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**CITY AND COUNTY OF HONOLULU**

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OFFICE OF ENVIRONMENTAL  
QUALITY CONTROL

December 21, 2000

CDED-A 00-0470

Ms. Genevieve Salmonson, Director  
Office of Environmental Quality Control  
State of Hawaii  
235 South Beretania Street, Suite 702  
Honolulu, Hawaii 96813

Dear Ms. Salmonson:

Subject: Finding of No Significant Impact (FONSI) for Kahauola Street  
Relief Drain, Sunset Beach, Oahu

The City and County of Honolulu, Department of Design and Construction (CCH), has reviewed the comments during the 30-day public comment period, which began on September 23, 2000. The CCH has determined that this project will not have significant environmental effects and has issued a FONSI. Please publish this notice in the January 10, 2001, Environmental Notice. We have enclosed a completed OEQC Publication Form and four (4) copies of the Final EA.

**Identification of Proposing Agency**

The City and County of Honolulu, Department of Design and Construction

**Identification of Accepting Agency**

The City and County of Honolulu, Department of Design and Construction  
Determination of Negative Declaration, Finding of No Significant Impact

**Reasons for Supporting Determination**

This determination is based on the significance criteria listed in 11-200-12 of the Environmental Impact Statement Rules. Specifically, these significant criteria are summarized below and addressed in Chapter 5:

1. There would be no irrevocable commitment to loss or destruction of any natural or cultural resource;

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2. The proposed action would not curtail the range of beneficial uses of the environment;
3. The proposed action does not conflict with the State's long-term environmental policies or goals and guidelines, as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders;
4. The economic and social welfare of the community or State will not be substantially affected by the proposed action;
5. The proposed action would not substantially affect public health;
6. The proposed action does not involve substantial secondary impacts, such as population changes or detrimental effects on public facilities;
7. It is anticipated that no substantial degradation of environmental quality will occur as a result of the proposed action;
8. The proposed action does not involve a commitment to large actions, nor would it contribute to a considerable cumulative impact upon the environment;
9. Rare, threatened, or endangered species and habitat would not be substantially affected by the proposed action;
10. Air and water quality and ambient noise levels will not be detrimentally affected by the proposed action;
11. The proposed action will not affect or likely suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land area, estuary, fresh water, or coastal waters;
12. Scenic vistas and view planes identified in county and state plans and studies will not be substantially affected by the proposed action; and
13. The proposed action does not require substantial energy consumption.

The final EA for the proposed action, prepared pursuant to Chapter 343, HRS, and the State Department of Health Title 11-200 administrative rules, is attached to support the FONSI.

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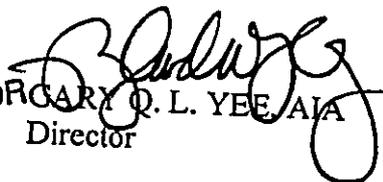
Ms. Genevieve Salmonson  
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December 21, 2000

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Very truly yours,

  
FORGARY Q. L. YEE, AIA  
Director

Enc.

JAN 23 2001

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2001-01-23-0A-~~FEA~~

Final Environmental Assessment and Finding of No Significant Impact

## **Kahauola Street Relief Drain** **Sunset Beach, Oahu**

*This environmental document has been prepared pursuant to  
Chapter 343, Hawaii Revised Statutes*

Proposing Agency:

City and County of Honolulu  
Department of Design and Construction

Accepting Agency:

City and County of Honolulu  
Department of Design and Construction

Prepared by:

Earth Tech, Inc.  
700 Bishop Street, Suite 900  
Honolulu, Hawaii 96813

December 2000

## EXECUTIVE SUMMARY

### INTRODUCTION

The purpose of this environmental assessment (EA) is to analyze the potential environmental consequences of the proposed City and County of Honolulu (CCH) Kahauola Street Drainage project activities and to determine if there would be significant short-term, long-term and/or cumulative impacts on the human, natural and historic environments. This project is in compliance with Chapter 343, Hawaii Revised Statutes (HRS 343), and Title 11, Chapter 200 (11-200), Hawaii Administrative Rules (HAR) of the State Department of Health (DOH) implementing rules for the environmental assessment process.

The purpose of the proposed project is to improve the existing storm drainage system and ocean outlet along Kahauola Street near Sunset Beach in order to reduce the severity and frequency of flooding in the associated residential area. Sand in the existing pipe may reduce the efficiency of the drainage system and contribute to the flooding problems. Previous studies have indicated that it would be necessary to both increase the capacity of the present drainage system and to extend the outfall pipe sixty feet into the ocean to solve this problem. However, in response to community concerns and possible safety issues, an alternate solution has been found which utilizes a Tideflex® check valve (hereinafter referred to as "duckbill valve"). This check valve was designed in response to a commission by the U. S. Environmental Protection Agency (EPA) as an alternative to traditional ineffective methods used to keep drainage lines open. It will allow stormwater to exit the pipe while preventing sand from entering it.

It is now proposed that the existing tee outlet and approximately fifty feet of the existing 66-inch pipe be removed and a duckbill be attached to the end of the pipe on the downstream side of the first drain manhole on the beach (DMH 1), ("Phase A"). It is expected that this action, in conjunction with regular removal of trash and debris from the inlets, will reduce the effects of future flooding. However, if it should not prove adequate, it may be necessary to upgrade the capacity of the drainage system ("Phase B"). Enlargement of the system's capacity would be accomplished by removing the existing 54-inch and 66-inch pipes from the inlet near Kamehameha Highway to the outlet, and installing a new 84-inch pipe along the same alignment. The existing 66-inch duckbill valve would be replaced with an appropriately sized replacement valve.

### ALTERNATIVES CONSIDERED

The principal alternative to the proposed action, and the one initially proposed, is to extend the outfall pipe approximately 60 feet into the ocean to the 2-foot depth contour. This extension would place the outlet just beyond the estimated most seaward excursion of the beach toe and the wave swash zone along the shore where sand transport occurs. The outlet structure would be changed to a 90° bend facing away from the prevailing currents and sand movement to reduce sand entering the pipe.

Other alternatives considered were: replacement of the existing closed drainline pipe with an open drainage channel; relocation of the outlet to another site along the coast; relocation of the outlet inland; and construction of a detention basin. The "no action" alternative is unacceptable because it would leave the Kahauola Street residents with an inadequate drainage system prone to sand plugging problems.

#### **ANTICIPATED IMPACTS**

The analysis detailed in Chapter 4 indicates that implementation of the proposed Kahauola Street Relief Drain project would not pose any anticipated significant long term or cumulative adverse impacts on the human, natural and historic environments. Potential short-term affects to vegetation, water quality, visual resources, noise, and air quality may occur during construction at the proposed site. Positive impacts may occur in an improved view of the shoreline, restoration of natural sand transport processes at the shoreline and reduced effects of flooding in the Kahauola Street area.

#### **SUMMARY OF RESULTS**

**Air Quality** - Project activities would generate exhaust products and fugitive dust emissions from vehicles and equipment used to remove the existing outlet and a portion of the existing 66-inch pipe and to deliver and install the duckbill. Air quality effects will be short-term in nature. Workers will be scheduled to arrive and depart the site during non-peak traffic hours.

**Biological Resources** – The impacts to aquatic biota, plants, birds, and mammals will be minimal since no in-water work is anticipated and, wherever possible, excavation and disturbances to vegetation in the area will be minimized or avoided. Coastal plants requiring replacement will be replanted with similar or other appropriate native plants. Removed landscaping will be replaced with similar landscaping. Removal of the outlet and pipe will restore the beach area to its natural condition and allow normal sand transport to resume, which may change the location of vegetation in the future. If Phase B is implemented and the drainline is enlarged, increased flows of stormwater may have additional effects on the aquatic biota in the vicinity of the outlet during storm events.

**Cultural Resources** – Cultural resources including pre-historic burials and cultural layers may be present in the proposed project area according to archaeological records review. Mitigation measures will be taken in the form of archaeological monitoring, with recovery and burial plans in place.

**Hazardous Wastes and Materials** – There are no anticipated short-term or long-term effects from hazardous wastes and materials or petroleum products. Appropriate construction best management plans (BMPs) and spill contingency plans will be implemented throughout the duration of the project.

**Noise** – Intermittent elevated noise levels from specific construction activities are unavoidable, but are expected to be short-term and minor. Typical heavy construction equipment noise levels are within the decibel range identified for a daytime, noisy urban environment.

**Socioeconomic** – The Kahauola Street drainline improvements are designed to increase the efficiency of the drainage system. These improvements may reduce the financial impacts associated with flooding on Kahauola Street.

**Transportation** – Replacement of the existing outlet with the proposed check valve will result in minimal effects on transportation along Kahauola Street. Effects will be experienced only while crews are mobilizing to the project area near DMH 1.

**Utilities and Infrastructure** – Various utilities are located within the project limits including the drainline itself, utility poles, cable, water and sewer lines. Most utilities will not be impacted, however, some will require protection. No short-term effects are expected with the protection of utilities. In general, significant impacts to infrastructure are not anticipated with the exception of the improved drainage system.

**Visual Resources** – Short-term activity-related visual impacts are anticipated, but will be controlled to within acceptable limits by timing and phasing and by revegetation of cleared areas. In the long-term, with the removal of the existing outlet and 50 feet of pipe, and the replacement with a duckbill valve, the view of the shoreline will experience a positive effect. However, it should be noted that the duckbill would still be visible in the backshore area.

**Water Resources** – Turbidity may be increased and water quality may be reduced during removal of the outlet and the pipe, but this is expected to be short-term in nature and scheduled during low tide, limiting in-water work. Increased flows of stormwater from the duckbill during storm events may adversely impact water quality. However, the proposed duckbill outlet configuration will allow for more overland contact, increasing stormwater infiltration into the sand, instead of being discharge directly into the near shore waters as is the existing conditions.

#### **APPLICABLE ENVIRONMENTAL PERMITS**

- U.S. Army Corps of Engineers Section 404 Permit
- U.S. Army Corps of Engineers Section 10 Permit
- Letter of Permission (LOP) under Section 10
- Section 401 Water Quality Certification
- Conservation District Use Application
- Shoreline Setback Variance

- State Historic Preservation Clearance

**ANTICIPATED DETERMINATION**

The proposed action has been reviewed and analyzed pursuant the "Significant Criteria" established in 11-200-12, HAR, environmental impact assessment process. Potential adverse impacts are negligible and short-term in nature. Based on this Finding of No Significant Impact (FONSI), an environmental impact statement is not required.

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**ACRONYMS AND ABBREVIATIONS**

µg/L	micrograms per liter
µg/m <sup>3</sup>	micrograms per meter cubed
°F	degrees Fahrenheit
ANSI	American National Standards Institute
APE	area of potential effect
BFE	base flood elevation
BMP	best management practice
BCA	Belt Collins and Associates
CAA	Clean Air Act
CCH	City and County of Honolulu
CDUA	Conservation District Use Application
CFR	Code of Federal Regulations
Cfs	<i>cubic feet per second</i>
CO	carbon monoxide
CO <sub>2</sub>	carbon dioxide
COE	United States Army Corps of Engineers
ComSat	Communications Satellite Corporation
CWA	Clean Water Act
CWB	Clean Water Branch
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Program
db	decibel
dBA	A-weighted decibels
DBEDT	Department of Business, Economic Development and Tourism
DLNR	Department of Land and Natural Resources
DMH	drain manhole
DOH	Department of Health
DOT	Department of Transportation
DPP	Department of Planning and Permitting
EA	environmental assessment
EIS	Environmental Impact Statement
EPA	United States Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FONSI	finding of no significant impact
HAR	Hawaii Administrative Rules
HRS	Hawaii Revised Statutes
LCA	Land commission award
L <sub>dn</sub>	annual average day-night sound level

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LOP	Letter of permission
Msl	mean sea level
NAAQS	National Ambient Air Quality Standards
NFIP	National Flood Insurance Program
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
O <sub>3</sub>	ozone
OEQC	Office of Environmental Quality Control
OSHA	Occupational Safety and Health Act
PER	Preliminary Engineering Report
PM <sub>10</sub>	particulate matter ≤ 10 microns
RCP	reinforced concrete pipe
ROH	Revised Ordinances of Honolulu
SEI	Sea Engineering, Inc.
SFHA	Special flood hazard area
SHPD	State Historic Preservation Division
SMA	Special Management Area
SMP	Special Management Area Use Permit
SO <sub>2</sub>	sulfur dioxide
SSV	Shoreline Setback Variance
TMK	Tax Map Key
TSP	total suspended particulate matter
USC	United States Code
USDA-SCS	United States Department of Agriculture – Soil Conservation Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WQC	Water Quality Certification

## 1. INTRODUCTION

The City and County of Honolulu (CCH) proposes to improve an existing storm drainage system and ocean outlet along Kahauola Street in a residential area near Sunset Beach. The proposed project includes improving the outlet to reduce sand plugging problems (referred to as "Phase A"), and, if necessary, replacing the existing drainage lines with larger pipes (referred to as "Phase B").

This environmental assessment (EA) was prepared pursuant to the Hawaii Revised Statutes Chapter 343 (HRS 343), and the Hawaii Department of Health (DOH) Hawaii Administrative Rules (HAR) Title 11-200, environmental impact statement rules. The proposed action "triggers" HRS 343-5(1) because of the use of county funds, the use of land classified as Conservation District, and the use of land within the Shoreline Setback Area.

### 1.1 Purpose and Need for Action

The purpose of the Kahauola Street Relief Drain project is to address deficiencies in stormwater drainage from the Sunset Beach residential community associated with the Kahauola Street drainage system and outlet. Adequate conveyance of stormwater runoff from the area is needed to protect public health and safety and mitigate future property damage associated with flooding. Significant flooding occurred in November 1996 where the debris level reportedly reached nine feet high at the intersection of Huelo and Kahauola Streets according to residents. Sand that enters the existing drainline may reduce the drains efficiency and contribute to flooding in the area. Previous studies have indicated that it would be necessary to both enlarge the capacity of the present drainage system along Kahauola Street and to extend the outfall pipe sixty feet into the ocean to solve this problem. However, in response to community concerns and possible safety issues, an alternate solution has been found in using a Tideflex® check valve (hereinafter referred to as a "duckbill valve"). This check valve was designed in response to a commission by the U. S. Environmental Protection Agency (EPA) as an alternative to traditional ineffective methods used to keep drainage lines open (EPA 1990). It will allow stormwater to exit the pipe while preventing sand from entering it.

It is now proposed that the existing tee outlet and approximately fifty feet of the existing 66-inch pipe be removed and a duckbill valve be attached to the end of the pipe on the downstream side of the first drain manhole on the beach (DMH 1) ("Phase A"). It is expected that this action, in conjunction with regular removal of trash and debris from the inlets, will reduce the effects of future flooding. However, if it should not prove adequate, it may be necessary to upgrade the capacity of the drainage system ("Phase B"). Enlargement of the system's capacity would be accomplished by removing the existing 54-inch and 66-inch pipes from the inlet near Kamehameha Highway to the outlet, and

installing a new 84-inch pipe along the same alignment. The existing 66-inch duckbill would be replaced with an appropriately sized replacement valve.

## 1.2 Decisions to Be Made

During the development of this EA, possible environmental consequences of the proposed CCH Kahauola Street Relief Drain improvement actions were analyzed for significant short-term, long-term and/or cumulative impacts on human, natural and historic environments. Impacts have been reviewed and mitigation measures developed in support of the proposed actions.

## 1.3 Required Permits

In addition to the nature and location of the proposed action, a number of federal, state, and county permits may be required. These include: the U.S. Army Corps of Engineers (COE) Permits (Nationwide, Section 404, or a Section 10 with letter of permission (LOP); Section 401 DOH Water Quality Certification (WQC); State Coastal Zone Management Program (CZMP) Consistency Determination; Conservation District Use Application (CDUA); Shoreline Setback Variance (SSV); Section 402 DOH National Pollutant Discharge Elimination System (NPDES) Permits for construction activities and construction dewatering activities; and State Historic Preservation Clearance.

### 1.3.1 U.S. Army Corps of Engineers Permit for Activities in Waterways

The COE permit program is authorized under Section 10 of the Rivers and Harbors Act of 1889, Section 404 of the Clean Water Act (CWA), and Section 103 of the Marine, Protection, Research and Sanctuaries Act. The proposed action will require a permit pursuant to Title 33, Part 320-330 of the Code of Federal Regulations (33 CFR 320-330) regulating work in the waters of the United States.

The COE has jurisdiction over dredge and fill actions in United States. Certain discharges specified in 33 CFR 330 are permitted under a "Nationwide Permit" system, while others receive regional and individual permits. The proposed project may be covered under the conditions of a Nationwide Permit for the criteria established in No. 31, Maintenance of Existing Flood Control Projects. Requirements for the permits are as follows:

**Permit No. 31 Maintenance of Existing Flood Control Projects** regulates discharges associated with maintenance of existing facilities, including debris basins, retention/detention basins and channels either i) previously authorized by the COE; or ii) constructed by the COE and transferred to local sponsor for operation and maintenance. Pre-construction notification to the COE is required.

Alternatively, only a LOP under Section 10 may be needed for the installation of the duckbill valve near DMH 1. The letter will include a description of how the outlet and pipe section will be removed without in-water work and how the duckbill valve will be installed.

By requiring demolition and removal of the existing outlet structure to take place at low tide, pre-construction notification to the Corps along with a LOP under Section 10 may be acceptable.

### 1.3.2 U.S. Army Corps of Engineers Section 404 Permit

Section 301 of the 1977 federal CWA regulates actions involving the discharge of dredged or fill material (includes rock, sand, dirt, structures cast-in-place (concrete) and other material) into waters of the United States, including areas designated as wetlands. The development of a storm drain outlet 60 feet from the shoreline into the ocean, and construction-related activities associated with this structure may involve a discharge of fill or dredged material in jurisdictional waters, as defined by 33 CFR 323.2. Installation of the duckbill valve will not require a 404 permit.

### 1.3.3 Section 401 DOH Water Quality Certification

This application is required per Title IV (Permits and Licenses, Certification, Section 401(a)(1) of the 1977 CWA (Public Law 95-217) and HRS 342D. The CWA and Section 401 of its implementing regulations (Title 33, Section 1341 of the United States Code [33 USC 1341]) require any applicant for a federal license or permit conducting any activity that may result in any discharge into the navigable waters to obtain a water quality certification from the state where the discharge takes place or originates. The DOH Clean Water Branch (CWB) administers the Water Quality Certification permitting process in Hawaii through HAR Chapter 11-54 so construction discharge activities can be monitored and conducted in a manner that will not violate the basic water quality criteria applicable to the class of receiving waters at the site. Since the installation of the duckbill valve will not require any COE permits, a Section 401 Water Quality Certification is not required.

### 1.3.4 Coastal Zone Management Program Consistency Determination

Authorized by HRS Chapter 205A, the Hawaii CZMP guides the use, protection, and development of land and ocean resources within Hawaii's coastal areas. The National Coastal Zone Management Act (CZMA) of 1972, Section 307(c)(1), requires federal agencies to conduct their planning, management, development, and regulatory activities in a manner consistent with the state CZMP. Informational and procedural requirements for federal agencies are established under 40 CFR 930. The Office of Planning, Department of Business, Economic Development and Tourism (DBEDT), the state's lead agency for review for consistency, must agree with the determination that the proposed action is

consistent with the State of Hawaii's CZMP or provide specific conditions on the proposed action to place it in consistency. Phase A will not require CZMP consistency determination.

#### 1.3.5 City and County of Honolulu Special Management Area Permit

The State of Hawaii's HRS 205A authorizes counties to establish Special Management Areas to protect and preserve the coastal zone in Hawaii. The CCH regulates actions taking place in the SMA under Chapter 25, Revised Ordinances of Honolulu (ROH). The CCH Department of Planning and Permitting (DPP) administers the SMA Use Permit (SMP) process to control development in the SMAs, minimize effects to sensitive ecological areas, and avoid permanent loss of valuable coastal resources. The permit process also is used to preserve scenic views and ensure public access to beaches, coastal recreation areas, and natural reserves. Actions affecting wetland areas, including dredging, also are regulated in this process. DPP has indicated by letter that an SMP will not be required for the duckbill valve installation.

#### 1.3.6 Conservation District Use Application

This application is required to apply for a land use within areas classified as a state Land Use Conservation District. All applications are subject to County SMA requirements. All land uses, pursuant to Section 13-5-2, HAR require that a CDUA be filed with the Department of Land and Natural Resources, Division of Land Management and be approved by the Board of Land and Natural Resources. Because the proposed project is on the shoreline and the state asserts ownership of all land seaward of the upper reaches of the waves, a CDUA is required for this project.

#### 1.3.7 Shoreline Setback Variance

Pursuant to the authority conferred by HRS Chapter 205A, this permit covers structures and activities in the Shoreline Area as defined in ROH Chapter 23. The primary policy of CCH DPP is to protect and preserve the natural shoreline, (especially sandy beaches); public pedestrian access laterally along the shoreline and the sea; and open space along the shoreline. The proposed project is subject to HRS Chapter 205A and a SSV is required. DPP has indicated by letter that a Shoreline Setback Variance will not be required for Phase A.

