization of non-potable water for the sludge incinerator and other
in-plant activities will continue.

ALFRED J. THIEDE
Director and Chief Engineer

cc: OROC
DLH/Attach.
bcc: WH

DEPARTMENT OF GENERAL PLANNING
CITY AND COUNTY OF HONOLULU

882260

850 SOUTH KING STREET
HONOLULU HAWAII 96813
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DONALD A. CLEGG
DEPUTY CHIEF PLANNING OFFICER

KK/DGP 3/88-1245

FRANK F. FASH
MAJOR

April 20, 1988

MEMORANDUM

TO: JOHN P. WHALEN, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

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

SUBJECT: CHAPTER 343, HAWAII REVISED STATUTES
DRAFT ENVIRONMENTAL IMPACT STATEMENT
FOR THE PROPOSED HONOLULU WASTEWATER
TREATMENT PLANT UNIT 2, EWA OAHU

We have reviewed the subject Draft Environmental Impact Statement (EIS) and have found that the concerns we presented on the EIS Preparation Notice have been addressed.

Thank you for giving us an opportunity to comment on this matter.

Donald A. Clegg
DONALD A. CLEGG
Chief Planning Officer

cc: Department of Public Works
OEQC

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PB 88-332

April 4, 1988

MEMO TO: JOHN P. WHALEN, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM: HERBERT K. MURAKA
DIRECTOR AND BUILDING SUPERINTENDENT

SUBJECT: DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT FOR
PROPOSED HONOLULU WASTEWATER TREATMENT PLANT UNIT 2

We have reviewed the Draft Supplemental Environmental Impact Statement for the proposed Honolulu Wastewater Treatment Plant, Unit 2, and have no comments.

Thank you for the opportunity to review the document.

Herbert K. Muraka
HERBERT K. MURAKA
Director and Building Superintendent

TH:10
cc: Public Works Dept.
J. Harada

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

DEPT. OF PUBLIC WORKS
450 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4161

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FRANK P. EARL
MAYOR

MIKE MOON
DIRECTOR
ROBERT MIYAZATO
DEPUTY DIRECTOR

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DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

DEPT. OF PUBLIC WORKS
450 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4161

MAY 11 10 30 AM '88



FRANK P. EARL
MAYOR

MIKE MOON
DIRECTOR
ROBERT MIYAZATO
DEPUTY DIRECTOR

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ENUW
40 UUMW

May 9, 1988

Mr. John P. Whalen, Director
Department of Land Utilization
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Whalen:

Subject: Draft Supplemental Environmental Impact Statement
for Unit 2, Honolulu Wastewater Treatment Plant

We have reviewed the subject Draft Supplemental Environmental
Impact Statement and support the development of the proposed
project.

Sincerely,

MIKE MOON
Director

cc: Mr. Alfred J. Thiede

May 9, 1988

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

Dear Dr. Miura:

Subject: Draft Supplemental Environmental Impact Statement
for Unit 2, Honolulu Wastewater Treatment Plant

We have reviewed the subject Draft Supplemental Environmental
Impact Statement and support the development of the proposed
project.

Sincerely,

MIKE MOON
Director

cc: Mr. Alfred J. Thiede

DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
 DEPT OF PUBLIC WORKS
 880 SOUTH KING STREET
 HONOLULU, HAWAII 96813 • (808) 522-4222

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FRANK F. EARL
 MAYOR

JOHN P. WHALEN
 DIRECTOR
 BENJAMIN S. LEE
 DEPUTY DIRECTOR
 88/EIS-2 (BWN)

ENV/4
 S/A WWM

880 SOUTH KING STREET
 HONOLULU, HAWAII 96813



FRANK F. EARL
 MAYOR

ALFRED J. THIEDE
 DIRECTOR AND CHIEF ENGINEER
 In reply refer to:
 ENV 88-108

April 28, 1988.