#### 1.3.8 State DOH Section 402 NPDES Permit Coverage

Title IV – Permits and Licenses of the CWA gives EPA the authority and responsibility to issue discharge permits to every point source discharger. Section 402 (33 USC 1342) of the CWA describes the NPDES permit system. The CWA allows states to request EPA authorization to administer the NPDES program within their borders. The DOH CWB administers the General Permitting process in Hawaii through the HAR Chapter 11-55

Notice of Intent (NOI) Appendix B-I. An NPDES permit is required before any effluent discharge can be made to surface streams or coastal waters. Applicable construction work may require the preparation of a State DOH NPDES CWB-NOI Forms C and G, Stormwater Associated with Construction Activities and Construction Dewatering Activities, respectively. The stormwater discharge from the existing system is permitted under the CCH General Permit #00021229. Phase A activities is not expected to create additional discharges that exceed permit levels. Additionally, since the removal of the existing outlet will be required to take place at low tide and will encompasses a construction area of less than 5 acres, and construction dewatering activities are not anticipated, no additional NPDES permitting will be required.

#### 1.3.9 State Historic Preservation Clearance

The proposed actions for the Kahauola Street Relief Drain are also regulated by the State Historic Preservation Division (SHPD) and its implementing regulations (36 CFR 800), as well as the State Historic Preservation Act (HRS 6E). This clearance process is designed to minimize project impacts to historically or archaeologically significant sites. Human burial sites are within the vicinity of the proposed project and will require a clearance from the SHPD.

## 2. PROJECT DESCRIPTION

This section provides general information regarding the proposed project's technical, social, economic, and environmental characteristics, pursuant to HRS 343, and the DOH HAR Title 11-200-10 content requirements for an environmental assessment.

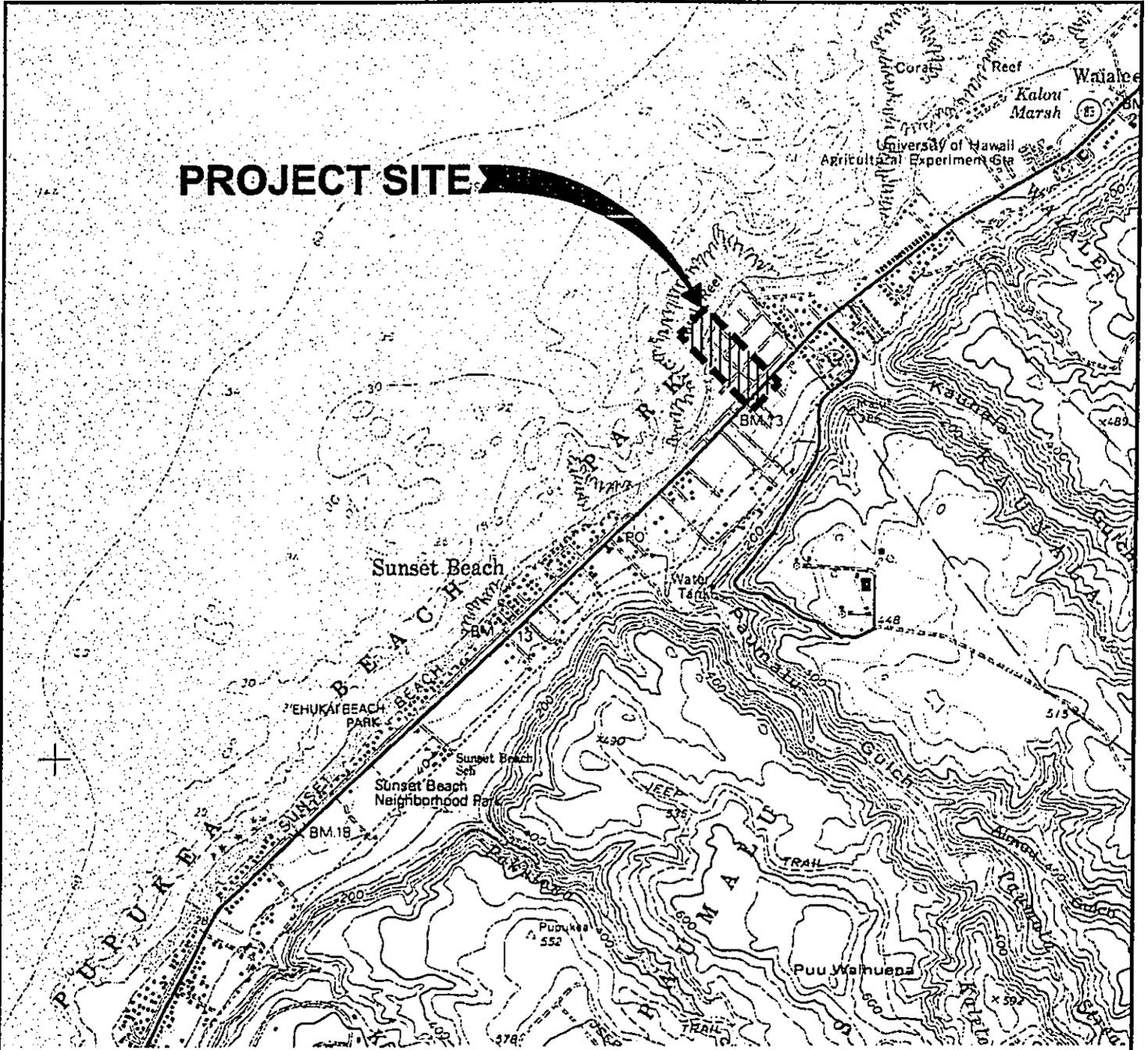
### 2.1 Project Location and Background

**Location.** Kahauola Street is located within the Sunset Beach residential subdivision area on the north shore of Oahu (see Figure 2-1). The project site is located downstream of a small ridge defined by Paumalu Gulch to the west and Kaunala Gulch to the east. The proposed project area includes approximately 0.23 acres of land seaward (makai) of Kamehameha Highway.

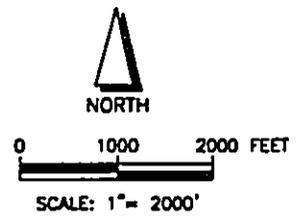
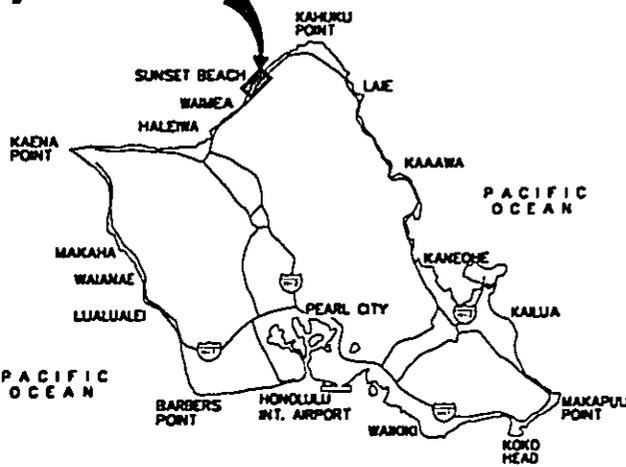
**Background.** The primary drainage system for the residential area is an underground drainline that begins in the drainage easement between Kamehameha Highway and Hoalua Street, runs makai under Kahauola Street and discharges through a 66-inch tee outlet at Sunset Beach (see Figure 2-2). A large inlet structure located in the drainage channel in the easement is fed by a 24-inch pipe culvert and by channel flows from a double five-foot by three-foot box culvert. The pipe culvert collects stormwater runoff from the residential area inland (mauka) of Kamehameha Highway in the vicinity of Oopuola Street and routes it to the inlet. Stormwater runoff in the drainage channel is routed from the area mauka of the highway in the vicinity of the access road to Hoalua Street through the double box culvert. Construction of the drainage system was completed in 1970.

Although the present system may have been adequate at the time it was built, it does not meet current City standards for conveying stormwater runoff from the area during severe weather conditions. Significant flooding occurred in November 1996 when, according to residents, the debris level reportedly reached nine feet high at the intersection of Huelo and Kahauola Streets.

Several alternatives for improving the existing storm drainage system along Kahauola Street were evaluated in the January 1992 Sea Engineering, Inc. (SEI) report titled, "Coastal Engineering Design Guidelines for Outlet Improvements at the Kahauola Street Relief Drain" and the November 1999 Earth Tech, Inc. Preliminary Engineering Report (PER). The former report focused on the drainage problems associated with sand blockage in the ocean outlet during periods of high surf and contained extensive analyses of oceanographic conditions at the site, including site bathymetry and beach topography, wave height distribution and wave force calculations, littoral processes and beach changes from historical data as well as biological studies and water quality sampling. The PER included hydrologic and hydraulic analyses of the drainage system. The alternatives proposed in the



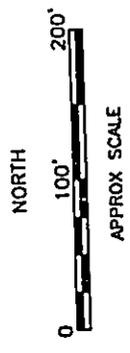
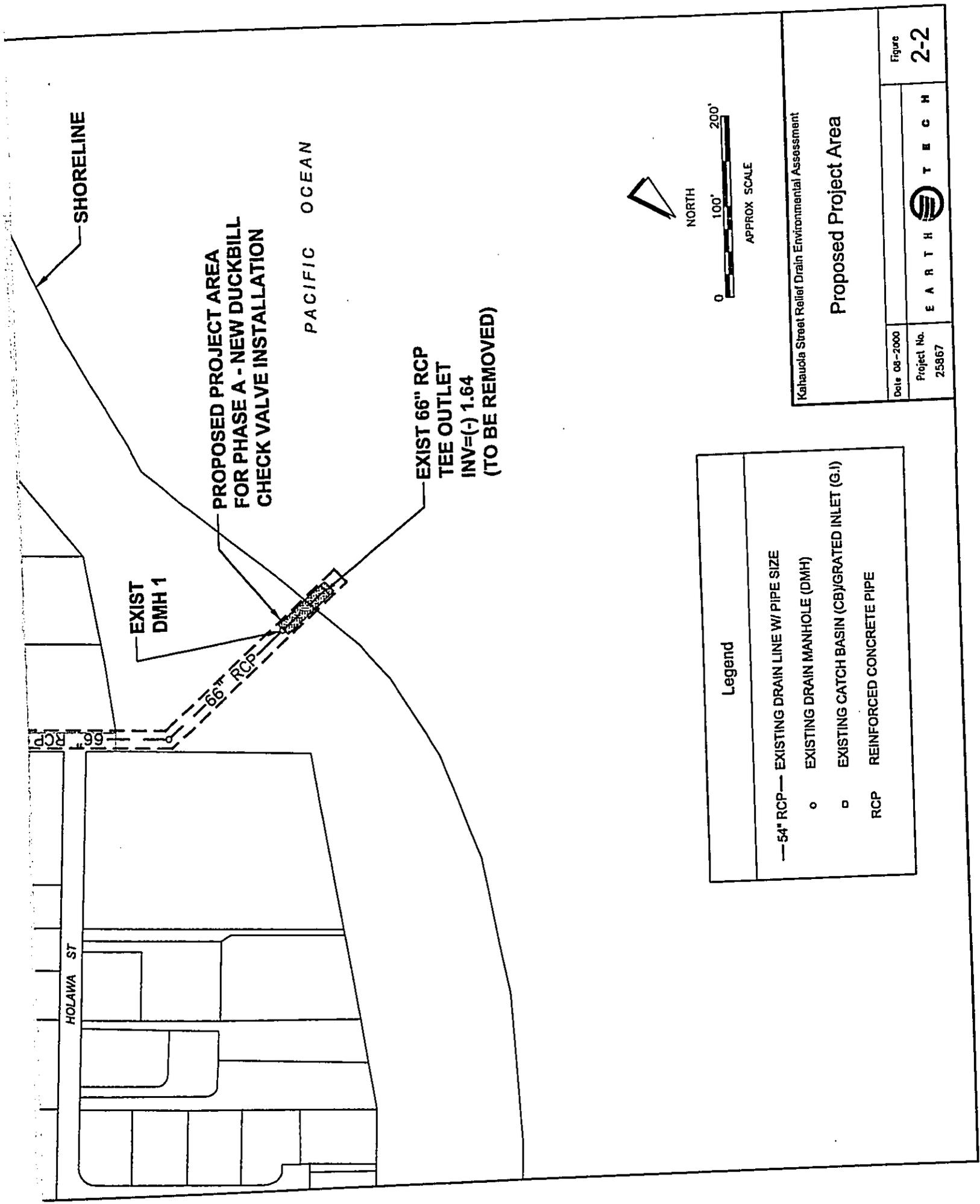
**Project Location**



Kahauola Street Relief Drain Environmental Assessment		
<b>Project Location and Vicinity Map</b>		
Date 05-2000		Figure
Project No. 25867	EARTH  TECH	2-1

Source: U.S.G.S Topographical Map of Oahu (1983)





Legend	
— 54" RCP —	EXISTING DRAIN LINE W/ PIPE SIZE
o	EXISTING DRAIN MANHOLE (DMH)
□	EXISTING CATCH BASIN (CB)/GRATED INLET (G.I.)
RCP	REINFORCED CONCRETE PIPE

Kahaoula Street Relief Drain Environmental Assessment

**Proposed Project Area**

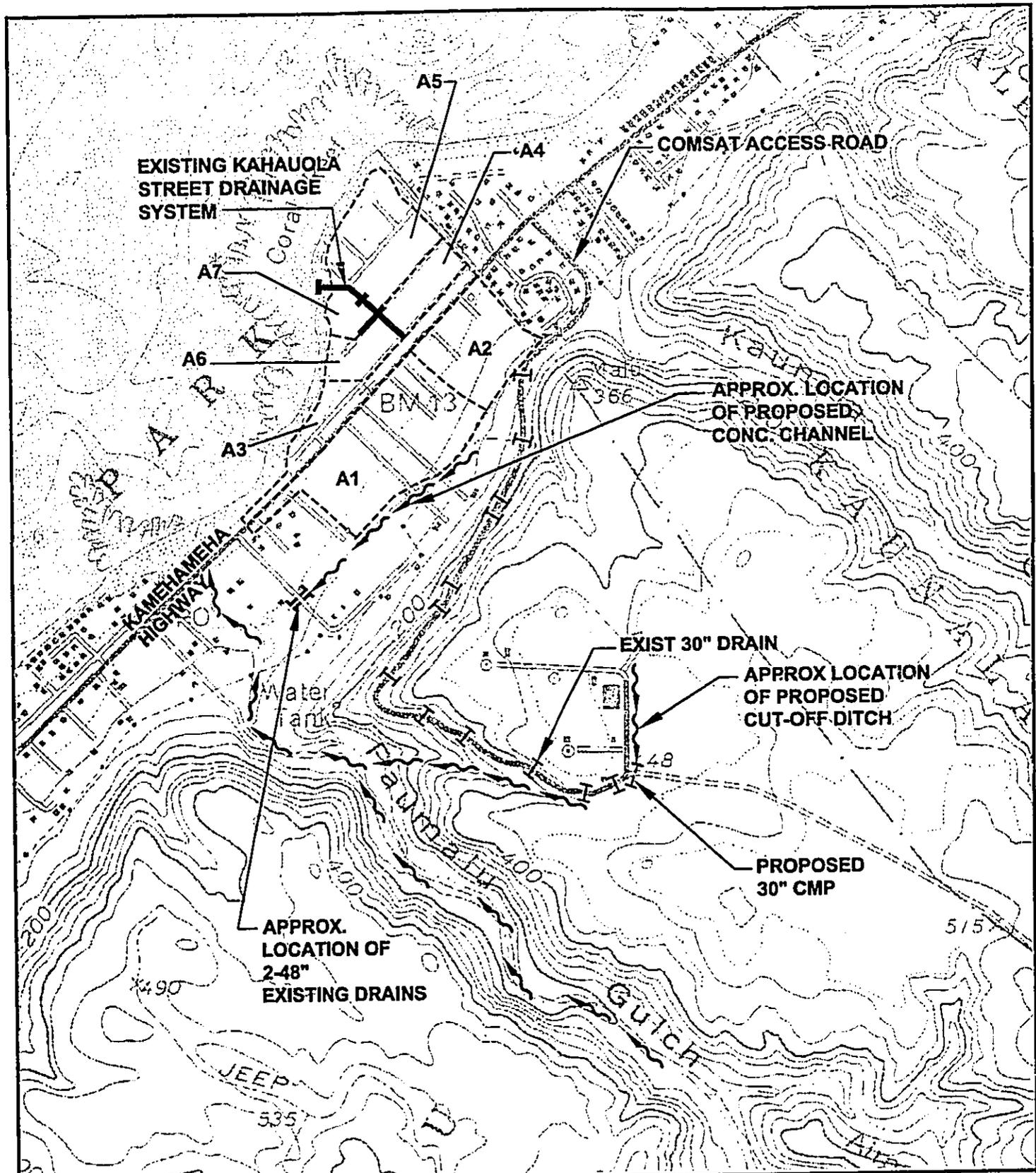
Date 08-2000	 E A R T H T E C H	Figure
Project No. 25867		2-2

1992 SEI report centered around outlet relocation while the PER focused on the site hydrology and hydraulic capabilities of the existing drainline.

**Background Hydrology.** In order to evaluate the capacity of the existing drainline, the contributing drainage areas and the quantity of stormwater runoff were assessed in accordance with the CCH Storm Drainage Standards. The drainage basin for the Kahauola Street drainline shown on Figure 2-3 encompasses the homes makai of Kamehameha Highway and extends to include the residential area mauka of Kamehameha Highway. The general topography of the area slopes down inland from the homes along Sunset Beach toward Kamehameha Highway. There is a relatively flat residential area on the mauka side of Kamehameha Highway and then the topography quickly rises up to the ridge. Located on the ridge is the Communications Satellite Corporation (ComSat) facility. There is a natural low point in the vicinity of Kamehameha Highway between Paumalu Place and Oopuola Street, collecting runoff along the highway and routing it to the drainage system along Kahauola Street. This means the residential area along Kahauola Street is situated in depression (or basin) which serves as a natural detention basin for the stormwater runoff. The total area of the drainage basin is 60 acres. The drainage basin was divided into smaller subbasin areas based on the topography shown on U.S. Geological Survey (USGS) topographic maps for the Waimea and Kahuku Quadrangles (USGS, 1983).

According to a report to the 1993 Legislature, "A Study to Alleviate Chronic Flooding on Oahu's North Shore (Pupukea & Haleiwa-Waiialua Areas)," the State of Hawaii Department of Land and Natural Resources (DLNR) states that Ditch "P" in Easement "K" was supposed to be intercepting and diverting runoff discharged from the first seven culverts crossing ComSat Access Road to Paumalu Gulch when the Paumalu Farm Lots subdivision was designed in 1951. The report also notes that "ditch maintenance work was lacking and therefore, portions of the ditch have become undefined, especially the downstream ditch connection to Paumalu Gulch."

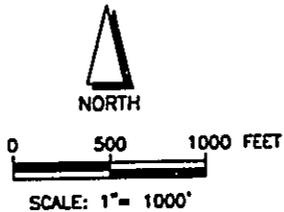
The ownership of Easement "K" and maintenance responsibility of Ditch "P" has been disputed between the private landowners of the residential area mauka of Kamehameha Highway and CCH. Although tax maps for the area describe Easement "K" in favor of CCH, this easement was never dedicated to CCH. To help reduce flooding problems, CCH helped maintain the ditch until 1975. Maintenance was terminated after some residents complained of illegal entry upon their land by CCH maintenance crews. A title search of the easement by CCH confirmed that the easement was privately owned. As such, maintenance of the ditch within the easement was determined to be the responsibility of its owners, not CCH.



**Legend**

- Drainage Boundary
- ~ Direction of Flow
- CMP Corrugated Metal Pipe

Note: Existing road culverts crossing Comsat Access Road are 18" unless otherwise noted.  
 Source: U.S.G.S Topographical Map of Oahu



Kahauola Street Relief Drain Environmental Assessment

**Project Drainage Map**

Date 03-2000

Project No.  
25857



Figure

**2-3**

A drainage study conducted by Belt Collins and Associates (BCA) (Paumalu Drainage Study, September 1989) for ComSat analyzed the hydrology for their facilities and the private homes downstream of the ridge on the mauka side of Kamehameha Highway. In this study, several drainage improvements were to be completed by ComSat to mitigate flood damage resulting from ridge runoff to downstream properties. The following drainage improvements recommended in the BCA report were measures intended to convey runoff from a 10-year storm to Paumalu Gulch.

- Construction of a new 2,200-foot-long concrete-lined drainage channel within an existing drainage easement (Easement "K") located in the residential area mauka of Kamehameha Highway to convey runoff from two existing culverts crossing the ComSat Access Road to two existing 48-inch pipe culverts beneath Paumalu Place.
- Construction of a new concrete-lined drainage channel downstream of the two 48-inch pipe culverts under Paumalu Place approximately 150 feet long to convey runoff directly to Paumalu Gulch.
- Construction of a cut-off ditch and 30-inch pipe culvert upstream of the ComSat facility (on the ridge) to divert a portion of the ridge runoff to Paumalu Gulch approximately 2,500 feet upstream of the existing drainage channel entry.
- Debris removal from the outlet side of the two existing 48-inch pipe culverts under Paumalu Place.

According to the DLNR report, only the cut-off ditch upstream of the ComSat facility was constructed, reducing the amount of runoff routed to the ditch in Easement "K." The other three recommendations were not completed since the improvement to Easement "K" was beyond the scope and responsibility of ComSat. The affected residents were noted to be unwilling to undertake the improvements and of the opinion that it is CCH's responsibility to complete the drainage improvements from the BCA study.

However, Ditch "P" and Easement "K" are privately owned and CCH is prohibited from constructing improvements to private property. In addition, CCH is not responsible for the stormwater within the ditch since it is generated from the ComSat facility and private property; there are no CCH facilities contributing runoff to the ditch.

Although runoff from the ComSat facility and the entire residential area mauka of Kamehameha Highway may contribute to the CCH Kahauola Street drainage system, only stormwater runoff from the drainage basin shown on Figure 2-3 was included in the PER hydrologic analysis of the drainline since Ditch "P" within Easement "K" was to divert the upstream flow to Paumalu Gulch. Hydrologic calculations for the stormwater runoff for the Kahauola Street drainline were performed for a 50-year storm event due to the sump

conditions of the drainage basin in accordance with the CCH Storm Drainage Standards. The total 50-year stormwater runoff was estimated to be 191 cubic feet per second (cfs) for the Kahauola Street drainage basin.

**Background Hydraulics.** Based on the 50-year stormwater runoff quantity calculated in the PER, the capacity of the drainline along Kahauola Street was assessed for adequacy. The alignment of the drainage system is shown on Figure 2-2. In accordance with the CCH Storm Drainage Standards, Manning's equation was used to calculate the hydraulic grade line and to determine if the underground drainage system can convey the runoff to the outlet without flooding the adjacent areas.

The existing culverts crossing Kamehameha Highway are adequate to convey the stormwater runoff generated from the residential area mauka of the highway. However, the Kahauola Street drainline system is inadequate to convey the 50-year stormwater runoff. The capacities of the existing inlets along the drainline are adequate for the calculated stormwater flows (Earth Tech, 1999).

## 2.2 Proposed Action

As noted earlier, the SEI report centered on outlet relocation while the PER focused on the site hydrology and hydraulic capabilities of the existing drainline. The SEI report recommended that the existing ocean outlet be extended 60 feet seaward. The PER determined that the existing drainage lines be replaced with larger pipes and included the SEI report recommendations. The SEI report indicated that adverse environmental effects would be incurred with the implementation of the proposed outlet extension. Because of these anticipated impacts and concerns expressed by the community, an alternate solution was investigated and evaluated.

The proposed action is focused on the reduction of efficiency of the drainage system due to sand clogging of the existing drainline outlet. The traditional way to address the problem is by extending the pipe into the water and out of the active sand transport area. A new method of blocking sand from entering and clogging the pipe involves installing a special kind of check valve manufactured by Tideflex® (the duckbill valve). It was designed in response to a commission by EPA to find an alternative to traditional ineffective methods used to keep drainage lines open. It will allow stormwater to discharge from the pipe while preventing sand from entering it.

The proposed action is comprised of two phases. Phase A consists of the removal of the existing tee outlet and approximately fifty feet of existing 66-inch pipe up to the first drain manhole on the beach (DMH1). The removed sections will be replaced with a duckbill valve, which will slipped over and bolted to a section of 66-inch pipe of the downstream side of DMH 1 and function as the new outlet. It is expected that this action, in conjunction

with regular removal of trash and debris from the inlets, will reduce the effects of future flooding.

The elastomer "duckbill" Tideflex® check valve is specifically designed to eliminate the operational and maintenance problems associated with mechanical flap gate check valves. It has no moving parts. It is called a "duckbill" because of its appearance and functions like an old-fashioned coin purse, always closed unless pushed open by pressure. The EPA rigorously tested it for two years and found that it showed significant improvement over conventional valves in terms of leakage inflow, entrapment of debris, capability to self-clean and susceptibility to marine fouling. Because the duckbill valve is fabricated entirely from rubber, it is resistant to weathering and salt water attack. The flexible nature of the valve prevents most hard marine growth from attaching to the valve. It can continue to operate even when completely buried by sand. Even though the flat terrain of a beach offers little head pressure to force a valve open, the water level will rise until it reaches the top of the bill. Water pressure pushes against the walls of the valve, compressing the sand until a small stream of water can exist from the top of the duckbill. The stream will wash away the surrounding sand, opening the valve until the entire area is cleared and the pipe can flow at full capacity. A plan of the proposed installation is shown on Figure 2-4.

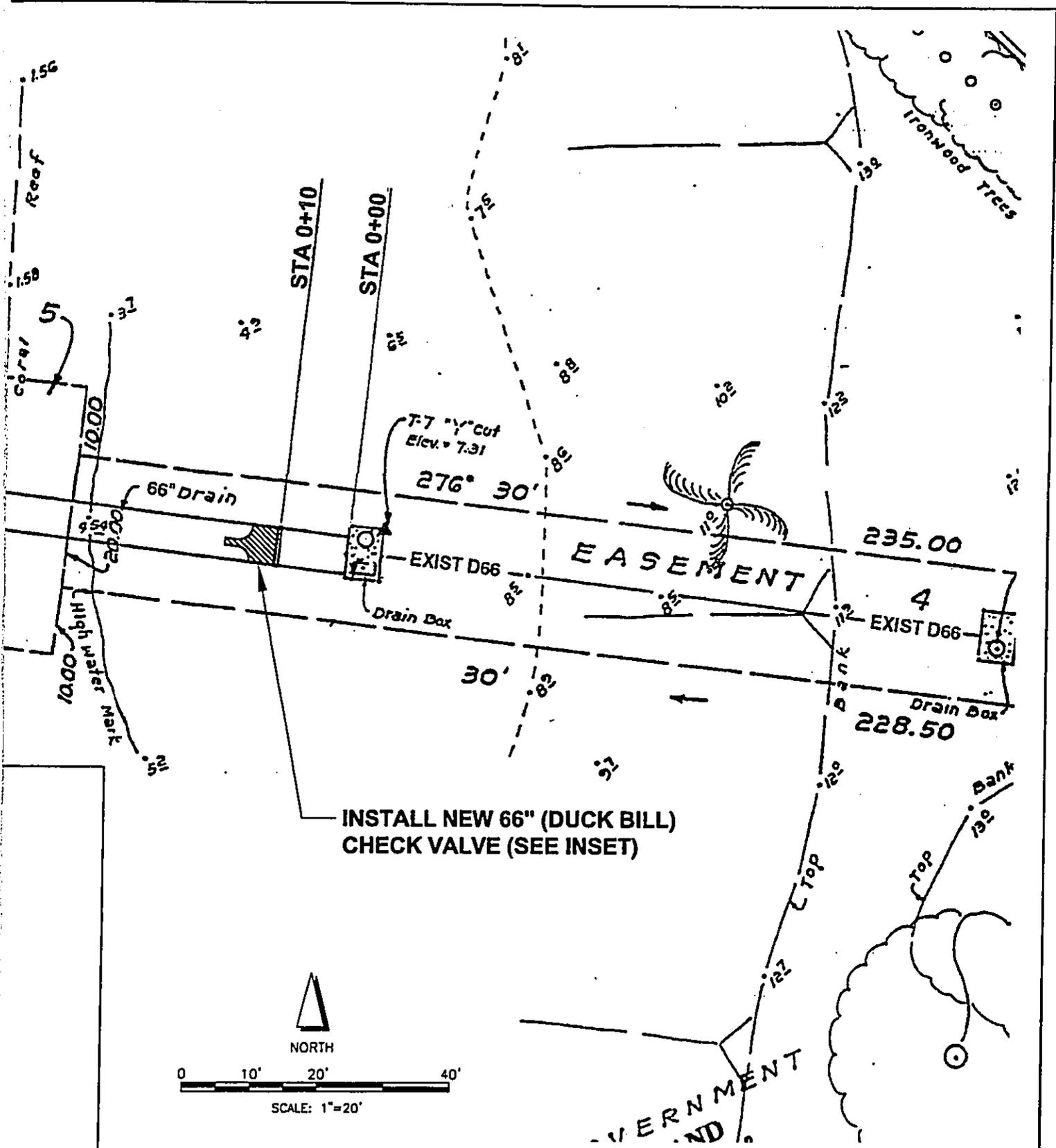
The Phase B action to increase the capacity of the drainage system will be implemented only if the duck bill installation fails to solve the flow problem. It will include removal of the existing 54-inch and 66-inch pipes between the inlet near Kamehameha Highway and the duckbill valve and the installation of a new 84-inch pipe along the same alignment. The 66-inch duckbill valve would be replaced with a larger duckbill valve to fit the enlarged pipe.

### **2.3 Project Schedule and Costs**

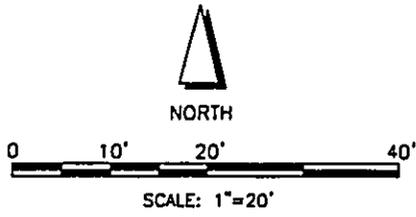
The proposed project is currently in the planning stage and the design and construction of the selected alternative is dependent upon the outcome of the environmental assessment process. Total cost for the planning stage is estimated to be \$150,000.

- Phase A: Item costs for a 66-inch duckbill valve would be \$32,428, plus \$1,683 for shipping costs to Honolulu.
- Phase B: Item costs for an 84-inch duckbill valve would be \$48,520, plus approximately \$3,000 for shipping costs. Construction costs including the removal of the existing 54-inch and 66-inch diameter pipe and replacement with 84-inch pipe is estimated at \$700,000.





INSTALL NEW 66" (DUCK BILL)  
CHECK VALVE (SEE INSET)



Legend	
STA	STATION

Kahaoula Street Relief Drain Environmental Assessment	
Plan View of Check Valve Installation	
Date 08-2000	
Project No. 25867	EARTH  TECH
	Figure 2-4

SS,  
THRU  
T CIRCLE

## 2.4 Alternatives to the Proposed Plan

This environmental assessment evaluates a no-action alternative, and proposed alternatives to resolve drainage problems.

### 2.4.1 No-action Alternative

This alternative is found to be unacceptable because it would leave the Kahauola Street residents with an inadequate drainage system. The current drainage system may be inadequate for the following reasons:

- Sand must be physically removed from the pipe through manholes, sometimes as far up as Huelo Street, roughly 600 feet mauka of the outlet. Continued periodic sand removal will not ensure adequate drainage for the area. Although maintenance may be performed routinely, high intensity rainfall may not precede sand removal operations, resulting in flooding. In addition, disposal of removed sand is costly due to potential contamination from chemicals in stormwater runoff and therefore not suitable for beach replenishment.
- Drainlines may be inadequately sized, and may require upgrades to meet current standards.

### 2.4.2 Outlet/Pipe Replacement Alternative

The following are outlet/pipe replacement alternatives considered:

**Outlet Replacement with an Open Channel.** An open drainage channel constructed to replace the section of the existing closed drainline from DMH 1 to the outlet was evaluated and rejected as an alternative to alleviate area flooding. For this alternative, the existing 66-inch pipe would end at a concrete headwall and then discharge to an open concrete channel approximately 5.5 feet deep by 7 feet wide, following the same alignment to the existing outlet. This design would impair beach access to a greater extent than other alternatives. Periodic maintenance of the open channel outfall (i.e., removing trash, debris and sand clogging), although easier to access for removal than a closed system, would require increased frequency due to sand overtopping the channel. Concern for public safety and health ultimately led to the rejection of the open channel alternative.

### 2.4.3 Outlet Relocation Alternatives

According to the 1992 SEI report, beach sand is an element in flooding by being moved into the outlet and up the pipe (Sea Engineering, 1992). To reduce the impact of sand transport into the outlet, SEI recommends it be relocated to a point outside the area of

active sand transport. Also, a relocated outlet should be designed in a manner such that it is not open to the general prevailing direction from which waves and sand are moving.

The following factors were taken into account in evaluating outlet relocation alternatives:

- the need to be out of the zone of active sand transport in order to reduce sand infiltration;
- the need to minimize adverse impacts to the shoreline and natural coastal processes;
- the existence of a world-class surf site immediately seaward of the existing drain outlet;
- the location of the drain outlet adjacent to a popular and heavily used beach and water recreation area; and
- a high wave energy site, with large potential design wave forces on the pipe and outlet structure.

Several relocation alternatives were assessed in the SEI report and are summarized below.

**Outlet Site Relocation.** The relocation of the relief drain and outlet to another location along the coast was considered. However, a field reconnaissance revealed the sand beach shoreline extends for a considerable distance on either side of Sunset Point and offers no advantage over the existing outlet location. Additionally, an investigation of shoreline changes in this area (Sea Engineering, 1992) that the Sunset Point area, over a 30-year study period was more stable in terms of vegetation line and beach toe than beach areas around it. The outlet site relocation option was rejected because a more suitable site location with regards to sand movement does not exist within the vicinity of the existing Kahauola Street relief drainage outlet.

**Seaward Extension of the Outlet.** The only feasible outlet relocation alternative would be to extend the drainline seaward to a point beyond the zone of active sand transport. The design constraint is how far seaward is sufficient to reduce sand infiltration to an acceptable level while not creating impractical design or construction problems or unacceptable environmental impacts.

The elevation of the drain pipe with respect to the reef flat requires that the pipe run essentially on the surface of the reef, exposed to wave force. If the pipe elevation were lowered by trenching and burying the pipe in the reef to protect against wave assault, it would have to extend some 500 feet before it could daylight at the reef edge. The following are general planning and design considerations.

- The high wave energy environment will require extensive anchoring and armoring of the pipe, with wave forces increasing as the water depth increases.
- Constructability decreases with distance from shore due to increasing water depth and the year-round generally prevailing wave action on the reef.
- Environmental impacts increase with distance seaward due to greater biological impacts of construction and freshwater discharge as well as possible impacts to recreational surfing if the outlet is moved too far seaward.
- Marine flora and fauna species diversity and abundance increases with distance from shore.
- Although there is no surfing in the immediate areas along the area where pipeline extension would occur, surfboards and sometimes surfers themselves are swept onto and across the reef flat in this area.
- The extended outlet will act like a groin perpendicular to the beach blocking longshore transport of sand. Extending the pipe may result in greater sand accumulation on the prevailing downdrift or northeast side, resulting in less sand and a narrower beach for some distance to the southwest of the outlet. Review of historic aerial photos indicates that groin effects of the existing pipe are not significant over the long term and are most notable during the summer season as a result of the prevailing tradewind wave transport from east to west. During the winter seasons with swells coming from the west and north, the high surf erodes and redistributes the sand without apparent regard to the existing 66-inch pipe.

#### 2.4.4 Other Alternatives

**Detention Basin.** This alternative is not feasible due to the lack of open land to dedicate to a detention basin. Based on the hydrologic calculations for this area in the PER, a detention basin with a depth of one foot would need to be 120,000 square feet in order to store the 50-year stormwater runoff.

**Maintenance of Diversion Facilities.** Stormwater runoff from the ComSat ridge to Paumalu Gulch may be restricted due to clogging of Ditch "P" within Easement "K" from debris and vegetation. This may cause drainage to backup, flow through the residential lots makai of Kamehameha Highway, over top Kamehameha Highway and contribute runoff to the Kahauola Street residential area. Since the drainage improvements to Easement "K" recommended by the 1989 BCA study have not been installed by ComSat and the drainage conveyance system is not owned by the CCH, clearing and maintaining the drainage system must be done by the private owners. This alternative was not further addressed.

### **3. DESCRIPTION OF THE AFFECTED ENVIRONMENT**

The following sections describe the existing natural and man-made environmental conditions for the proposed project area. The objective of this section is to define the areas of potential effect (APE) and to provide background information for the determination of how the proposed action may affect these areas. This includes, but is not limited to information regarding air quality, biological and cultural resources, flora and wetlands, geology and soils, hazardous materials and wastes, land use and ownership, natural hazards, noise, socioeconomics, safety and health, shoreline assessment, transportation, utilities and infrastructure, visual and water resources of the proposed project area. It should be noted that the Phase A proposed project area includes the area from the current outlet to the first drain manhole encountered (DMH 1) (see Figure 2-4). The Phase B project area would include the area along the drainline from the duckbill valve to the inlet at Kamehameha Highway.

#### **3.1 Air Quality**

The APE for air quality is the proposed project area and its downwind areas. Construction efforts would be the primary influence in air quality for the APE. Downwind areas vary during the year and air quality is affected by the climate. The climate is characterized by two distinct seasons, primarily defined by the annual variation in persistence of the northeast trade winds. The summer months from May to September are typically drier and warmer, while the winters from October to April are usually wet and cooler. The area is subject to prevailing northeast trade winds with average velocities between 14 to 16 miles per hour a majority of the year. Strong gusts up to 20 or 25 miles per hour do occur intermittently. Trade winds prevail 90 percent of the time during the summer and 50 percent in the winter. The area also experiences Kona (southerly or westerly) winds and storms, particularly during the winter months.

Rainfall patterns over Oahu are influenced by the orientation of the Waianae and Koolau mountain ranges perpendicular to the northeast trade winds. Rainfall maxima occur on the intercepting Koolau range, while desiccated trades produce less intense rainfall over the Waianae range. The mean annual rainfall for the North Shore in the proposed project area is approximately 1500 millimeters per year, with 2000 millimeters per year occurring in areas mauka of the site. Peak rainfall occurs in January (at approximately 150-200 millimeters) while the lowest rainfall occurs in June (at approximately 50-100 millimeters), (Giambelluca, 1986).

Average temperatures on Oahu vary depending on the two seasons in Hawaii. Temperatures in the drier summer months tend to be higher with an average maximum of 88.7 degrees Fahrenheit (°F) in August to a minimum of 64.7° F minimum in February for the cooler winter months (NOAA, 2000).

Modeling of downwind areas was not completed as part of this assessment. However, typical downwind areas of the APE would normally include places to the south-southwest. During Kona winds, downwind areas would typically be places to the north or east.

Ambient air quality, which refers to the purity of the general outdoor atmosphere, is regulated under the Clean Air Act (CAA) and the U.S. EPA National Ambient Air Quality Standards (NAAQS) (40 CFR 50). The DOH also regulates air quality and established ambient air quality standards (HAR 11-59) that are as strict or, in some cases, stricter than the NAAQS. The State of Hawaii has also established standards for fugitive dust emissions emanating from construction activities. These standards prohibit any visible release of fugitive dust from construction sources.

The State of Hawaii monitors ambient air quality at twelve stations throughout the state for five regulated pollutants including:

- Particulate Matter less than or equal to ( $\leq$ )10 microns (PM<sub>10</sub>)
- Carbon Monoxide (CO)
- Sulfur Dioxide (SO<sub>2</sub>)
- Ozone (O<sub>3</sub>) and
- Total suspended particulate matter (TSP)

The primary sources of air pollution in the vicinity of the project site include vehicular traffic from Kamehameha Highway, and smaller surface roads, (producing CO and carbon dioxide [CO<sub>2</sub>]). Other potential sources of air pollution include small-scale agriculture that is present on the North Shore. As described above, persistent trade winds contribute to favorable climatic conditions in the area for air quality. The State has monitored PM<sub>10</sub>, O<sub>3</sub>, CO, SO<sub>2</sub>, and nitrogen dioxide at various locations across the State and island of Oahu (Table 3-1); results from 1994 through 1998 indicate that Oahu meets all ambient air quality standards promulgated by the EPA and is attainment for all criteria pollutants (40 CFR 81.312). Because these standards were not exceeded, and only minimal potential pollution sources are upwind of the site, it can be assumed that air quality at the proposed project area is currently acceptable.

**Table 3-1 Hawaii Air Monitoring Data 1994-1998**

Constituent	Averaging Time	Monitoring Stations	Federal Standard <sup>a</sup> µg/m <sup>3</sup>	State Standard <sup>b</sup> µg/m <sup>3</sup>	Monitoring Result µg/m <sup>3</sup>
PM <sub>10</sub>	24-hour Annual (arithmetic)	Honolulu, Liliha, Pearl City, Lihue; Waimanalo, West Beach, Kapolei,	50	50	<30
O <sub>3</sub>	1-Hour	Sand Island	230	100	< 70

**Kahauola Street Relief Drain Final EA**

Constituent	Averaging Time	Monitoring Stations	Federal Standard <sup>a</sup> μg/m <sup>3</sup>	State Standard <sup>b</sup> μg/m <sup>3</sup>	Monitoring Result μg/m <sup>3</sup>
CO	1-Hour	Honolulu, Waikiki, West Beach, Kapolei	40,000	10,000	< 5,000
SO <sub>2</sub>	Annual Average	Honolulu, West Beach, Kapolei, Makaiwa	80	80	< 10
Nitrogen Dioxide	Annual Average	West Beach, Kapolei	100	70	< 10

Source: State of Hawaii Department of Health – Clean Air Branch, Annual Hawaii Air Quality Data, 1998

< = less than; μg/m<sup>3</sup> = micrograms per cubic meter.

<sup>a</sup> National standards other than ozone and those based on annual or quarterly averages are not to be exceeded more than once a year. Standards based on annual or quarterly averages are not to be exceeded. The ozone standard is not to be exceeded on more than an average of one day a year over a three year period.

<sup>b</sup> Hawaii standards, other than those based on annual or quarterly averages, are not to be exceeded more than once in any 12-month period. Standards based on annual or quarterly averages are not to be exceeded.

### 3.2 Biological Resources

The following sections summarize the aquatic biology and the avifaunal and mammal resources within their respective APEs. Surveys for biological resources were conducted in May 2000; the complete biological reconnaissance report by AECOS is included as Appendix A.

#### 3.2.1 Aquatic Biology

The APE for aquatic resources includes the sandy beach in front of the proposed duckbill valve and the first 10 meters of nearshore water in front of it. This is the approximate area where discharged stormwater from the duckbill may travel. Two aquatic surveys have been completed for the Kahauola area. The initial aquatic biology survey was completed in August of 1991. It consisted of a reconnaissance swim along a 95-meter transect perpendicular to the beach, which included the area in front of the outlet. Every other meter was inspected and estimates (using quadrant frames) of algae, coral, invertebrates and fish were made. To update the August 1991 data, another reconnaissance was completed, comparing relative abundance of species in the area previously surveyed (AECOS, 2000). The survey data is present in the AECOS update report in Appendix A.