May 3, 1988

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

TO: JOHN P. WHALEN, DIRECTOR
 DEPARTMENT OF LAND UTILIZATION

FROM: ALFRED J. THIEDE, DIRECTOR AND CHIEF ENGINEER

SUBJECT: DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT (DSEIS) FOR
UNIT 2 OF THE HONOLULU WASTEWATER TREATMENT PLANT (WWTP)

Dear Dr. Miura:

Draft Supplemental Environmental Impact
 Statement (EIS) for
 Proposed Honolulu WWTP, Unit 2
 Honolulu, Ewa, Oahu, Hawaii
 Tax Map Keys: 9-1-12: 26; 9-1-13: 7
 March 1988

We have reviewed the Draft EIS for the proposed Honolulu WWTP,
 Unit 2, and have no further comments to offer on the document's
 content.

We would appreciate being kept informed if a final decision is
 made by the U. S. Environmental Protection Agency on granting the
 City and County of Honolulu a variance from secondary treatment
 requirements of the Clean Water Act for wastewater discharge into
 the Pacific Ocean through the Honolulu WWTP and outfall.

Very truly yours,

John P. Whalen
 JOHN P. WHALEN
 Director of Land Utilization

JPW:sl
 17984

cc: JDPW, Alfred J. Thiede

We are responding to your memorandum [88/EIS-2(PWM)] dated April 28, 1988,
 regarding the subject DSEIS.

Upon receipt of a 301(h) NPDES Permit (Waiver of Secondary Treatment) for the
 Honolulu discharge from the U.S. Environmental Protection Agency, your
 office will be informed.

Alfred J. Thiede
 ALFRED J. THIEDE
 Director and Chief Engineer

cc: 080C

DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813

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TIC/KIM

HIRSHI K. KAMAKA
DIRECTOR
WALTER M. OZAWA
DEPUTY DIRECTOR

May 11, 1988

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

Dear Dr. Miura:

We have no concerns or comments to offer to the Supplemental Environmental Impact Statement for the Wastewater Treatment Plant in Honolulu, Ewa, Oahu, Hawaii.

Thank you for the opportunity to review and comment on the EIS.

Sincerely,

HIRAM K. KAMAKA, Director

HKK:st

cc: John Whalen, Department of Land Utilization
✓ Alfred Thiede, Department of Public Works

Copy 1 water works

DEPARTMENT OF TRANSPORTATION SERVICES
OFFICE OF THE DIRECTOR
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
350 SOUTH KING STREET
HONOLULU, HAWAII 96813

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JOHN E. HIRTEN
DIRECTOR
JOSEPH M. MADALONI, JR.
DEPUTY DIRECTOR

ENVI
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PL 1-1072
TE-2054

April 26, 1988

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

Dear Dr. Miura:

Subject: Honouliuli Wastewater Treatment Plant - Unit 2
Draft Supplemental Environmental Impact Statement
TMK: 9-1-12: 26
9-1-13: 7

This is in response to your letter of March 22, 1988 requesting our comments on the above subject.

The area on both sides of the driveway at Geiger Road should be kept clear to provide sufficient sight distance for both egressing and ingressing of vehicles.

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

Yours truly,

John E. Hirten
(for) JOHN E. HIRTEN

cc: Department of Public Works
Department of Land Utilization

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



FRANK F. FAHRE
MAYOR

ALFRED J. THIEDE
DIRECTOR AND CHIEF ENGINEER

In reply refer to:
ENV 88-106

April 29, 1988

MEMORANDUM

TO: JOHN E. HIRTEN, DIRECTOR
DEPARTMENT OF TRANSPORTATION SERVICES

FROM: ALFRED J. THIEDE, DIRECTOR AND CHIEF ENGINEER

SUBJECT: DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT (DSEIS) FOR
UNIT 2 OF THE HONOLULULI WASTEWATER TREATMENT PLANT (WWTP)

We are responding to your letter (TE-2054) dated April 26, 1988, concerning the DSEIS for Unit 2, Honouliuli WWTP.