The site has a rather homogeneous environment, on a shallow reef platform extending approximately 150 meters offshore, with the depths increasing slowly to a maximum of 6 feet in the survey area. Within this environment, observations indicated subtle changes in dominant species. The most distinct change occurs at approximately 20 meters from the end of the outlet, defining two areas. In the first area, which is nearshore, the dominant species are boring urchins and algae assemblages; coral growth was sparse. Progressing seaward, the second area contained extensive coverage of brown algae and red algae as well as coral (AECOS, 2000).

Comparisons of the amounts and types of echinoderms, algae, coral and fish present are summarized in the following sections:

**Invertebrates.** Echinoderms (especially sea urchins) were the predominate invertebrate in both surveys. Species observed in one survey but not the other generally occurred in the rare or uncommon reported species (AECOS, 2000). Overall comparability between the two surveys regarding invertebrates is considered favorable.

**Algae.** Comparisons between the 1991 survey and observations in May 2000 indicate that more species of algae were observed in the May 2000 reconnaissance, primarily in the uncommon to rare species (AECOS, 2000). The greatest change was with *Turbinaria ornata*, a brown algae. In August 1991, it was observed to be rare, however, in May 2000, it dominated the substratum. Additionally, *Sargassum* (also a brown algae) was uncommon or occasional in observance in 1991, but absent in 2000. The changes with *Turbinaria ornata* may be attributable to its seasonal growth preference of cooler winter months. However, the absence of *Sargassum* is not explained (AECOS, 2000).

**Coral.** In the 1991 survey, reef building coral appeared closest to shore at 10 meters, with its coverage increasing at approximately 30% at 22 meters. During the May 2000 survey, the encrusting corals *Porites lobata* and the smaller blue encrusting *Montipora flabellata* dominate the coral coverage (AECOS, 2000). In the first 20 meters of the shoreline, *Porites* coverage was at approximately 5-10 % and 50-60% in the outer part of the transect (95 meters or 285 feet). However, it should be noted that the macroalgae dominate the reef platform. Based on observations of the May 2000 reconnaissance, coral coverage has not declined (AECOS, 2000).

**Fish.** Considerable consistency was demonstrated between the two surveys regarding fish. More species were observed in the May 2000 survey, most likely due to the strong interest of the observers (AECOS, 2000). All but one species observed in the May 2000 reconnaissance, and not observed in the August 1991 reconnaissance, were rare or uncommon species. Often, only one fish was observed. AECOS has concluded that the overall fish population has changed very little in a quantitative sense, when compared to the August 1991 reconnaissance (AECOS, 2000).

### 3.2.2 Avifauna and Mammals

The avifaunal and mammals APE for the proposed duckbill valve installation and potential drainline size upgrade is the beach in front of the valve, and the area of the drainline and immediately adjacent to it in the proposed project area. Mammals were not encountered across the proposed project area. However, it is likely that dogs, small Indian mongoose, cats, and rodents (roof rats, Norway rats and field mice) are present in the vicinity of portions of the proposed project area. No endemic mammalian species were encountered

in or near the proposed project area during this survey. Kalou Marsh, located approximately 4,000 feet northeast of the proposed project site (which is not part of the APE), may contain Hawaiian Duck, Hawaiian Coot, the Common Moorhen, and the Hawaiian Stilt. These species may fly over the proposed project area, or visit it; however it is not their primary habitat nor a likely loafing or resting place for them. No endangered species have been recorded in the APE (USFWS, 2000).

### **3.3 Cultural Resources and Practices**

Cultural resources are prehistoric and historic sites, structures, districts, artifacts, or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, religious, or any other reason. For the purposes of this EA, cultural resources are defined to include prehistoric and historic archaeological sites, historic buildings and structures, and traditional (i.e., native Hawaiian) sites. Cultural practices may include subsistence, commercial, residential, agricultural, access-related, recreational and religious and spiritual customs.

#### **3.3.1 Cultural Resources**

The APE for cultural resources is the proposed project area from the inlet at Kamehameha Highway makai along Kahauola Street to existing tee outlet. It should be noted that the entire project area has been previously disturbed from the original construction and maintenance of the drainline.

An archaeological resources background search was completed in April 2000. SHPD records reviewed indicate that three burial sites have been encountered in the vicinity of the APE (Table 3-2). Several burials have been encountered in unconsolidated beach sand that eroded. Construction activities at Ehukai Beach Park (Sunset Beach) have encountered other burials as well as midden and fire pits in a cultural layer (Table 3-2). This cultural layer was present along with some of the other burials as well. The characteristics of the layer may indicate that the beach area was not used for primary residences, but perhaps as seasonal campgrounds.

#### **3.3.2 Cultural Practices**

The site is located in the ahupua'a of Paumalu in the Koolauloa District. Pre-contact Hawaiian inhabitants of the Sunset Beach area probably utilized the beach to obtain marine resources while living farther inland. Since the narrow sea-plain has little fresh water, and these gulches were reportedly not terraced for taro farming, it is likely that small gardens were planted with sweet potatoes, yams and gourds. The beach area was probably seasonally used due to high winter waves. Marine resources, such as fish, shell fish and probably sea weed were collected, however, the big-eyed scad was forbidden from removal

from this area. Land Commission Awards (LCAs) from the Great Mahele in 1848 indicate that several Hawaiian families utilized the areas mauka of Sunset Beach for growing foods similar to those listed above. It was also reported that more families were also in the area, but had not claimed lands in the Great Mahele (Athens and Magnuson, 1998).

**Table 3-2 Archaeological Resources in the Vicinity of the APE**

<b>SHPD Site No.</b>	<b>Date</b>	<b>Description</b>	<b>Source</b>
50-80-01-5531	3/17/92	Burial containing a skull and fibula.	(Komori, 1992)
50-80-01-33	7/18/97	Burial containing the upper body portion of an individual, with a cultural layer present.	(Collins, 1997)
50-80-01-4519	8/30/79	Two human remains (male and female) within a cultural layer (heavy charcoal present).	(Yent, 1979)
50-80-01-5585 50-80-01-5586	7/98	Pre-contact midden deposits and charcoal.	(Athens and Magnusen 1998)
50-80-01-4452	2/92	Human bones from two individuals, a fire pit and midden (basalt flakes).	(Kennedy and Denham, 1992)

### **3.4 Flora and Wetlands**

The APE for flora and wetlands includes the proposed project area, and the areas bordering it. Several different vegetation types are present in the APE including:

- Occupied lands (residential, recreational and roadways), and
- Strand vegetation (pockets of coastal ecosystem plants). These plants included morning glory varieties (pohuehue), beach dropseed grass ('aki 'aki), naupakapaka and a palm tree.

The vegetation types can be seen in Appendix B. Native plants, which are increasingly rare in lowland, coastal and urban areas of Hawaii are present in the vicinity of the APE. The Kalou Marsh is located approximately 4,000 feet northeast of the project site, but is not part of the APE (Elliott, 1981). There are no other wetland-type areas or plants that are associated with the APE or proposed project area.

### **3.5 Geology and Soils**

The APE for geology and soils is the proposed project area. The island of Oahu consists of two volcanic domes, the younger Koolau in the east, and older Waianae in the west, comprised of tens of thousands of thin, extremely permeable basalt lava flows. Both

volcanoes are eroded remnants of large, elongated shield volcanoes. Coastal plain sediments are primarily composed of fossil reef limestone and calcareous beach deposits, as well as alluvial sediments.

The soil association in the vicinity of the project area is classified as the Lualualei-Fill land-Ewa association (U.S Department of Agriculture – Soil Conservation Service [USDA-SCS], 1972). It is composed of deep, nearly level to moderately sloping, well-drained soils having a fine to moderately fine textured subsoil or underlying material, and areas of fill land on coastal plains. Specific soil types underlying the APE include: BS (beach sand), JaC (Jaucas sand, saline, 0-12 % slopes), and WkB (Waialua silty clay, 3-8% slopes), (USDA-SCS, 1972). The soils in the vicinity of the proposed project site are presented in Figure 3-1.

The general topography of the area slopes down inland from the homes along Sunset Beach toward Kamehameha Highway (Route 99). There is a relatively flat residential area on the mauka side of Kamehameha Highway and then the topography steeply rises up to the ridge. Located on the ridge is the ComSat facility. There is a natural low point in the vicinity of Kamehameha Highway between Paumalu Place and Oopuola Street. This topography indicates the area was a natural detention basin for stormwater accumulation or a wetland-type area prior to residential development.

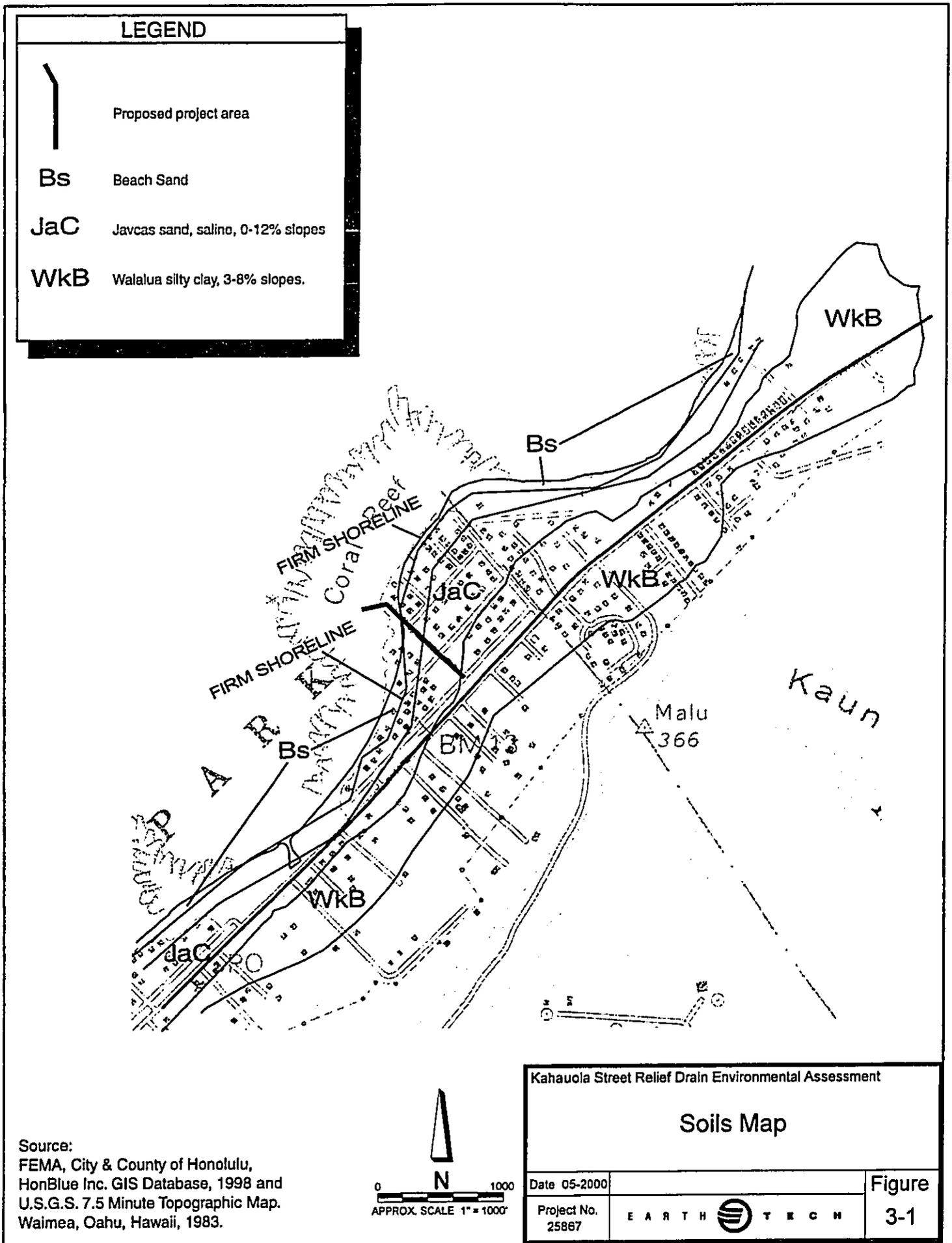
### **3.6 Hazardous Materials and Wastes**

The APE for hazardous materials and wastes is the proposed project area, and nearshore area immediately adjacent to it and downcurrent from it. EPA defines waste materials in 40 CFR 261.2 as a discarded material (i.e., abandoned, recycled, or inherently waste-like) that is not specifically excluded under their definition. Hazardous waste is further defined in 40 CFR 261.3 as any solid waste not specifically excluded, which meets specified concentrations of chemical constituents or has certain toxicity, ignitability, corrosivity or reactivity characteristics. Additionally, petroleum products (regulated materials) have constituents that individually may be considered hazardous.

In 49 CFR 171.8, the Department of Transportation (DOT) defines hazardous materials as a substance or material which is capable of posing an unreasonable risk to health, safety, or property when transported in commerce and has been so designated.

Although there are no transportation or storage facilities specifically designated for hazardous waste or materials in the APE, there are several areas of concern for exposure:

**Roadways.** Hazardous materials and/or wastes may be transported on roadways that are parallel to or intersect the APE.



**Construction Equipment.** Vehicles involved in construction of the proposed project contain an assortment hazardous and regulated materials (i.e. gasoline, diesel, oil, hydraulic and brake fluid, etc.).

### **3.7 Land Use and Ownership**

In 1977, the City and County of Honolulu approved the General Plan that directs growth in Honolulu (the primary urban center) and Ewa, while limiting growth in the urban fringe and rural areas (CCH, 1999). The North Shore of Oahu has been designated as a rural area to maintain its rural character, agricultural lands, open space, natural resources, and scenic beauty. Growth is limited to infill areas adjacent to already established areas to accommodate housing and employment needs (CCH, 1999). However, the region's population is expected to be maintained at 1.8 percent of the island wide population through the year 2020. The proposed project area is listed as a park along the shore and a rural community mauka (CCH, 1999).

The proposed project is located within an utility easement/right-of-way owned by CCH. Properties to the north and south of the proposed project site are single-family detached residences with the following tax map key (TMK) designations: 5-9-01-109, 5-9-01-113, 5-9-01-003, 5-9-01-100, 5-9-01-106, 5-9-01-112, 5-9-01-114, 5-9-01-015, 5-9-01-016, and 5-9-01-027 (CCH, 2000). The tax map key designations are presented in Figure 3-2.

### **3.8 Natural Hazards**

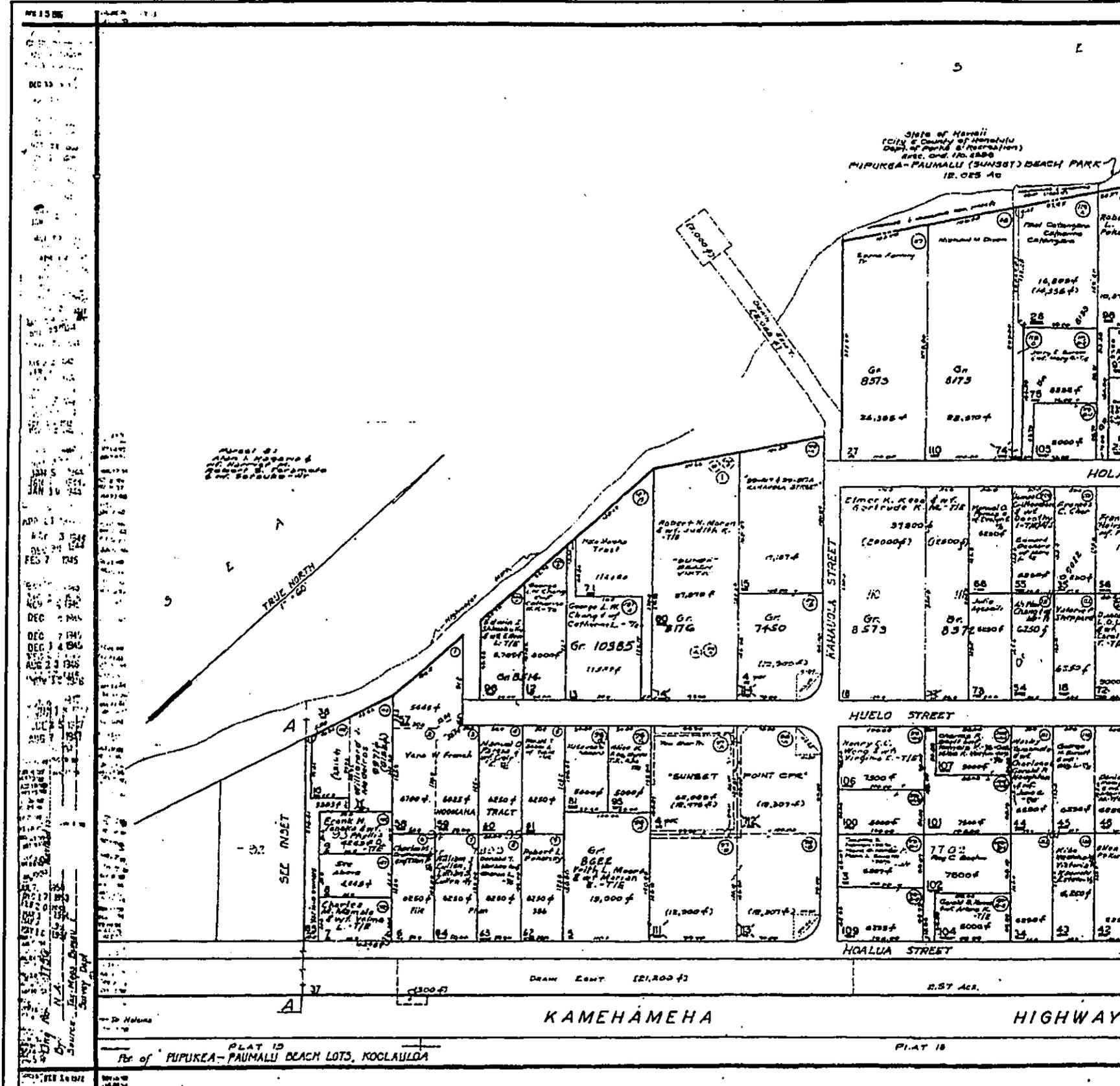
Natural hazards that may occur in and affect the proposed project area include floods, tsunamis, hurricanes, earthquakes, and other natural events. The APE for natural hazards includes the proposed project area and adjacent downgradient areas.

**Floods.** The Federal Emergency Management Agency (FEMA) updated the Flood Insurance Rate Map (FIRM) for the North Shore area in 1990. These areas are listed as zones:

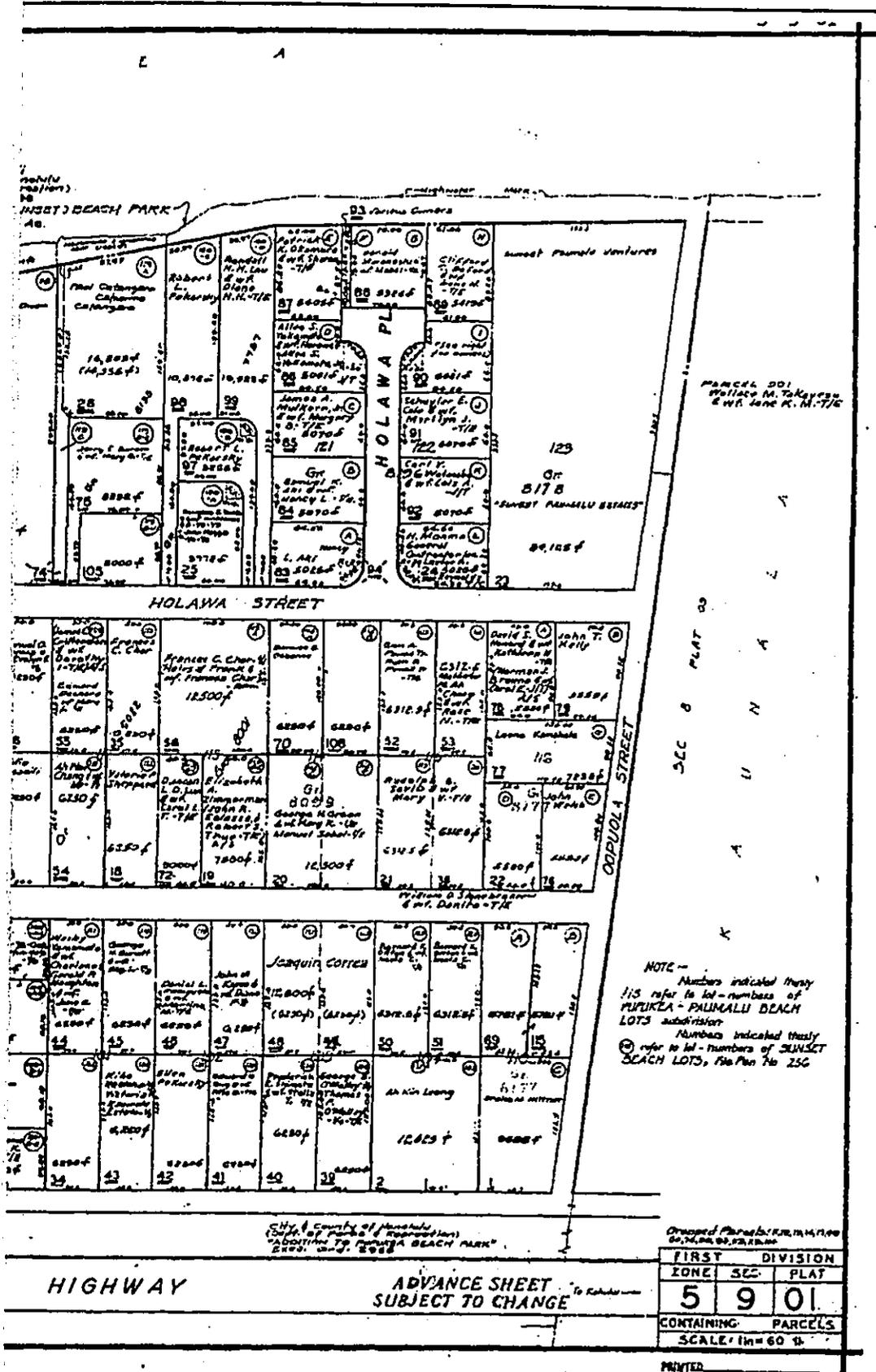
- AE - Areas of 100-year flood, base flood elevation determined.
- VE - Areas of 100 year coastal flood with velocity (wave action), base flood elevations determined (Coastal High Hazard District).

The APE contains AE areas with base flood elevations ranging from 14-21 feet above mean sea level (msl). Also in the APE are VE areas with base flood elevations ranging from 19-21 feet above msl. Figure 3-3 shows the flood zones, and base flood elevations determined by FEMA.

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**LEGEND**

- 1) Owner's lessee's and vendee's names recorded on the tax map not be current.
- 2) Scale not accurate.

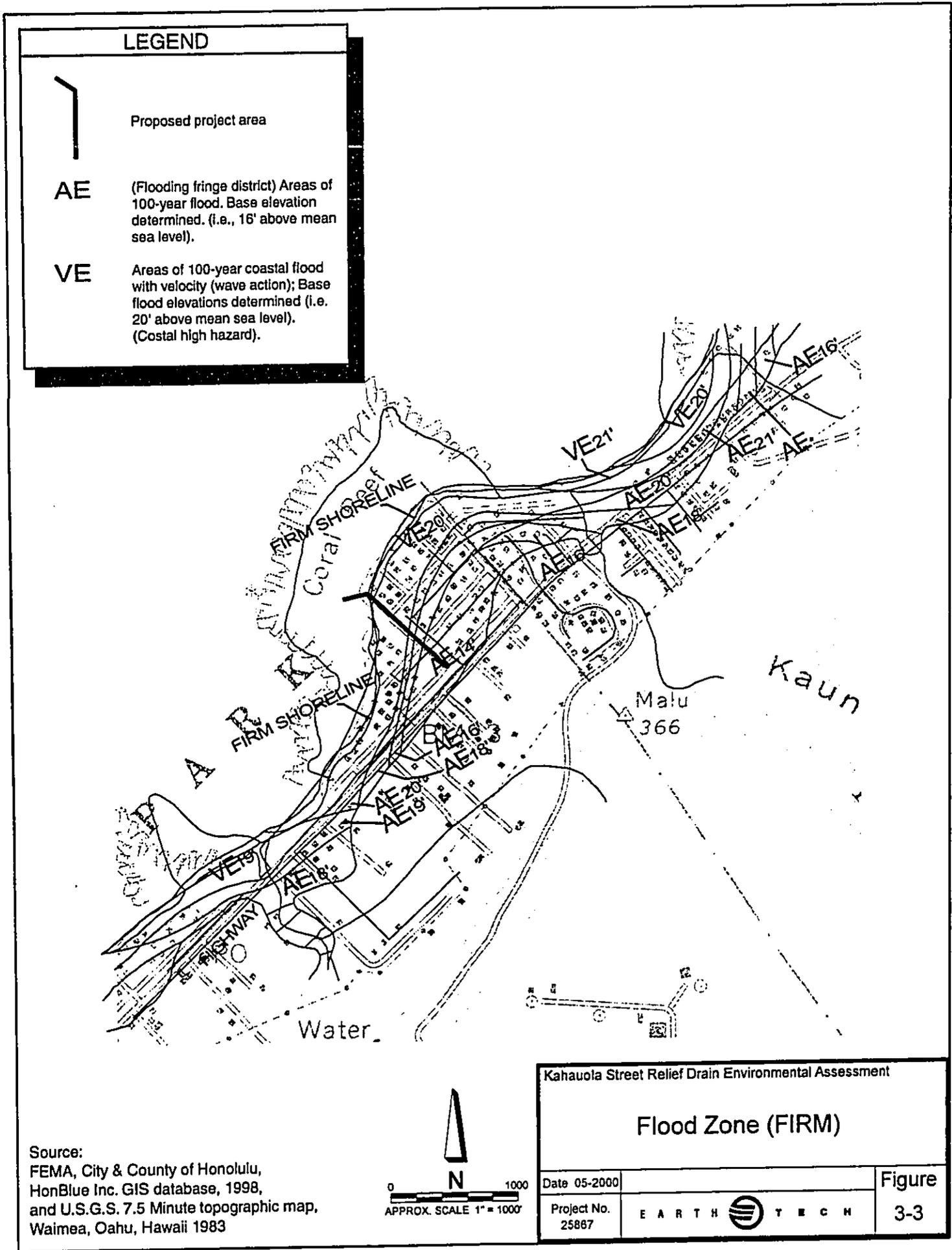
Kahauola Street Relief Drain Environmental Assessment

## Tax Map Key

Date 05-2000	Figure
Project No. 25867	3-2

EARTH TECH

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**Tsunamis.** Tsunamis are a series of destructive ocean waves generated by seismic activity that could potentially affect shorelines of Hawaii. Tsunamis affecting Hawaii are typically generated in the waters off of South America, the west coast of the United States, Alaska and Japan. Local tsunamis have also been generated by seismic activity on the island of Hawaii.

The State of Hawaii Civil Defense establishes tsunami inundation zones and maps for all coastal areas in Hawaii. According to the Tsunami Evacuation Oahu Map 12: Sunset Beach to Waialua Bay, the APE is in a tsunami inundation zone (GTE, 1999).

**Hurricanes.** The Hawaiian Islands are seasonally affected by Pacific hurricanes in the season from June to November. These storms generally travel toward the islands from a southerly or southeasterly direction and can deposit large amounts of rain with high winds on the Hawaiian Islands. The storms generally contribute to localized flooding and coastal storm surges.

**Earthquakes.** Because Oahu is an older Hawaiian island with dormant volcanic activity, it is not particularly prone to seismic activity. Seismic activity usually occurs on the island of Hawaii, and has been felt as far away as Oahu. Oahu is listed in Seismic Zone 2A on a scale of 1 to 4 under the 1997 Uniform Building Code (ICBO, 1997). Zone 2A indicates a place that has low potential for ground motion created by seismic activity.

### 3.9 Noise

The APE for noise effects is the proposed project area and immediately adjacent areas. Noise is defined as sound that is undesirable because it interferes with speech communication and hearing, or is intense enough to damage hearing, or is otherwise annoying. Under certain conditions, noise can interfere with human activities at home or work and affect human health and well being. The accepted unit of measure for noise levels is the decibel (dB) because it reflects the way humans perceive changes in sound amplitude. Sound levels are easily measured, but human response and perception of the wide variability in sound amplitudes is subjective.

Different sounds have different frequency content. Typical heavy construction equipment noise levels are provided in Table 3-3. When describing sound and its effect on a human population, A-weighted (dBA) sound levels are typically used to account for the response of the human ear. The term "A-weighted" refers to a filtering of the noise signal to emphasize frequencies in the middle of the audible spectrum and to de-emphasize low and high frequencies in a manner corresponding to the way the human ear perceives sound. This filtering network has been established by the American National Standards Institute (ANSI). The A-weighted noise level has been found to correlate well with a person's judgment of

the noisiness of different sounds and has been used for many years as a measure of community noise.

**Table 3-3: Heavy Construction Equipment Noise Levels at 50 Feet**

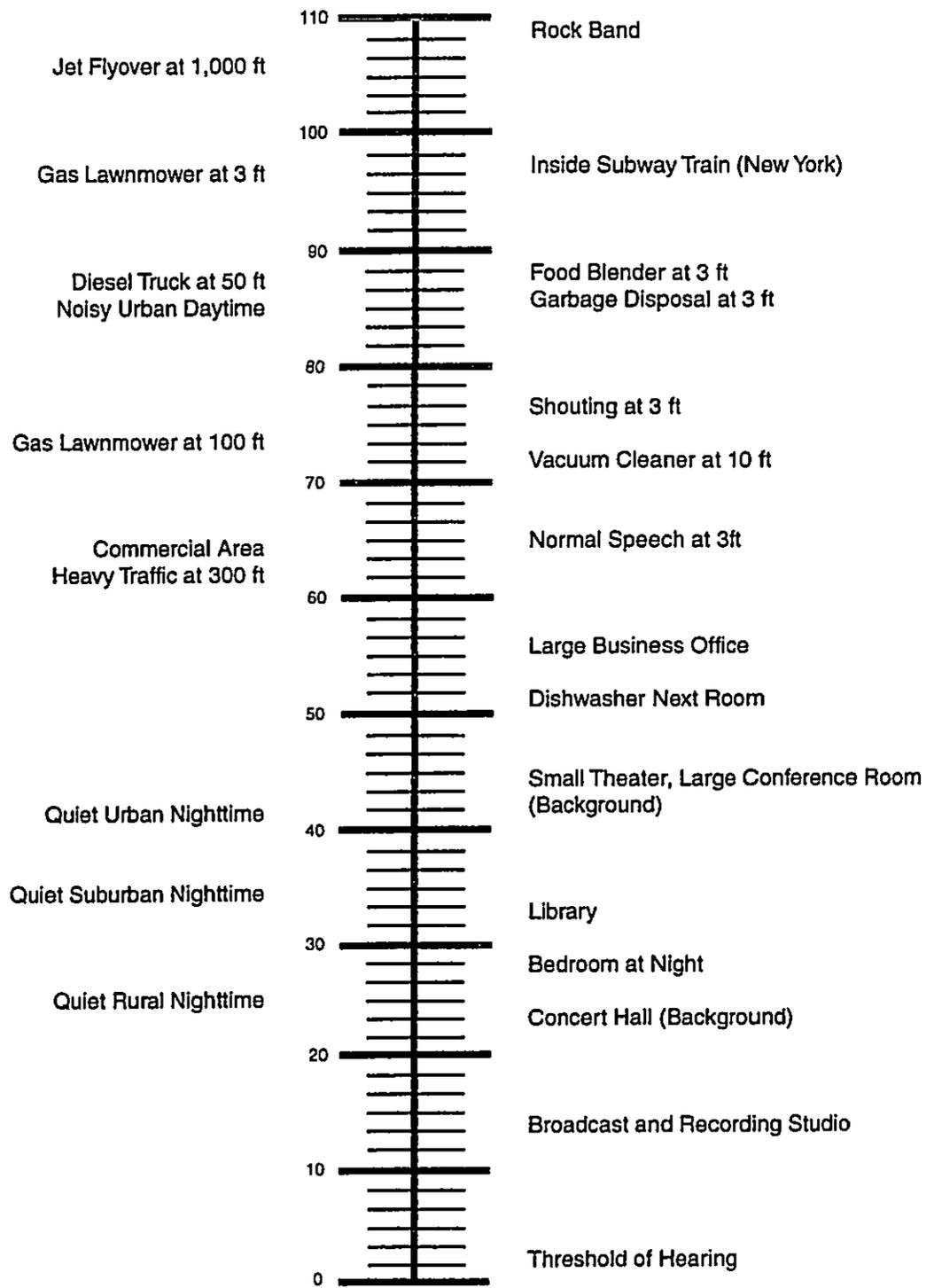
Equipment Type	Generated Noise Level (dBA)
Bulldozer	88
Backhoe (rubber tire)	80
Front Loader (rubber tire)	80
Dump Truck	75
Concrete Truck	75
Concrete Finisher	80
Crane	75
Asphalt Spreader	80
Roller	80
Flat-bed Truck (18 Wheel)	75
Scraper	89
Trenching Machine	85

Source: U.S. Army Corps of Engineers, (1978)

Community noise levels change continuously during the day; therefore, to compare levels over different time periods, several descriptors have been developed that take into account this time-varying nature. The most common descriptor is the annual average day-night sound level ( $L_{dn}$ ). The  $L_{dn}$  is the average A-weighted level for a 24-hour period with a 10dB upward adjustment added to the nighttime levels (10:00 PM to 7:00 AM). This adjustment accounts for the increased sensitivity of most people to noise in the quiet nighttime hours.  $L_{dn}$  has been adopted by many federal and state agencies as the accepted unit for quantifying human annoyance to general environmental noise and for assessing and correlating the various effects of noise on humans and animals, including land use compatibility, sleep interference, annoyance, hearing loss, speech interference, and startle effects. Comparative noise levels are presented in Figure 3-4.

Permissible occupational noise exposure levels and duration's defined in 29 CFR 1910.95 are presented in Section 4.7. The DOH monitors noise issues in accordance with HRS, Title 19, Chapter 342F. The DOH issues noise permits only when excessive noise levels are expected. In addition, the Occupational Safety and Health Act of 1970 (OSHA) was established to assure healthy and safe working conditions for workers. OSHA regulations established a maximum noise level of 90 dBA for a continuous 8-hour exposure (typical workday); maximum noise levels for shorter periods of time are higher.

<b>Common Outdoor Noise Levels</b>	<b>Noise Level (dBA)</b>	<b>Common Indoor Noise Levels</b>
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Kahauola Street Relief Drain Environmental Assessment

### Comparative Noise Levels

Date 05-2000		Figure
Project No. 25867	EARTH  TECH	3-4

Source: U.S. Army Space and Strategic Defense Command, 1994a.

The major contributors of noise in the vicinity of the project area are motor vehicles on nearby roads. As described in Section 3.13, there are numerous roads that parallel or intersect the APE. In the areas of these roads, traffic is somewhat continuous and ambient daytime noise levels are consistent with an urban area. Estimated noise levels for the roadway areas are between 60-70 and 80-85 dBA (Figure 3-4).

The nearest sensitive noise receptors (human) to the proposed project include the adjacent residences and people present at Sunset Beach Park. Sensitive wildlife may occasionally be present in the beach area.

### **3.10 Socioeconomic Characteristics**

The socioeconomic characteristics of the project area include demographics, employment, and commercial activities. The following section discusses the existing social and economic characteristics of the North Shore district that comprises the APE. The data are from the last census performed in 1990 (UH-H, 1998).

The project site is located on the island of Oahu, in the City and County of Honolulu. As of 1990, Honolulu claimed 830,000 residents or approximately three-fourths of Hawaii's population. Approximately 96.4 percent of the population live in an urban setting with 3.6 percent living in a rural area. The ethnic diversity of Oahu is composed of the following populations: Caucasian (25%), Chinese (6%), Filipino (10.6%), Hawaiian (16.2%), Japanese (21%) and others (21.2%), (UH-H, 1998). The North Shore has 1.8% of the island-wide population and is planned to be maintained through the year 2020 (CCH 1999). The North Shore is a designated rural area planned to maintain agricultural lands, open space, natural environments, and recreational resources. Diversified agriculture, low-key retail and cottage industries are the main economic base on the North Shore. Since it is a planned rural area, low-rise and infill development is planned to occur primarily in the areas of Haleiwa and Waialua (CCH 1999).

The average population density along the APE is approximately 501-5,000 people per square mile by census tract according to the 1990 census (UH-H, 1998). The average population ethnicity in the vicinity of the APE ranges from 10 - 24.9% Filipino, 25 - 49.9% Caucasian, 10 - 24.9% Japanese, 5 - 24.9% Hawaiian, and 1 - 4.9% Chinese. According to 1990 census data, median household incomes for this area range from \$30,000 to \$50,000 (UH-H, 1998).

### **3.11 Safety and Health**

Safety and health includes consideration of activities, occurrences or operations which have the potential to affect the following:

- **Safety and health of Workers.** Workers on the project are directly involved with the operation or construction of the drainline (which includes installation of the check valve) and during that operation (or subsequent maintenance) are physically present onsite.
- **Safety and health of the Public.** Members of the public may be physically present in the vicinity of the drainline (i.e., neighboring residential areas etc.).

**Workers.** The affected environment for workers includes the construction areas for the proposed drainline. The APE for workers will be the drainline, the 20-foot easement on either side of the drainline, and any staging/access areas used for construction. Health and safety issues concerning workers include, but are not limited to, heavy equipment operation, traffic, heat exposure, biological exposure (insects, loose dogs), and hazardous surf.

**Public.** The APE for the public includes the areas immediately adjacent to the proposed project area, (e.g., residential developments, roads, and bikeways and beach parks in the Sunset Beach area. Health and safety issues impacting the public include, but are not limited to exposure to construction activities (i.e., noise pollution, potential fugitive dust exposure, construction traffic, etc.).

The proposed project may also have an effect on safety and health associated with flooding in the Pupukea-Paumalu and Sunset Beach lots. With the removal of the tee outlet and drainline to DMH 1, and installation of the duckbill valve, sand blockage of the drainline should be minimized. If Phase B needs to be implemented, capacity will be increased. These improvements are designed to increase the efficiency of the drainline, a positive safety and health effect in terms of reducing the effects of flooding.

### **3.12 Shoreline Assessment**

In support of HRS 205A, the Office of Environmental Quality Control (OEQC) has issued *Shoreline Hardening Policy and Environmental Assessment Guidelines* (OEQC, 1998) which requires environmental assessments prepared in conjunction with an application to construct a shoreline structure which may affect littoral processes to contain the studies and justifications listed below. Relevant site maps are presented in Section 2; the site photographs, aerial photographs, beach profile and beach change map are presented in Appendix B.

**Shoreline Type.** Sunset Beach is a continuous sandy shoreline which, on average, is 200 feet wide for approximately two miles. The beach character is very dynamic with significant seasonal width changes. High surf in the winter months causes beach erosion exposing beach and reef rock along the shore resulting in a steep and narrow foreshore. In the

summer months, lower wave activity produces a wide beach and flatter slope. Housing is present at the vegetation line bordering the beach at the proposed project area. At Sunset Point, shoreline protection structures (walls) completely line the area. Streams or channels are not present in the proposed project area; the only drainage feature is the current drainage pipe.

The shoreline front is a narrow beach consisting of coarse sand. A shallow coral reef approximately 100-150 feet wide and less than 1.5 meters in depth exists outside of the shoreline. The maximum depth of the reef occurs approximately 60-70 meters from the shoreline; outside of which it becomes shallow again until the offshore reef edge. The substratum of the reef at the shoreline edge is a smooth limestone bottom which grades to a highly eroded and grooved surface 5 meters from the shore. Farther offshore, the substratum becomes irregular with small channels and elevated sections of reef at the offshore edge. Coral cover begins at approximately 10 meters from the shore and continues offshore.

**Coastal Hazard History.** With the proposed project site location on the shoreline of the North Shore of Oahu, it is susceptible to numerous coastal hazards including high waves, high winds, high water levels from storms and tsunamis. These coastal hazards are caused from three different and sometimes interacting events; tsunamis, high waves and intense rainfall. Hurricanes, although not common, may also have extreme effects on coastlines with combined storm surges and heavy rains. The damage caused by these events is destruction of property, erosion, flooding and even loss of life. In the proposed project area, the winter months are the rainy season which also occur with typical high surf conditions. This results in increased likelihood of damages from high waves and storms.

Conditions at the Sunset Beach area are well known for creating large surf, especially in the winter months. For the months of December, January and February, an average of three days per month can have swells of 12 feet producing breakers up to 24 feet (Scudder, 1972). These are often produced by large North Pacific swells which originate as severe storms in the Aleutian Islands to the north (Sea Engineering, 1992). Swells over 12 feet from the North occur 2% of the time, while those coming from the northwest occur 2.6% of the time (Scudder, 1972). Flooding and erosion damage are common when breakers exceed 20-25 feet. Damages are intensified when they occur with high tide, low surface elevation and little offshore protection. It should also be noted that high wave conditions can last for several days, depending on the producing storm (Scudder, 1972).

Flooding due to intense rainfall is one of the most repetitious causes of damages, and commonly occurs in the winter months (Scudder, 1972). Flooding is caused by stream overflow, poor drainage, depressions in relief, clogged streams and drains as well as reservoir overflows. Rain flooding is likely to occur in depressions near cliff faces and

where there is poor infiltration or poor drainage. Known flooding zones of this type exist near Waialua, Haleiwa and Sunset Beach (Scudder, 1972).

Tsunamis can occur at any time and are the result of seismic activity. They are characterized by a long wave length and rapid propagation. As they enter shallow water, depending upon the conditions, their speed is reduced and they may become steeper. The tsunami runup is the water maximum elevation reached above mean low water at a given point. The inundation is the horizontal distance inland of flooding or overflowing (Scudder, 1972). Historical data indicates that the North Shore is susceptible to tsunami damage. Review of historical aerial photographs indicate that at Kahuku Point, the 1946 tsunami runup was approximately 1,200 feet inland. Significant tsunami effects were also indicated for Kealia Beach by Dillingham Airfield in 1957 (Hwang, 1981). The proposed project site is located in a tsunamis inundation zone (GTE, 1999).

With the occurrence of both high waves and storms in the winter hazardous surf conditions, beach and road closures, coastal flooding, and property damage on the North Shore of Oahu has and will occur. The 43 major storm and wave events that have happened and been recorded are listed in Table B-2 in Appendix B. It should be noted that closure of roads and beaches on the North Shore may happen as often as once a year. Other localized unrecorded events may not have been included.