The present landscaping at the driveway of the plant site on Geiger Road does not interfere with sight distance for both egressing and ingressing vehicles. There are no plans to alter the present landscape with tall shrubbery; e.g., oleasda, at the plant driveway.

Alfred J. Thiede
ALFRED J. THIEDE
Director and Chief Engineer

cc: OEOC
DLU



EWA BEACH COMMUNITY ASSOCIATION
P.O. BOX 7, EWA BEACH, HAWAII 96706

884966

ENYU
7/9 LWM

May 5, 1988

Mr. John P. Whalen, Director
Dept. of Land Utilization
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Sir:

I have reviewed the Supplemental EIS for the proposed Honolulu
Wastewater Treatment Plant, Unit 2.

1. I am concerned that the proposed increased discharge of waste in the West Manala Bay may affect Ewa Beach Park, Nimitz and Onueia Beaches as well as other recreational facilities under a 301 (b) permit. What measures will be taken if the discharge interferes with recreational activities in the area prior to the end of the five year permit?
2. The present odor control measures have not been effective in the past! I would like to be assured that better odor control technology will be installed when the plants capacity is increased.
3. I support the proposed increased capacity to 510 mgd; most CIP projects too often fall short of needs and must be expanded at a high cost, i.e., H-1 Freeway.

Sincerely,

Charles "Dick" Beamer, Ph.D.
President
Ewa Beach Community Association

cc: Mr. Alfred J. Thiede
Dr. Marvin T. Mura

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

250 SOUTH KING STREET
HONOLULU, HAWAII 96813



FRANK C. PAUL
MAYOR

ALFRED J. THIEDE
DIRECTOR AND CHIEF ENGINEER

In reply refer to:
EMW 88-127

May 11, 1988

Dr. Charles Beamer, Ph.D.
President
Ewa Beach Community Association
P.O. Box 3
Ewa Beach, Hawaii 96706

Dear Dr. Beamer:

Subject: Draft Supplemental Environmental Impact Statement (DSEIS) for
Unit 2 of the Honolulu Wastewater Treatment Plant (WWTP)

We are responding to your letter dated May 5, 1988, regarding the DSEIS for Unit 2 of the Honolulu WWTP.

1. Currently 204 million gallons per day (mgd) of primary effluent is discharged into the receiving waters, approximately 9,000 feet off Onueia Beach Park. Under the worst case conditions with shoreward currents, the theoretical coliform concentration is about 2 organisms per 100 milliliter (2/100 ml), off Onueia Beach Park, well below the State criterion of 200/100 ml. The theoretical coliform at Ewa Beach Park and Nimitz Beach would be less because of the longer travel time from the area of discharge.

Since 1984, when primary effluent was being discharged, the average geometric means of fecal coliform bacteria was less than 2/100 ml within the zone of initial dilution (immediate discharge area). Based on this value, the beach parks will not be affected by the Honolulu discharge (see Figures V-14 and IV-16 and Table V-10 of the EIS and related text).

In the event the discharge interferes with recreational activities in the receiving waters, the effluent can be disinfected by standby chlorinators at the plant site. If the effluent does not meet the requirements of the 301(b) permit prior to the end of the 5-year permit period, the permit may not be renewed and secondary units may have to be constructed.

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4/26/88

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TO _____
FROM _____



Brenner Munge, Ph.D., PE
Manager
Environmental Department
(808) 548-6880

May 11, 1988

-2-

Mr. Charles Beamer, Ph.D.

- The odor control measures utilized at the existing Honolulu WTP consist of good housekeeping and treatment of odors collected within enclosures by activated carbon scrubbers. The activated carbon in the existing scrubbers requires frequent regeneration because of the higher than anticipated concentration of the inlet hydrogen sulfide. Hence, the scrubbers are currently not being operated at the most optimum level.
- The existing scrubbers at the plant are planned to be replaced by two-stage scrubbers. The first stage will consist of a wet chemical scrubber, followed by the activated carbon scrubber operating as the polishing unit. The two-stage scrubbers will be more effective in reducing odor levels within the plant site than the current scrubbers.
- Unit 2 of the Honolulu WTP will be constructed in two phases. Phase I will expand the plant's capacity to 38 mgd, sufficient to serve a de facto population of 279,200 people. The construction of Phase II will take place about the year 2005 and increase the plant capacity to 51 mgd, sufficient to serve a de facto population of 402,000 people.

Very truly yours,

[Signature]
ALFRED J. THIEDE
Director and Chief Engineer

cc: O&C
DLU

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

Subject: Draft Supplemental Environmental Impact Statement (EIS)
for Proposed Honolulu Wastewater Treatment Plant,
Unit 2, Honolulu, Ewa, Oahu

We have reviewed the above subject document and have no comments.

Sincerely,

[Signature]
Brenner Munge

cc: Mr. John P. Whalen, Director
Dept. of Land Utilization

Mr. Alfred J. Thiede, Director
Dept. of Public Works

CITY AND COUNTY OF HONOLULU

DEPARTMENT OF PUBLIC WORKS

500 SOUTH KING STREET
HONOLULU, HAWAII 96813



ALFRED J. THODE
DIRECTOR AND CHIEF ENGINEER
In reply refer to:
ENV 88-130

For information

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May 9, 1988

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

Dear Dr. Miura:

Subject: Supplemental EIS for Proposed Honolulu
Wastewater Treatment Plant, Unit 2

We have reviewed the subject EIS with particular attention to those sections addressing air quality impacts and have the following comments to offer.

The EIS indicates that "a second multiple health incinerator will be added in Unit II or at a later date" (p. II-6). The air quality impact analysis (pp. V-1 to V-7) presents a good description of the existing facility, odor sources, odor controls, etc., but fails to provide a detailed analysis of the anticipated impact of a new incinerator, either individually or cumulatively with the existing incinerator unit. There are no emissions estimates for pollutants regulated pursuant to federal or state law, nor are there ambient concentration estimates to demonstrate compliance with federal and state ambient air quality standards. If, in fact, a new stationary source of air pollution is being proposed in this action, then the failure to thoroughly analyze the impact is a serious omission and should be rectified before this EIS is accepted. Even if, as suggested on page II-6, the incinerator will be added at a later date, it should be assessed in this document since it is simply another phase in the overall expansion of the facility and such assessment is required by State EIS Rules (11-200-17(i)).

Thank you for providing the opportunity to review this draft EIS.
Sincerely yours,

Helene Takemoto
Chairman
Environmental Health Committee

HT:ct
L8823

cc: DOH
UH-Environmental Center

May 18, 1988

Ms. Helene Takemoto
Chairperson
Environmental Health Committee
American Lung Association of Hawaii
245 North Kukui Street
Honolulu, Hawaii 96817

Dear Ms. Takemoto:

Subject: Draft Supplemental Environmental Impact Statement (DSEIS) for Unit 2 of the Honolulu Wastewater Treatment Plant (WWTP).

We are responding to your letter dated May 9, 1988, regarding the DSEIS of Unit 2 of the Honolulu WWTP.

A future second sludge incinerator at the Honolulu WWTP was under consideration at one time but is being deleted as part of Unit 2 since the need for one has not been established. Currently, the Division of Wastewater Management is reviewing its entire sludge management program in anticipation of the development of sludge technical standards by EPA under Section 405 of the Clean Water Act. Under the technical standards, still to be established in 40 CFR Part 503, EPA will specify limits on pollutants of concern in sewage sludge, and address the land application, landfilling, and incineration process of disposal. Under the circumstances, future plans for sludge disposal at all municipal plants have been held in abeyance.

Several sludge disposal alternatives have been suggested in the staff review including off-site codisposal of sludge with municipal refuse for energy recovery, composting, and landfilling. It may be a while before an alternative system will be recommended subject to the adoption of EPA sludge technical standards.