**Recreational Resources.** Recreational resources were addressed in the *Coastal Engineering Design Guidelines for the Outlet Improvements at the Kahauola Street Relief Drain, Sunset Beach Oahu* report (Sea Engineering Inc., 1992). Sunset Beach is an internationally known big-wave surfing site. It consistently produces large, challenging waves due to refraction and shoaling on the reef fronting Sunset Point, and interaction with a large channel on the west side of the point (Sea Engineering, 1992). The surf site is approximately 800 feet wide and 1800 feet long. During periods of high surf, a strong wave-induced current typically runs east to west across the reef, then seaward in the channel to the west of the reef (Sea Engineering, 1992).

During a site visit in April 24, 2000, several uses of the beach were observed in addition to large-wave surfing. It should be noted that waves for the North Shore were in the 2-foot range. Beach uses included diving/spearfishing, surfing and sunbathing on the beach. Most water-users entered the water at the outlet. Surfers were observed to be in closer to shore than the 1992 SEI report indicated for the surfing area. Other people walking down the beach climbed over and/or walked up and around the existing drainline/outlet.

**Coastal Ecosystems.** Coastal ecosystems are addressed in Section 3-2.

**Waves and Currents.** The following subsection describes the wave and current regime acting along the shoreline at the proposed project site as reported by Sea Engineering in its 1992 report and 2000 update (Sea Engineering Inc., 1992 and 2000).

General coastal currents in the proposed project area includes 3 types of waves: northeast trade wind waves, Kona or westerly storm waves, and North Pacific storm swell waves. In the summertime, trade wind-generated waves usually approach from the northeast, while in the wintertime, long-crested waves come from the west-northwest. Hurricanes and tropical storms may also be a source of major wave action in the proposed project area.

- Trade wind waves may be present throughout the year, but are particularly dominant from May-October. The deepwater trade wind waves have periods of 6-8 seconds and heights of 4-10 feet.
- Kona waves usually have periods of 6-10 seconds and heights up to 10 feet. The proposed project area is most susceptible to Kona storm events approaching from a more westerly direction. Kona storms typically occur during the summer.
- North Pacific storm swells may occur at any time of the year, but are most prevalent from October through March. The swells usually have periods from 12-20 seconds and deep water heights of 5-15 feet; breaker heights to 20 feet also occur.
- Hurricanes and tropical storm waves usually occur from June to November. Estimated possible deepwater wave heights and periods for scenario hurricanes range from 25-50 feet with 11-15 second periods.

It should be noted that wave heights 10 feet and greater are typically measured approximately 6% of the time.

Nearshore water levels are a function of incident wave height and tides which cause the wave-induced setup at shore. Mean higher high water is approximately +1 foot msl and mean lower low water is approximately -0.8 feet msl. Wave setup on the fringing reef in front of the proposed project area results in a mass transport of water towards the shore by waves. For the proposed project site conditions, the wave setup would be approximately 10-14% of the breaking wave height at the reef edge (Sea Engineering, 1992).

At the proposed project site, large storm waves may break offshore, reform and continue shoreward where they may break again. The shallow fringing reef in front of the proposed project area induces depth limited wave heights nearshore. An example of typical nearshore breaker heights for a large North Pacific swell and a hurricane are listed in Table 3-4.

**Table 3-4: Typical Nearshore Breaker Heights for the Proposed Project Area**

Wave Data	North Swell	Hurricane
Deepwater Wave Height (feet)	10	35
Deepwater Wave Period (seconds)	15	13
Average Offshore Bottom Slope	1:100	1:100
Initial offshore Breaker Height (feet)	15	49
Nearshore Water Level		
Wave Set-up (feet)	1.8	4.7
Tide (feet)	1.0	1.0
Total Rise Above msl	2.8	5.7
Reef Flat Bottom Slope	1:50	1:50
Breaker Height at -2 foot msl Contour	4.8	7.7

Note: Breaker height at the -2 foot msl contour was used to evaluate waves at the approximate depth of an alternative not considered; the 60-foot outlet pipe extension.

Net drift in the Sunset Point area is weak in strength with a variable occurrence in the months of August through January, and consistent in occurrence with moderate to strong strength in the months of February through April. Typical circulation flood currents are to the southwest-west, while typical ebb currents are to the north-northeast (Bathen, 1978).

Aerial photographs of the proposed project site indicate that approaching waves refract over the flat reef at Sunset Point and converge at the storm drain outlet location with waves contacting the shore from the east and the west (Sea Engineering Inc., 1992). Waves observed during a site visit completed on April 24, 2000 approached the proposed project area from the west and northwest direction. As they encountered the shoreline at the existing outlet structure, they wrapped around it.

**Sediment Movement.** A coastal engineering evaluation was completed for the proposed project site in 1992 and updated in March 2000 (Sea Engineering Inc., 1992 and 2000). In both reports, the direction of sand transport has been determined to be seasonally influenced. In the summertime, trade wind-generated waves approaching from the northeast result in sand being deposited on the northeast side of the existing drainage outfall. With steep, short-crested trade wind waves, a steep shore-face beach profile is produced. The opposite occurs in the wintertime with long-crested waves coming from the west, producing sand build-up on the southwest side of the drainline outfall.

The proposed project requires the removal of the existing outlet and 50 feet of pipe up to DMH 1, followed with the installation of the duckbill valve. By removing the outlet and pipe, the natural movement of sand will be re-instituted. Sand that is moved by the intermittent discharge of stormwater from the front of the duckbill valve will be replaced by natural sand transport.

**Historical Shoreline Analysis of Coastal Erosion and Accretion Rates.** Sunset Beach was studied as part of the *Beach Changes on Oahu as Revealed by Aerial Photographs* (Hwang, 1981). In the study at Sunset Beach, changes in the vegetation line were observed on aerial photographs from 1962 through 1979. Transects were measured from stable reference points; the transects 9, 10, and 11 are in the vicinity of the proposed project site. During this time period, on the Haleiwa side of Sunset Point, there was an overall positive net change in the vegetation line with a range of 3 to 14 feet. The net change of the water line was -59 feet to -26 feet, with a range of 33 to 77 feet. On the Kahuku side of Sunset point, the vegetation line for transects 1 and 2 receded over the 29-year period approximately 35 feet. This data is summarized in Table 3-5; the transects are illustrated in Appendix B, Figure B-3.

**Table 3-5: Sunset Beach Changes in Vegetation Line in Feet**

Observation Period	Transect					
	8	9	10	11	1	2
May 1949-Aug 1962	*	-5	+6	-2	-7	*
Aug 1962-Apr 1967	0	+23	+4	+9	-10	-7
Apr 1967-Jan-1971	-10	-21	+7	-11	-3	-23
Jan 1971-Apr 1975	-10	+7	+4	+12	-3	+3
Apr 1975-Apr 1979	+1	-1	-7	+2	+3	-8
Net Change Vegetation Line	-19	+3	+14	+10	-20	-35
Range- Vegetation Line	20	23	21	14	23	35
Net Change - Water Line	-16	59	-26	-6	+11	*
Range - Water Line	53	77	33	33	59	*

Source: Hwang, 1981. Note: transects 8, 9 and 10 are located on the Haleiwa side of Sunset Point with Transect 10 closest to the proposed project site. Transects 1 and 2 are located on the Kahuku side of Sunset Point. \*=No data.

Sea Engineering also completed an analysis of the shoreline in their 1992 report. It was noted that between 1949 and 1988 the net change in the vegetation line was seaward movement of approximately 14 feet. Another observation was that between the time period of 1975 through 1979 erosion occurred, resulting in a seven-foot regression which ended at a sea wall (Sea Engineering, 1992). The position of the beach toe was also analyzed from the time period of 1971-1991. It was concluded that the beach toe was approximately at or landward of the current drainage outlet (Sea Engineering, 1992).

It should be noted that during these study periods the installation of the present drainline and outlet occurred and the seawalls along Sunset Point are present. The seawalls are a mixture of concrete walls in some areas and boulders in others. The seawalls are sufficiently close to the foreshore area, that under high surf conditions, they can interact with waves.

The study completed by Hwang indicated the following (Hwang, 1981):

- On the Haleiwa side of Sunset Point, the Sunset Beach area has large seasonal changes in the water line, and relatively small changes in the vegetation line. Over the thirty-year study period, there was a small trend in the vegetation line to grow seaward. It was, however, upset by major storm damage in December of 1969 (Hwang, 1981).
- On the Kahuku side of Sunset Point, the vegetation line receded up to 35 feet over the 29-year study interval. Losses were especially great during the December 1969 storm.

For this EA, the most recent aerial photograph of Sunset Beach (9 November 1995) was reviewed and the Sea Engineering data was updated with the shoreline and vegetation line as presented in Appendix B, Figure B-4. Data indicates that no net overall changes in the beach at the proposed project area have been observed during that time period. Aerial photographs are presented in Appendix B, Figures B-5 and B-6.

**Description of Improvements.** The project improvements are described in Section 2.

**Thirty Year Erosion Hazard.** In the *Guidelines for Assessing Shoreline Alteration and Hardening Projects* (OEQC, 1998), OEQC requires an analysis using annual erosion rate data to project the location of the 30-year erosion hazard zone as measured from the certified shoreline or vegetation line in the absence of any shoreline stabilization structures. At this time, mapping of 30- or 60-year erosion hazards has not been extensively performed by government agencies. However, FEMA and the H. John Heinz III Center for Science, Economics and Environment have published a collaborative study regarding coastal erosion, *Evaluation of Erosion Hazards* (Heinz, 2000). This study was conducted to explore the effects of erosion and erosion mapping on the National Flood Insurance Program (NFIP), policyholders and communities prone to erosion. The study was completed across 27 counties on the mainland United States, and involved calculating the 60-year erosion hazard area by multiplying erosion rates at each site by 60, updating/mapping FIRM-based flood zones (particularly V and A zones), and projecting the FIRM-based flood zone locations in 60 years. The study required field surveys as well as historical analysis and mapping.

Although a 60-year erosion hazard maps was not produced for the County of Honolulu in the study, the study did relate FIRM information to erosion hazards:

"Through detailed engineering studies, FEMA prepares maps of flood risk in each participating community. Flood risk zones are delineated into special flood hazard areas (SFHA) and non-special flood hazard areas (non-SFHAs). The SFHAs show the Base Flood Elevation (BFE), which is defined as the elevation of a flood that has a 1 percent chance of occurring in any given year, also known as the 100-year flood plain. They include A-zones and V-zones. Although both zones are subject to inundation by 100-year flooding,

V-zones (or high-velocity zones) are also subject to high-velocity wave action from coastal storms and seismic sources, whereas in A-zones wave action either does not occur or is less than 3 feet high. Areas excluded from NFIP coverage (e.g., units of Coastal Barrier Resources System) are also marked on the FIRMs; erosion prone areas are not. In most coastal communities, the structures most susceptible to erosion over the next few decades are located in the V-zone, although not all V-zone structures are susceptible to erosion (Heinz 2000)."

Based on the information presented in the study, general qualitative information regarding a 30-year erosion hazard can be inferred:

- The areas in the vicinity of the proposed project site, which have been listed in the FIRM as V zones, have the potential for erosion within the next 30-years (Figure 3-3).
- The erosion study completed by Hwang indicated that the Haleiwa side of Sunset Point has large seasonal changes but appears to be relatively stable, while the Kahuku side of Sunset Point experienced recession of the vegetation line over the 29-year study interval up to 35 feet, (Hwang, 1981). It is anticipated that, under similar conditions over the next 30 years, that these trends would continue.

**Alternatives.** Project alternatives are discussed in Section 2.4.

### 3.13 Transportation

The APE for transportation effects includes Kahauola Street and intersections with roadways. Intersecting roadways in the APE include:

- Hoalua Street,
- Huelo Street, and
- Holawa Street.

During Phase A, Kahauola Street will be used to access the beach area where the outlet and 50 feet of pipe will be removed and the duckbill valve installed. If Phase B is required, then the APE will include Kahaulola Street and intersecting streets and driveways. This would result in limited access to and along Kahauola Street and disrupt traffic on the intersecting streets listed above.

### 3.14 Utilities and Infrastructure

The APE for utilities and infrastructure is the proposed project area. Utilities located in the APE include:

- The existing drainline;
- Aboveground and underground utilities including overhead power and telephone lines, subsurface cable television, water lines and sanitary sewers are present along Kahauola Street, and Huelo Street/Kamehameha Highway.

Large infrastructure facilities are not located adjacent to the APE.

### **3.15 Visual Resources**

Visual resources are the aggregate of characteristic features imparting visually aesthetic qualities to a natural, rural, or urban environment. This resource is assessed during the environmental impact analysis process to determine whether or not a project will be compatible with the existing landscape. The APE for visual resources is the Sunset Beach coastal area.

The North Shore Sustainable Community Plan takes into account the preservation of visual landmarks and significant vistas. Not only are the views from the proposed project area important, but so are the views from other areas that include the proposed project area. The Sunset Beach area has been identified as having intermittent panoramic ocean views from Kamehameha Highway (CCH, 1999). However, views from the beach are continuous. Photographic documentation of the APE is presented in Appendix B.

The present drainline and outlet are visible from the shoreline. The current beach profile slope is 1:10 to 1:15 vertical to horizontal, with the pipe buried in sand 40-50 feet from the outlet. The elevation of the exposed pipe is approximately 5 feet. After the removal of the current outlet and 50 feet of pipe up to DMH 1, and with the installation of the duckbill valve, visual impacts to the shoreline will be reduced. The shoreline area will have an open view, with the duckbill valve located in the backshore area.

### **3.16 Water Resources**

Water resources include the aspects of the environment which relate to the availability and characteristics of water (surface or groundwater). Surface water may include marine water, rivers, streams (including intermittent streams), runoff and drainage. Groundwater includes water present in aquifers (perched, unconfined, confined or artesian). Water resources are also concerned with supply and quality of water. The APE for water resources includes the Sunset Beach marine waters, gulches and drainage features associated and downgradient from the former proposed project area, and the underlying aquifers.

### 3.16.1 Surface Water

Surface water drainage typically begins high in the mountains during rainstorms and proceeds downgradient, collecting in streams and dry gulches. A portion of surface water infiltrates through the streambeds, recharging the underlying aquifer.

Potential issues arise when gulches or streams are changed in their course or carrying capacity, causing flooding and scour damage, which in turn affects water quality downstream, ultimately polluting marine water bodies and decreasing the supply and quality of groundwater sources.

**Gulches.** Two gulches are present in the vicinity of the proposed project area, Paumalu and Kaunala. These gulches are typically dry, however during periods of heavy rain, they carry water seaward, and have overflowed their boundaries. The gulches themselves are not part of the proposed project area; however, they are part of the drainage area for the Sunset Beach.

A gauging station at Paumalu Gulch (number 318000) is operated by the U.S. Geological Survey since 1968. The following are drainage basin and climatic characteristics at Paumalu Gulch (Wong, 1990):

Average basin width: 0.627 miles	Main channel length: 4.15 miles
Shape Factor: 2.28	Main Channel Slope: 244 feet/mile
Area of Drainage Basin: 2.59 square miles	Mean Basin Altitude: 550 feet
Forest/vegetative Cover: 86%	Meander Ratio: 1.31
Mean Annual Precipitation: 66 inches	2-year recurrence interval, 24-hour rainfall intensity: 5.59 inches
Shape Factor: 3.131/miles	Perimeter of Drainage Basin: 8.15 miles
Form Factor: 0.151	Urban Cover: 0%

As of 1990, Paumalu Gulch had a maximum discharge of 982 cfs in 1974.

### 3.16.2 Groundwater

Two general types of groundwater generally occur on Oahu, basal and high level dike water. The predominant source of groundwater on Oahu is fresh water in the basal aquifer that floats on and displaces salt water that saturates the base of the island. The second source of groundwater is fresh water that is contained in vertical dikes that are present in rift zones. Rainwater is the ultimate source of groundwater; it percolates down through porous and permeable materials, like basalt. Movement of groundwater is downgradient

towards the ocean, and it typically discharges in seeps, springs and streams. Coastal sediments can act to confine groundwater movement within underlying basalt, causing artesian conditions during discharge.

Groundwater quality is naturally the end product of geochemical processes; however, it can easily be affected by human activities. These includes industrial, agricultural and commercial activities as well as drainage patterns and groundwater removal. The current aquifer classifications at the APE is 30403116(12211)/30403121(12313) (Table 3-6) (Mink & Lau, 1990). As indicated in the descriptions provided in Table 3-6, the aquifer underlying the proposed project site is not intended for use as a sole source aquifer.

**Table 3-6: Groundwater Resources: Aquifer Identification and Status**

Aquifer (Status Code)	Aquifer <sup>1</sup> : Island, Sector, System, Type Status <sup>2</sup> : Development Stage, Utility, Salinity, Uniqueness, Vulnerability to Contamination.
30403116 (12211)	– Oahu, North, Kawaihoa, Basal, Unconfined, Sedimentary – Currently Used, Ecologically Important, Low Salinity (250-1,000), Irreplaceable, High Vulnerability
30403121 (12313)	– Oahu, North, Kawaihoa, Basal, Confined, Flank – Currently Used, Ecologically Important, Moderate Salinity (1,000-5,000), Irreplaceable, Low Vulnerability

<sup>1</sup> The first five digits of the aquifer code refer to the hydrogeologic continuity of an aquifer: the island, sector, system and type that have the same general features. The second set of three numbers describes the groundwater as being basal or high level, confined or unconfined, and as flank, dike, perched or sedimentary in its geology.

<sup>2</sup> The status code of the aquifer describes its development stage (currently used, potential use, no use), utility (drinking, ecologically important, neither), the salinity in milligrams per liter as chloride, uniqueness (irreplaceable or replaceable), and vulnerability to contamination (high to none).

### 3.16.3 Surface Water Quality

Information on water resources was derived from a field aquatic biology/water quality survey. Federal, state, and county laws regulate actions proposing to affect water resources through permit processes including the COE 404 Permit, the Section 401 WQC, the SCA Permit, the CZMP Consistency Determination, and the City and County of Honolulu SMA Permit.

Water quality data was collected and assessed by AECOS on 5 May 2000 to characterize the aquatic environments. These measurements do not comprise an adequate baseline for water quality parameters but are an indication of conditions at a specific point in time.

Surface water quality samples were collected from four sampling stations that were established in the 1992 survey. These locations were off the front of the outlet (Station 1), two stations in the Haleiwa direction (Stations 2 and 4), and one in the Kahuku direction (Station 3). Samples were collected by directly filling one 2-liter amber polyethylene and two 60-milliliter sample containers at each location. The samples were analyzed for salinity,

pH, turbidity, chlorophyll a, ammonia, nitrate + nitrite, orthophosphate, total nitrogen and total phosphorus. Analytical methods and sample locations are presented in Appendix A.

Analytical results indicate that there were minor differences between the stations sampled in the May 2000 survey. Compared to other sampling stations, the turbidity at Station 1 was elevated. When compared to the other sampling stations, concentrations of nitrate + nitrite, orthophosphate and total phosphate were slightly elevated at Station 2. To compare the results to the 1992 survey, both sets of results were analyzed using the Student's t-test (which assumes normal distribution) and the non-parametric Mann-Whitney test. Nutrient concentrations, with the exception of phosphorus, were lower in 2000 than in 1991; total nitrate also experienced significant difference between the two sampling events. Complete results are presented in Appendix A.

When compared against DOH water quality criteria, the following were noted:

**1991.** Turbidity, nitrate+nitrite, total nitrogen, and chlorophyll a were exceeded.

**2000.** Turbidity and chlorophyll a were exceeded.

The turbidity levels could indicate changes in the sea state or turbulence over the reef from one date to another. Greater benthic algae productivity noted in May 2000 could also account for reduced concentrations of nutrients observed (AECOS, 2000). Complete analytical results are presented in Appendix A.

#### 4. ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

The following sections discuss environmental consequences and mitigation measures associated with the proposed project. In general, Phase A project activities (outlet and pipe removal with duckbill valve installation) will reduce visual impact, increase beach accessibility, increase natural sand transport, and will not increase discharge volumes from the pipe (although the pipe may seem to flow more freely), or current effects to surface water quality. Phase B activities (increasing the drainline size) are not anticipated to significantly change Phase A effects.

##### 4.1 Air Quality

During construction, potential sources that may affect air quality at the project site include the following:

- Vehicular traffic (additional sources of CO and CO<sub>2</sub>);
- Fugitive dust emissions from excavation and construction;
- Soil and concrete/asphalt removal or placement (particulate); and
- Removal of sediment (possible odor issues if the sediment is from an anaerobic environment).

Construction vehicles traveling to and from the proposed project area will increase vehicular emissions in the area. During the construction phase of the project, on-site construction equipment, consisting of primarily diesel engines, also will contribute to local air pollution. These sources are additional to existing emissions from local traffic. Because the project area is in attainment for ambient air quality standards, vehicles to be used during construction activities represent a very minor increase in the number of vehicles traversing the area daily, and because the prevailing trade winds rapidly carry pollutants away limiting the effect on receptors, increased vehicular emissions during construction of the proposed project are not expected to be significant. In general, effects to air quality from construction activities are expected to be indirect and short-term; no long-term impacts are anticipated.

**Cumulative Impacts.** This project has not been scheduled at this time. In the event that the project will be completed, other concurrent projects in the proposed project area will be researched. Planning and scheduling to avoid cumulative effects will be performed.

**Mitigation Measures.** Construction activity also will generate short-term fugitive dust particulate emissions. Dust control measures will be taken onsite during construction activities. It is anticipated that EPA and DOH standards (HAR 11-59) will not be exceeded.