If a future incinerator is ever constructed, a quantitative analysis of air quality impact will be prepared and incorporated in a separate supplemental statement. The existing incinerator is expected to be adequate for the anticipated flows since it was originally designed to handle primary and secondary sludges.

Ms. Helene Takemoto

May 18, 1988

-2-

Emission estimate for regulated pollutants under 40 CFR 60.150 Subpart "O" will be added in the Final EIS. In addition, reference to a future incinerator will be deleted in the Final EIS.

Very truly yours,


ALFRED J. THODE
Director and Chief Engineer

cc: OROG
BLU

245 North Kukui Street, Honolulu, Hawaii 96817, Telephone (808) 537-5966

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WUM/OC

AMERICAN  LUNG ASSOCIATION of Hawaii
The Christmas Seal People®

June 1, 1988

Mr. Alfred J. Thiede
Director and Chief Engineer
Department of Public Works
City & County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Thiede:

Subject: Draft Supplemental EIS for Unit 2 of the
Honouliuli Wastewater Treatment Plant

Thank you for your letter of May 18, 1988 responding to our
comments on the subject EIS. Your informative response with
regard to the second sludge incinerator was most appreciated.

Sincerely yours,



Helene Takemoto
Chairman
Environmental Health
Committee

HT:ct
18825

REFERENCES

AECOS, Inc. 1979. "Oahu Coral Reef Inventory." Part B-Sectional Map Description. Prepared for the U.S. Army Corps of Engineers.

AECOS, Inc. 1983. "Zooplankton and Larval Fish Near the Honouliuli Deep Ocean Outfall." Interim Report. Prepared for the Department of Public Works, City and County of Honolulu.

Bathen, K. H. 1978. "Circulation Atlas for Oahu, Hawaii." UMIHI -Seagrant-MR-78-05.

Belt Collins & Associates. 1987. "Ewa Water Master Plan" (Revised).

City and County of Honolulu, DPW. 1984. Design Standards of the Division of Wastewater Management Volumes 1 and 2

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City and County of Honolulu. 1987. Resolution 87-211, "Relating to Amending the General Plan of the City and County of Honolulu".

City and County of Honolulu, u.d. "Departmental and Agency Reports for Fiscal Year July 1, 1986 - June 30, 1987."

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Environmental Research Group, Inc. 1983. "Sampling and analysis of air pollutant effluent from multihearth sewage sludge incinerator to demonstrate compliance.." at Honouliuli WWTP, Ewa, Hawaii. Report #2446-A.

Engineering-Science, Inc.; Tom and Hara, Inc; and Dillingham Environmental Company. 1972. "Water Quality Program for Oahu with Special Emphasis on Waste Disposal" (WQPO). Prepared for the Department of Public Works, City and County of Honolulu.

_____. 1971. Final Report, Work Area 2A, "Municipal and Industrial Waste Load Projections".

_____. 1971. Final Report, Work Area 5, "Special Reports".

_____. 1971. Final Report Work Area 6 & 7, "Analysis of Water Quality and Oceanographic Studies".

Environmental Consultants, Inc. 1978. "Zooplankton and Larval Fish Sampling Program - Summary."

Farrell, J. B. and H. Wall. 1981. "Air Pollutational Discharges from Ten Sewage Sludge Incinerators." U.S. EPA.

REFERENCES (contd.)

- Hawaii State, DLNR, Division of Aquatic Resources. 1981. "Commercial and Recreational Fish and Catch Data."
- Hawaii State, DLNR, Division of Fish and Game. 1979. "Hawaii Coastal Zone Fisheries Management Study."
- Hawaii State, DOH. Chapter 11-54. "Water Quality Standards."
- Hawaii State, DOH and City and County DPW. u.d. "Water Quality Management Plan for the City and County of Honolulu," under revision.
- Hawaii State, DOH. Chapter 11-43. "Community Noise Control For Oahu."
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