## 4.2 Biological Resources

### 4.2.1 Aquatic Biology

Aquatic biota in nearshore waters at the proposed project site are sensitive to changes in salinity (i.e., introduction of fresh water) and turbidity/sedimentation. The proposed implementation of the duckbill valve will involve intermittent discharge of stormwater approximately 50 feet from the current beach toe. Stormwater may travel in the beach area in front of and downgradient from the valve, which may also enter the adjacent nearshore water. Increases in negative impacts to aquatic biology (compared to the current tee outlet discharge into the water at the beach toe) are not anticipated. This is due to the following reasons:

- Stormwater must travel 50 feet to reach the current beach toe, and has an opportunity for infiltration through the sand. Small volumes of water may not even reach the beach toe.
- Stormwater that does enter the water is not being placed directly into the nearshore waters. The volumes that do travel to the nearshore waters will be mixed and dissipated in the high-energy wave environment. As mentioned in the AECOS report (Appendix A), there is good mixing and circulation at Sunset Point to help dissipate stormwater that does enter the nearshore waters.
- Stormwater is not being placed directly on the reef. Reef organisms begin to grow approximately 10 meters offshore; the area from the beach toe to 10 meters is typically a scoured coralline limestone from wave action, with some algae growth.
- Significant increases in turbidity and sand movements are not anticipated. Some sand movement may occur with larger storm events. This sand may enter nearshore waters, however, major increases in turbidity (large sediment plumes moving offshore) are not anticipated. This is because sand movement with stormwater discharge should not progress great distances because the sand at Sunset Beach is coarse (larger diameter) and typically needs high energy to maintain carrying capacity. Sand that is removed from in front of the duckbill valve during intermittent storm events should be replaced during normal sand transport that will be re-established at the foreshore area.

Since intermittent stormwater discharges with the proposed duckbill valve will be reduced into nearshore waters, and will not be placed onto the reef, no increases in negative effects are expected. Positive effects (small amounts of possible increased growth or diversity) may also occur.

During construction, removal of the existing outfall will be required. This may have short-term impacts to the nearshore waters (first 5-10 meters). It is anticipated that turbidity may be increased during removal.

**Cumulative Impacts.** This project has not been scheduled at this time. In the event that the project will be completed, other concurrent projects in the proposed project area will be researched. Planning and scheduling to avoid cumulative effects will be performed. Additionally, it is not possible to determine cumulative effects from future natural processes (i.e., storms, tides, weather, shifts in circulation patterns, etc.), that may also occur during or after the completion of the improvements.

**Mitigation Measures.** Construction activity may generate short-term turbidity. The implementation of best management practices (BMPs) and control measures will be performed *onsite during construction activities*. Additionally, removal of the existing outfall and pipe will be scheduled during the dry season and at the lowest tide of the month, which will decrease unnecessary in-water work.

#### 4.2.2 Avifauna and Mammals

Endangered and sensitive species as well as critical habitat are not present in the APE for mammals or avian species. Impacts from the proposed project on avifaunal and mammalian resources are not anticipated.

**Cumulative Impacts.** This project has not been scheduled at this time. In the event that the project will be completed, other concurrent projects in the proposed project area will be researched. Planning and scheduling to avoid cumulative effects will be performed.

**Mitigation Measures.** In the unlikely event that during the clearing and construction phase of the project any nesting threatened and endangered species are determined to be in the area, project activities will cease. The DLNR and the U.S. Fish and Wildlife Service (USFWS) will be contacted for advice before proceeding.

Following completion of the proposed project, the area will be restored and revegetated to as close to its original condition as possible; denuded areas are expected to recover quickly as a result, aided by the favorable climate and growing conditions.

#### 4.3 Cultural Resources and Practices

According to archaeological resources background search, construction of the proposed project has the potential to directly impact pre-historic cultural resources. In the direct vicinity of the proposed project site, several pre-historic burials have been encountered in

unconsolidated beach sand that eroded as well as midden and fire pit deposits in a cultural layer.

**Cumulative Impacts.** This project has not been scheduled at this time. In the event that the project will be completed, other concurrent projects in the proposed project area will be researched. Planning and scheduling to avoid cumulative effects will be performed.

**Mitigation Measures.** Due to the possibility of unknown burials occurring in the proposed project area, a qualified archaeologist will monitor construction activities. In general, if cultural materials, particularly human remains, are unexpectedly discovered during construction, ground-disturbing activities will cease in the immediate area and the City and County of Honolulu Police Department and SHPD will be contacted. If pre-contact native Hawaiian remains are encountered, the Oahu Burial Council also will be consulted.

Additionally, to mitigate any potential adverse effects of construction that the proposed project may have on cultural or historic sites, the following plans will be prepared for comment by SHPD and the Oahu Island Burial Council prior to construction:

- a burial plan to deal with inadvertently discovered human remains and matters of burial treatment for traditional Hawaiian remains, and
- a data recovery plan to collect cultural layer samples for characterization of the ancient setting.

To ensure compliance with Act 50, Earth Tech is requesting that any traditional Hawaiian practitioners in the Sunset Beach area provide statements regarding past or current traditional uses of the proposed project area. Requests have been made through the North Shore Neighborhood Board (11/28/00), and additional requests are planned for OHA, Alu Like and other Hawaiian civic organizations. In the event that statements are made that would indicate negative impacts to traditional cultural uses, mitigation actions would be enacted. The original schedule of the FEA will continue, with any statements and/or mitigation actions appended, if they are provided.

Additionally, the proposed project should have positive impacts on traditional cultural practices. These include restoration of natural sand transport and natural beach processes and increased beach and shoreline. Also, since the proposed project is a City and County utility improvement, public access is not restricted.

#### **4.4 Flora and Wetlands**

Construction of the proposed project will likely have a short-term and possibly direct impact on vegetation along the APE. Most of the area along Kahauola Street contains landscaped

plants. No threatened or endangered plants were observed in the proposed project area. However, several native and indigenous plants of coastal ecosystems are sufficiently close to the proposed area of construction for the duckbill valve to be of concern from construction damage.

**Cumulative Impacts.** This project has not been scheduled at this time. In the event that the project will be completed, other concurrent projects in the proposed project area will be researched. Planning and scheduling to avoid cumulative effects will be performed.

**Mitigation Measures.** Wherever possible, excavation and disturbances to vegetation in the area will be minimized or avoided. Coastal ecosystem plants will be relocated just outside of the proposed project area. Coastal plants requiring replacement will be replanted with similar or other appropriate native plants. Landscaping will be replaced with similar landscaping.

#### 4.5 Geology and Soils

No adverse impacts to the geology and soils in the area are anticipated.

#### 4.6 Hazardous Wastes and Materials

No anticipated direct, indirect, short-term or long-term effects from hazardous materials and wastes or petroleum products are expected. Areas of concern for exposure to hazardous materials and wastes in the APE include roadways, the ocean and beach areas.

**Cumulative Impacts.** This project has not been scheduled at this time. In the event that the project will be completed, other concurrent projects in the proposed project area will be researched. Planning and scheduling to avoid cumulative effects will be performed.

**Mitigation Measures.** Mitigation measures for construction equipment and supplies, including petroleum products, shall consist of confined storage areas away from water and beach areas. Storage containers will be equipped with containment devices to contain spills or releases. All refueling and maintenance activities will take place on paved land, away from sensitive areas. To the extent possible, equipment will be kept free of pollutants during construction activities. Garbage and waste receptacles will be provided on site for waste containment. All wastes will be removed from the project area after completion of the project.

A contingency plan to control accidental spills of petroleum products shall be developed and implemented at the project site. Absorbent pads and containment booms shall be stored on site to facilitate quick response and clean up of any spills. The contractor also will not dump any material in the ocean or beach.

To mitigate problems in transporting hazardous materials and wastes on roadways, transporters are required follow DOT and EPA regulations.

#### 4.7 Natural Hazards

Natural hazards that may occur in and affect the proposed project area include floods, tsunamis, hurricanes, earthquakes, and other natural events. The proposed project would have no effect on the occurrence of such natural events; however, it is intended to reduce the effects of flooding on Kahauola Street and its associated inlets. It, therefore, may have some direct and indirect positive impacts as long as it is maintained.

**Cumulative Impacts.** This project has not been scheduled at this time. In the event that the project will be completed, other concurrent projects in the proposed project area will be researched. Planning and scheduling to avoid cumulative effects will be performed.

**Mitigation Measures.** None identified at this time.

#### 4.8 Noise

Intermittent elevated noise levels from certain types of construction activities are expected to result in indirect and direct short-term impacts. Onsite noise levels would not exceed the permissible noise exposure levels and duration shown in Table 4-1 or as defined by the DOH. To reduce nearby residential, and recreational beach use noise exposure, construction activities would be conducted on weekdays and in daytime hours in accordance with HRS 342-F-1. As a result, no significant long-term noise impacts are expected from construction of the proposed project.

**Cumulative Impacts.** This project has not been scheduled at this time. In the event that the project will be completed, other concurrent projects in the proposed project area will be researched. Planning and scheduling to avoid cumulative effects will be performed.

**Table 4-1 Permissible Noise Exposure Levels and Durations**

Duration (Hours/Day)	Sound Level (dB)
8	90
4	92
4	95
3	97
2	100
1 to 1.5	102
1	105

Duration (Hours/Day)	Sound Level (dB)
0.5	110
0.25 or less	115

Source: 29 CFR 1910.95

**Mitigation Measures.** Short-term, direct and indirect construction-related noise impacts will be controlled to within acceptable limits by coordinating construction projects and ultimately complying with all requirements set forth in HAR 11-46 - Community Noise Control, HAR 11-42 - Vehicular Noise Control for Oahu, and HRS 342F - Noise Pollution.

Onsite occupational exposure to noise from construction equipment will be reduced, in accordance with OSHA regulations by requiring construction workers (e.g., heavy equipment operators) to wear appropriate hearing protection (i.e., ear plugs and/or muffs).

Work will be completed during business hours to reduce impacts to nearby residents. In the event that work would occur after normal working hours (i.e., at night or on weekends), for special activities, as required, appropriate permitting and monitoring as well as development and implementation of administrative and engineering controls shall be employed.

#### 4.9 Socioeconomic

There are no anticipated negative short-term or long-term socioeconomic impacts from the proposed project. The implementation of the proposed improvements should not induce or decrease economic or population growth and public services will not be impacted in the North Shore area or the region in general. The proposed project will be constructed within the easement and take place during normal working hours on weekdays, therefore, existing lifestyles in the area will not be altered (with the exception of noise and traffic) during construction or in the long term.

The implementation of the proposed improvements may have positive long-term socioeconomic effect associated with economics:

The Kahauola Street drainline improvements are designed to increase efficiency of the drainline system, minimizing the effects of flooding in that area. By installing the proposed duckbill valve, active sand transport will be prevented from entering the pipe eliminating sand blockage. Implementation of Phase B would increase the size of the drainline and its capacity for handling floodwaters. Depending upon conditions at the time, these improvements may reduce the effects of flooding on Kahauola Street. It should be noted that the proposed project is not designed to alleviate flooding in the entire area; that would require numerous other actions including improvements by private parties.

**Cumulative Impacts.** This project has not been scheduled at this time. In the event that the project will be completed, other concurrent projects in the proposed project area will be researched. Planning and scheduling to avoid cumulative effects will be performed.

**Mitigation Measures.** None identified at this time.

#### **4.10 Safety and Health**

There are no anticipated negative short-term or long-term safety and health impacts from the proposed project. The implementation of the proposed improvements may have positive long-term safety and health effects by possibly reducing the effects of flooding in the areas adjacent to the Kahauola Street drainline.

**Cumulative Impacts.** This project has not been scheduled at this time. In the event that the project will be completed, other concurrent projects in the proposed project area will be researched. Planning and scheduling to avoid cumulative effects will be performed.

**Mitigation Measures.** None have been identified at this time.

#### **4.11 Shoreline Assessment**

There are no anticipated negative short-term or long-term shoreline impacts from the proposed project. The implementation of the proposed improvements should have a positive long-term effect by restoring natural sand transport along that section of the beach. Information reviewed during the shoreline assessment indicate that the beach at the project site was relatively stable over a 30-year assessment period (Hwang, 1981). However, with the current drainline and outlet configuration, a groin effect occurs producing seasonal differences in beach profile. Additionally, research has indicated that areas in the vicinity of the proposed project site which have been listed in the FIRM as V-zones, have the potential for erosion within the next 30-years (Heinz, 2000).

As stated earlier, removal of the existing outlet and 50 feet of pipe to be replaced with installation of the duckbill valve will have a positive shoreline effect in restoring natural sand transport in the foreshore area. To some extent, this may help the proposed project area and associated shoreline naturally deal with the effects of erosion over the next 30 years.

**Cumulative Impacts.** This project has not been scheduled at this time. In the event that the project will be completed, other concurrent projects in the proposed project area will be researched. Planning and scheduling to avoid cumulative effects will be performed.

**Mitigation Measures.** None have been identified at this time.

#### 4.12 Transportation

Replacement of the existing outlet with the proposed check valve will result in minimal effects on transportation along Kahauola Street. Effects will be experienced only while crews are mobilizing to the project area near DMH 1.

If Phase B is required, replacement of the drainline will affect traffic mainly at Kahauola Street, Hoalua Street, Huelo Street, and Holawa Street. As a result, proposed construction activities would limit access to and along Kahauola Street and disrupt traffic on the intersecting streets. These include potential lane closures, and re-routing of traffic. The lane closures will have direct impacts on the residences on those streets and indirect impacts in the entire residential area. These impacts are expected to be short-term (approximately 6 months) in nature and scheduled outside peak traffic periods to minimize the impact on traffic.

Additionally, occasional increases in construction traffic will result during the initial and final stages of the project and during the periodic movement of construction equipment and materials within the project area. Traffic patterns throughout the course of the proposed project should not be substantially altered by the proposed action. Minor delays during peak traffic hours can be expected. This can be largely attributed to the arrival and departure of construction crews.

There are no anticipated long-term negative effects from the proposed project.

**Cumulative Impacts.** This project has not been scheduled at this time. In the event that the project will be completed, other concurrent projects in the proposed project area will be researched. Planning and scheduling to avoid cumulative effects will be performed.

**Mitigation Measures.** In order to minimize impact to transportation/traffic in the APE, adequate signage directing and re-routing traffic will be employed. Access for local traffic will also be provided.

#### 4.13 Utilities and Infrastructure

Various utilities are located within the project limits including the drainline itself, utility poles, cable, water and sewer lines. Most utilities will not be impacted, however, some will require protection. No short-term effects are expected with the protection of utilities. In general, significant impacts to infrastructure are not anticipated. There will be a beneficial impact to CCH maintenance crews because of better accessibility to the pipe and the prevention of sand accumulation.

**Cumulative Impacts.** This project has not been scheduled at this time. In the event that the project will be completed, other concurrent projects in the proposed project area will be researched. Planning and scheduling to avoid cumulative effects will be performed.

**Mitigation Measures.** In order to avoid impact to utility services in the APE, the utility owners will be contacted to determine utility line locations and the methods to avoid and or protect them.

#### 4.14 Visual

The new proposed solution to the sand blockage problem at the Kahauola Drain outlet will result in a positive visual improvement to the beach area. After the completion of Phase A improvements, visual impacts to the shoreline will be reduced. The shoreline area will have an open view, with the duckbill valve located in the backshore. This will be a positive effect, improving upon the current view of the exposed pipe and outlet out to the water, or other alternatives that would have resulted in larger pipes exposed on greater portions of the beach, reef and water.

During pipe removal and valve installation, there will be short-term direct impacts to the visual quality along Kahauola Street. These will also occur during construction if Phase B is implemented.

**Cumulative Impacts.** This project has not been scheduled at this time. In the event that the project will be completed, other concurrent projects in the proposed project area will be researched. Planning and scheduling to avoid cumulative effects will be performed.

**Mitigation Measures.** Timing and phasing of construction with the restoration of construction areas will control short-term construction-related visual impacts. No other mitigation measures have been identified at this time.

#### 4.15 Water Resources

As described in Section 3.16, the APE for water resources includes the Sunset Beach marine waters, gulches and drainage features associated and downgradient from the former proposed project area, and the underlying aquifers. The most significant water resources that could be affected by the proposed project are the nearshore waters at Sunset Beach.

The proposed implementation of Phase A will involve intermittent discharge of stormwater approximately 50 feet from the current beach toe. Stormwater may travel in the beach area in front of and downgradient from the valve, which may also enter the adjacent nearshore water. Increases in negative impacts to nearshore surface water quality (compared to the

current tee outlet discharge into the water at the beach toe) are not anticipated. This is due to the following reasons:

- Stormwater must travel 50 feet to reach the current beach toe, and has an opportunity for infiltration through the sand. Small volumes of water may not even reach the beach toe.
- Stormwater that does enter the water is not being placed directly into the nearshore waters. The volumes that do travel to the nearshore waters will be mixed and dissipated in the high-energy wave environment. As mentioned in the AECOS report (Appendix A), there is good mixing and circulation at Sunset Point to help dissipate stormwater that does enter the nearshore waters.
- Significant increases in turbidity and sand movement are not anticipated. Some sand movement may occur with larger storm events. This sand may enter nearshore waters, however, major increases in turbidity (large sediment plumes moving offshore) are not anticipated. This is because of sand movement with stormwater discharge should not progress great distances because the sand at Sunset Beach is coarse (larger diameter) and typically needs high energy to maintain carrying capacity. Sand that is removed from in front of the duckbill valve during intermittent storm events should be replaced by normal sand transport that will be re-established at the foreshore area.

Intermittent stormwater discharges with the proposed duckbill valve will be reduced into nearshore waters, with no increases in negative effects expected. Positive effects may be experienced due to stormwater from small storm events not reaching the surface water and sedimentation in smaller storm events possibly being reduced.

There may be some short-term direct impacts to surface water quality during removal of the tee outlet and pipe due to increased sedimentation and turbidity in the nearshore water.

**Cumulative Impacts.** This project has not been scheduled at this time. In the event that the project will be completed, other concurrent projects in the proposed project area will be researched. Planning and scheduling to avoid cumulative effects will be performed.

**Mitigation Measures.** Construction activity may also generate short-term turbidity with the removal of the tee outlet and pipe. The implementation of BMPs and control measures will be taken onsite during construction activities. Additionally, removal of the existing outfall will be scheduled during the dry-season and at low tide decreasing unnecessary in-water work.

#### 4.16 Conflict with Federal, State, and Local Land Use Plans, Policies and Controls for the Area Concerned

Several federal, state and local plans, policies and controls have been identified for the proposed project area. They include the following, with discussion of conflict or compliance with the proposed project:

- The Federal government as well as State of Hawaii and City & County of Honolulu have mandated and initiated requirements for the development of retention and detention facilities to temporarily store runoff. Natural and man-made vegetated drainage ways and retention basins are the preferred method to handle runoff and drainage as they promote infiltration and decrease non-point source pollution and other coastal water degradation issues, (CCH 1999). This project involves drain line improvements as the primary method for addressing runoff and drainage problems in the vicinity of Kahauola Street. This project is not in direct compliance with utilizing retention and detention facilities, and is discussed more in the alternatives subsection of Chapter 2. However, it should be noted that discharged stormwater must travel over the foreshore area of the beach, where infiltration will occur. Stormwater from small storm events may not even reach the nearshore waters.
- The CZM Program's ten objectives as defined by Chapter 205A of the HRS includes:

**Recreational Resources** - Provide coastal recreational opportunities accessible to the public. *The proposed solution to the sand blockage problem at the Kahauola Drain outlet will result in a positive improvement to the beach area. Removal of the T-outlet and length of pipe will increase beach access to the public, and allow natural longshore sand transport to resume. Additionally, surfing activities will not be impeded by the proposed action. The proposed action is in compliance with this objective.*

**Historic Resources** - Protect, preserve and where desirable restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant to Hawaiian and American history and culture. *Cultural resources may be present in the proposed project area, in the form of pre-historic burials and cultural layers. Mitigation measures will be taken in the form of archaeological monitoring, with recovery and burial plans in place. The proposed project will be in compliance with this objective.*

**Scenic and Open Space Resources** - Protect, preserve and where desirable, restore or improve the quality of coastal scenic and open

space resources. *The proposed project will result in a positive improvement to the beach area. Removal of the tee outlet and length of pipe will improve the visual resources (the proposed duckbill valve will be in the backshore area) as well as create more access in the foreshore area (the outlet and the drainline will not be blocking or restricting movement along the beach). The proposed project will be in compliance with this objective.*

**Coastal Ecosystems** - Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems. *As stated in Section 4.15, the proposed project is not expected to have additional negative effects on coastal ecosystems. Intermittent stormwater discharges and sedimentation with the proposed duckbill valve will be reduced into nearshore waters because stormwater discharges will have increased over sand travel distance and small storm events may not reach the surface waters. Although there may be increased runoff during storm events due to an unobstructed pipe, it will be quickly dissipated due to the high wave action in this area. The proposed project will be in compliance with this objective.*

**Economic Uses** - Provide public or private facilities and improvements important to the State's economy in suitable locations. *The proposed project is not relevant to this objective.*

**Coastal Hazards** - reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence, and pollution. *The proposed project is intended to have a positive effect on safety and health associated with flooding in the Pupukea-Paumalu and Sunset Beach lots. Implementing the proposed project should reduce drainline blockage. The proposed project improvements are designed to increase the efficiency of the drainline system, minimizing the effects of flooding in that area. It should be noted that the proposed project will not ameliorate flooding for the entire area, nor can it reduce hazards of natural events such as tsunamis or high waves. This project is in partial compliance with this objective.*

**Managing Development** - Improve the development review process, communication and public participation in the management of coastal resources and hazards. *The proposed project is not relevant to this objective.*

**Public Participation - Stimulate public awareness, education, and participation in coastal management.** *The proposed project has been subject to a public review in community meetings as well as through the pre-consultation EA notification process. The proposed project is in compliance with this objective. In fact, changes in the project have been brought about in part because of public concerns.*

**Beach Protection - Protect beaches for public use and recreation.** *As noted earlier removal of the tee outlet and length of pipe will result in a positive effect to the beach area. It will increase beach access to the public, and allow natural longshore sand transport to resume along this section of the beach.*

**Marine Resources - Implement the State's ocean resources management plan.** *The proposed project is in compliance with the States' ocean resources management plan; the project alternative is not.*

- **Special Management Area, ROH 25.** *It is the City and County of Honolulu's policy to preserve, protect, and where possible, to restore the natural resources of the coastal zone of Hawaii. The proposed project is in compliance with SMA; the project alternatives are not.*

#### **4.17 Irreversible or Irrecoverable Commitment of Resources**

Although the proposed project activities would result in some irreversible or irretrievable commitment of resources, such as various metallic materials, minerals, fossil fuels, and labor, the amount of materials and energy required for any proposed action-related activities is anticipated to be relatively small. However, the amounts and types of materials have yet to be calculated.

In terms of natural resources, The proposed project would have no additional direct or indirect long-term impact on the reef community. There may be increased storm runoff from the pipe due to improved flows from lack of sand blockage present within the pipe. However, as noted earlier, this is not expected to have an adverse environmental impact because the stormwater that does reach the nearshore area will be mixed and dissipated in the high-energy wave environment.

#### **4.18 Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (Executive Order 12898)**

This environmental assessment has identified no effects that would result in a disproportionately high or adverse effect on minority or low-income populations in the area.

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The proposed project activities would also be conducted in a manner that would not exclude persons from participation, deny persons the benefits of, or subject persons to discrimination because of their race, color, or national origin.

## 5. DETERMINATION, FINDINGS AND REASONS FOR SUPPORTING DETERMINATION

To determine whether the proposed installation of a duckbill check valve to replace the existing tee outlet may have a significant impact on the environment, the project, its anticipated primary and secondary consequences, and the cumulative, short and long term effects have been evaluated. Based on the studies performed, research evaluated, and the significance criteria summarized below.

### 5.1 Significance Criteria

According to the DOH Rules (HAR 11-200-12), an applicant or agency must determine whether an action may have a significant impact on the environment. This includes all phases of the project, its expected consequences, both primary and secondary, its cumulative impact with other projects, and its short and long term effects. In making the determination, "Significance Criteria" are used as a basis for identifying whether significant environmental impacts will occur. According to DOH Rules HAR 11-200-12, an action shall be determined to have a significant impact on the environment if it meets one of the following criteria:

- **Involves an irrevocable commitment to, loss or destruction of any natural or cultural resources.** Significant impacts are not anticipated for flora and wetlands or avifaunal and mammalian resources. However, impacts may occur to the following:

**Scenic views.** The view at Sunset Point will be improved by the removal of the existing tee outlet and 50 feet of pipe.

**Cultural resources.** Cultural resources including pre-historic burials and cultural layers may be present in the proposed project area. Mitigation measures will be taken in the form of archaeological monitoring, with recovery and burial plans in place. Cultural practices will not be negatively impacted.

**Biological resources.** The proposed project will have no long-term negative impact on biological resources. There may be short-term impacts during pipe removal and possible enlargement at a later date.

- **Curtails the range of beneficial uses of the environment.** The overall effect of removal of the tee outlet and pipe from the beach will be to enhance the beneficial use of Sunset beach.
- **Conflicts with the State's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS; and any revisions thereof and amendments**

thereto, court decisions, or executive orders. The proposed project is consistent with the State Environmental Policies established in HRS 344.

- **Substantially affects the economic or social welfare of the community or state.** The proposed project will not have any significant impacts to the surrounding community in terms of economic or social development or land use as described in the North Shore Sustainable Communities Plan (CCH, 1999). In terms of social welfare, the proposed project may have impact to the surrounding community in terms of inconvenience (access along Kahauola and intersecting streets) during construction. In terms of economic welfare, the proposed project, after completion, may have a positive impact on the houses of Kahauola Street by decreasing the effects of flooding.
- **Substantially affects public health.** There are several issues that may impact public health.

**Flooding.** The proposed project will have a positive effect on safety and health associated with flooding in the Pupukea-Paumalu and Sunset Beach lots. Drainline capacity should be increased and sand blockage reduced by implementing the proposed project. The proposed project improvements are designed to increase the efficiency of the drainline system, minimizing the effects of flooding in that area.

**Construction.** Although public health may be minimally affected by short-term construction-related impacts, (i.e. air, noise, traffic, and water quality), these should be mitigated. The project will have appropriate federal, state and county land use permits, construction BMPs, water quality monitoring plans, and pollution prevention contingency plans to prevent, reduce or mitigate any possible adverse impacts.

**Surface Water Quality.** The proposed duckbill check valve installation is designed to eliminate sand blockage in the pipe and therefore increase efficiency of water removal associated with the pipe. The duckbill outlet will be an additional 50 feet inland from the existing outlet allowing for increased potential for stormwater and sediment to infiltrate into the course beach sand prior to discharge.

Any increased runoff during storm events, due to an increased efficiency of the drainline system, will be quickly dissipated due to the high wave action in this area; intermittent discharges from small storm events may not reach the surface waters.

- **Involves substantial secondary impacts, such as population changes or effects on public facilities.** The development of the proposed project does not have any foreseen impacts associated with public growth or the need for public facilities.

- **Involves a substantial degradation of environmental quality.** Any degradation of environmental quality will take place during pipe removal and installation of the duckbill valve. There will also be short-term effects during construction of a new larger drainage pipe (Phase B), should it be proven necessary. There will be short-term impacts to air, noise and water quality during these activities. The implementation of controls for permits, BMPs and construction schedule (pipe removal during dry season and low tide) should reduce and mitigate these impacts.
- **Is individually limited, but cumulatively has considerable effect on the environment, or involves a commitment for larger actions.**

**Known Possible Cumulative Effects.** With the proposed project, (i.e., removal of tee outlet and 50 feet of pipe, followed by installation of a duckbill valve back from the shore), natural sand transport will be re-established. The improved efficiency of the drainpipe will increase the potential for additional stormwater discharge. This may erode an area along the beach potentially affecting water quality in the nearshore waters after intense rainfall periods. Both the shoreline erosion and effects on water quality are anticipated to be short-term as daily tidal action will return the beach to normal. It should be noted that it is not possible to determine cumulative effects from future natural processes (i.e., storms, tides, weather, shifts in circulation patterns, etc.) that may also occur during or after the emplacement of the improvements.

**Unknown Cumulative Effects.** The project has not been scheduled at this time. In the event that the proposed project will be completed, a determination will be made of other concurrent projects in the proposed project area. Planning and scheduling to avoid cumulative effects will be performed.

- **Substantially affects a rare, threatened, or endangered species or its habitat.** Endangered and sensitive species as well as critical habitat are not present in the APE for mammals or avian species. Impacts from the proposed project on avifaunal and mammalian resources are not anticipated. Construction activities would cease and/or be redirected in the event that nesting birds are encountered. Additionally, most of the proposed project area contains landscaped plants. Several native and indigenous plants of coastal ecosystems are sufficiently close to the proposed project site to be of concern from construction damage. Relocation and replanting will be done as a mitigation effort if necessary.
- **Detrimentially affects air or water quality or ambient noise levels.** The project will obtain appropriate federal, state and county land use permits, and prepare construction BMPs, water quality monitoring plans, and pollution prevention

contingency plans as requested, to prevent, reduce or mitigate any possible impact to these resources during construction. The proposed project may not require in-water work, significantly reducing short-term turbidity due to construction. Since the new valve will be relocated approximately 50 feet inland of the existing outlet, intermittent non-point source pollution is not anticipated to have long-term effects on water quality. Short-term, minimal effects to air and noise will be experienced during construction activities.

- **Affects or is likely to suffer damage by being located in an environmentally sensitive area, such as flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, freshwater, or coastal waters.** The proposed project area located on the Sunset Beach shoreline is located in a flood zone, as determined by FEMA (FEMA, City & County of Honolulu, HonBlue GIS database, 1997), a tsunami zone and high-wave hazard area (Scudder, 1972). It is possible that the improvements could suffer damage from major storm or weather related events. However, appropriate installation requirements based on engineering wave force calculations for this area will be implemented. Removal of the existing outlet and 50 feet of pipe section will allow natural long shore transport of sand to resume potentially improving the shoreline erosion conditions.
- **Substantially affects scenic vistas and view planes identified in county or state plans or studies.** Construction activities will cause short-term and minor disruption to the visual qualities of the Sunset Beach area. Positive long-term effects will be seen as a result of removing the 66-inch tee outlet and 50 feet of the drainline followed by installation of a duckbill valve.
- **Requires substantial energy consumption.** Construction of the proposed project will not require substantial energy consumption.

## 5.2 Determination

Based on the above evaluation of the significance criteria and the discussion of impacts and mitigative measures contained in this document, it is anticipated that the proposed duckbill valve installation project will not have a significant negative effect on the environment.

## 6. CONSULTATIONS MADE DURING THE ENVIRONMENTAL ASSESSMENT PROCESS

Table 6-1 identifies the environmental companies that contributed to this EA and the agencies, citizen groups, and individuals either consulted in the development of the EA or were provided a copy for review. Presentations were made to the Sunset Beach Community Association and the North Shore Neighborhood Board to discuss the project and obtain community input. Pursuant to HRS 343 and HAR 11-200-9, the draft EA was subject to a 30-day review and comment period. Correspondence is presented in Appendix E.

**Table 6-1: Contributors to the EA**

<b>Company</b>	<b>Role</b>
Earth Tech, Inc.	Lead consultant for DEA
AECOS	Biological surveys
<b>Federal Agencies</b>	
U.S. Army Corps of Engineers	
U.S. Department of Agriculture, Natural Resources Conservation Service	
U.S. Department of the Interior, Fish and Wildlife Service	
U.S. Environmental Protection Agency, WTR-9, Region IX	
National Marine Fisheries Service	
<b>State Agencies</b>	
Department of Health, Environmental Management Division	
Department of Health, Water Resources Management Division	
Department of Land and Natural Resources	
State Historic Preservation Office	
Office of Environmental Quality Control	
Office of Hawaiian Affairs	
Office of Planning, DBEDT	
Office of Environmental Planning, Department of Health	
University of Hawaii, Environmental Center	
<b>City and County of Honolulu Agencies</b>	
Department of Planning and Permitting	
Board of Water Supply	
Fire Department	
Police Department	

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**Kahauola Street Relief Drain Final EA**

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**Community Groups and Individuals**

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Sierra Club

#27 North Shore Neighborhood Board, Mr. Michael Magoaoay

Sunset Beach Community Association

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**Appendix A -  
Biological Resources**

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## Revisit biological reconnaissance survey and water quality sampling off the Kahauola Street relief drain at Sunset Beach, O`ahu<sup>1</sup>

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May 9, 2000

DRAFT

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### Introduction

A reconnaissance survey of the shallow reef platform seaward of the storm drain outlet for the Kahauola Street storm drain was conducted on May 2, 2000 to provide information on biological resources for a proposal by the City & County of Honolulu to extend the drain's outlet seaward to correct problems of plugging with beach sand. An initial survey for this project was conducted in August 1991 (see AECOS, 1991; Sea Engineering Inc., 1992). However, proposed modifications to the drain system were never completed, and the present survey is for the purpose of establishing what, if any, changes might have occurred in the reef community over the intervening 9 years.

### Methods

The initial biological survey undertaken in August 1991 consisted of a snorkeling reconnaissance swim by the biologists and a transect survey that was semi-quantitative. That is, a transect line was laid out across the reef platform more or less normal to the shore beginning at the culvert pipe and extending seaward for some m. Every other meter of bottom was inspected along the 95 m transect and estimates of abundance of dominant macroalgae (seaweeds) and invertebrates made. A quadrat frame of 0.67 x 1.0 m dimensions divided into 50 subsections by a nylon filament grid was used at 25, 50, 75, and 95 m offshore to provide more accurate estimates of coral and coralline algae abundance, serving as a check on the visual estimates made at 2 m intervals along the line. These quantitative quadrat counts were repeated 10 times at each 25-meter survey point by tossing the frame and counting where it landed to minimize observer biases (AECOS, 1991).

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<sup>1</sup> Report prepared for EarthTech, Inc. This report will become part of the public record.

The May 2000 survey was limited to a reconnaissance snorkeling swim by two biologists making notes and estimating relative abundances in the area previously surveyed and transected in 1991. Abundance estimates were made using a relative abundance scale (Table 1) rather than cover values as was done for many species in 1991. The primary purpose of the revisit was to establish whether conditions of the biological community had changed substantially during the intervening 9 years. While transect and quadrat surveys could be used to detect subtle changes in reef community structure since 1991, it is also possible, with the quantitative data as presented in 1991 (based mostly upon visual estimates and using a quadrat frame in some cases but not others), that differences between the first survey and a resurvey using identical methods would reflect normal variation attributable to the observer differences or slightly different placements of the transect line and quadrats. Consequently, it was concluded that a reconnaissance dive directed at comparing what is observed now with the descriptive report prepared in 1991 would suffice for our purposes.

Table 1. Abundance scale used in May 2000 reconnaissance dive.

--	not observed
R	rare; only one or at most 3 individuals seen
U	uncommon; more than 3 individuals but less than 10 seen
O	occasional; encountered throughout area, but infrequently
C	common; encountered throughout area, but not in great numbers
A	abundant; encountered throughout area in great numbers
AA	very abundant; dominates the substratum

Water samples were collected in May 2000 by swimming out to the approximate locations as indicated on the map in AECOS (1991; and Sea Engineering, 1992). The area is very well mixed and with little change in depth within the offshore portion of the survey area, therefore exact replication of station locations between 1991 and 2000 would be unnecessary. At each station, a 2-liter dark polyethylene bottle, and two 60 ml bottles were filled. These samples were placed on ice in a cooler and transported to our laboratory in Kailua, O`ahu. Analyses were conducted with the instruments and following the methods indicated in Table 2.

Table 2. Analytical methods and instruments used for the May 2000 sampling off Sunset Beach, O`ahu.

Analyses List	Method	Reference	Instrument
Ammonia	alkaline phenol	Koroleff in Grasshoff et al. (1986)	Technicon AutoAnalyzer II

Chlorophyll $\alpha$			
Nitrate + Nitrite	EPA 353.2	EPA (1993)	Technicon AutoAnalyzer II
Orthophosphate			
pH	EPA 150.1	EPA (1979)	Orion SA 250 pH meter / Ross combination electrode
Salinity (field)	refractive index	---	handheld, temperature compensating refractometer
Total Nitrogen	persulfate digestion /EPA 353.2	D'Elia et al. (1977) / EPA (1993)	Technicon AutoAnalyzer II
Total Phosphorus	persulfate digestion /EPA 365.1	Koroleff in Grasshoff et al. (1986) / EPA (1993)	Technicon AutoAnalyzer II
Total Suspended Solids	Method 2540D (EPA 160.2)	Standard Methods 18th Edition (1992); EPA (1979)	Mettler H31 balance
Turbidity	Method 2130B (EPA 180.1)	Standard Methods 18th Edition (1992); EPA (1993)	Hach 2100P Turbidimeter

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## Site Description

The storm drain system serving Kahauola Street and vicinity is described elsewhere (Sea Engineering, 1992, 2000). The culvert outlet lies at the waterline some 275 m (900 ft) the southwest of Sunset Point (Figure 1), at the base of a rather broad beach of coarse sand. The outlet structure rests on a limestone remnant of presumed beachrock origin. A shallow reef platform extends some 150 m (500 ft) off the shore. Depths of water over this platform increase slowly offshore, and do not exceed 2 m (6 ft) within the area of our survey. AECOS (1991) noted that "[m]aximum depths occur about midway across the reef at about 60-70 m from the shoreline, outside of which the reef again becomes more shallow until the reef edge is reached at about 120 m from shore."

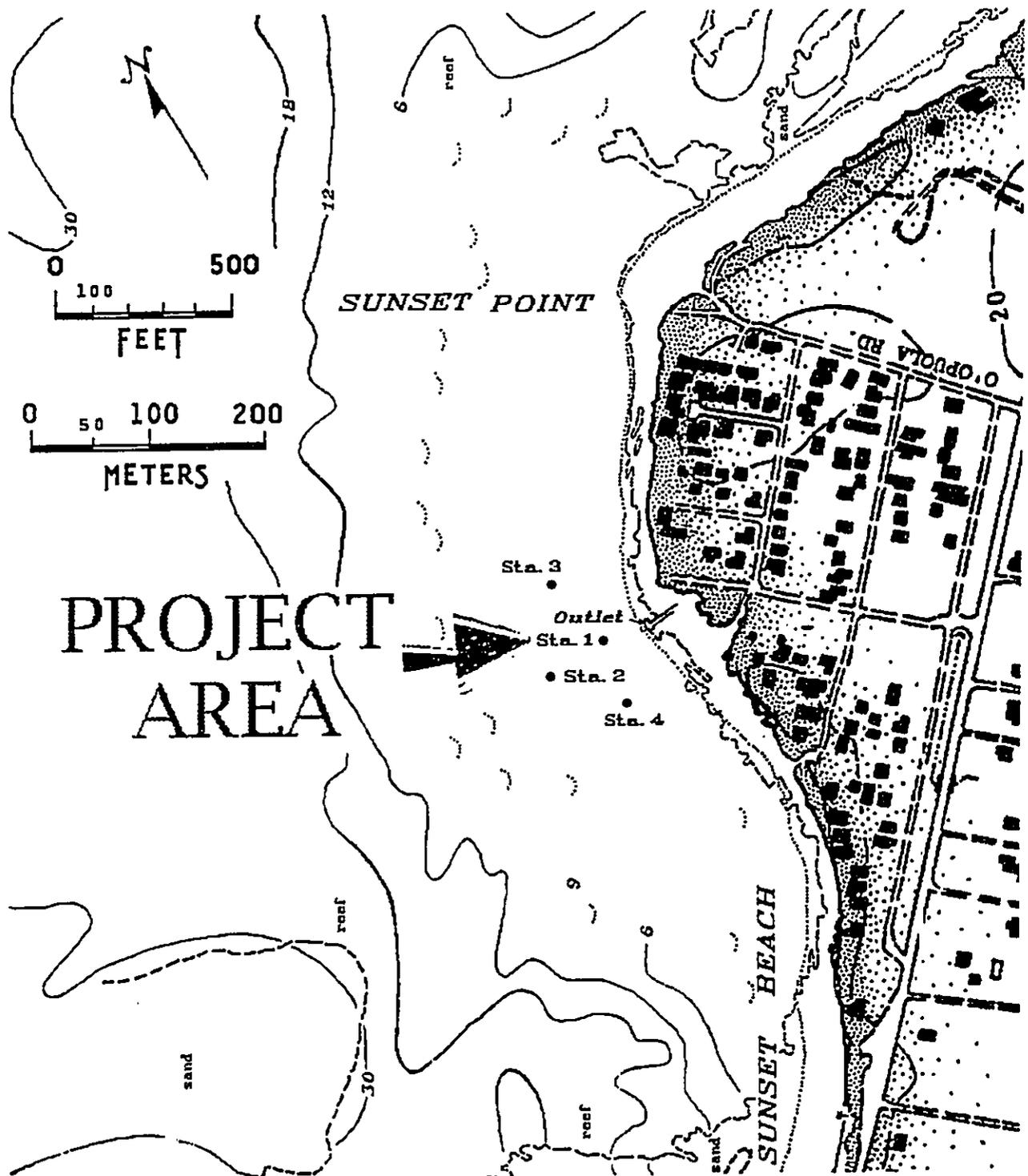


Figure 1. Survey location and water quality stations off Kahauola Street Relief Drain at Sunset Beach on O`ahu (base map after AECOS, 1981).

Although shifting sand is present within the T-shaped outlet of the culvert, sand deposits are sparse from immediately seaward of the structure all across the reef platform in the survey

area. Even in scattered depressions and grooves on the platform, sand deposits are sparse. The substratum is entirely of consolidated limestone with scattered pockets of loose material comprised mostly of rounded stones. Overall relief of the substratum is on the order of 1 m, although generally far less inshore, with greatest relief occurring where there are depressions or grooves. These are scattered widely over the surface, but increase in number and size offshore. The bottoms of the depressions tend to be barren of algae or corals, suggesting seasonal or aperiodic accumulations of loose material greater than what we observed in May.

### Water Quality Results

The results of water quality testing at four stations in May 2000 are presented in Table 3. Analyses included salinity, pH, turbidity, and a full suite of nutrients.

Table 3. Water quality sampling results for four stations off the Kahauola Street Relief Drain at Sunset Beach.

	Time sampled	Salinity (ppt)	pH (pH units)	Turbidity (ntu)	Chl $\alpha$ ( $\mu\text{g/l}$ )		
05-02-00							
<b>Station 1</b>	1255	34.72	8.25	1.10	0.41		
<b>Station 2</b>	1300	34.73	8.24	0.78	0.33		
<b>Station 3</b>	1255	34.73	8.25	0.88	0.40		
<b>Station 4</b>	1300	34.72	8.25	0.88	0.38		
		Ammonia ( $\mu\text{g N/l}$ )	Nitrate + nitrite ( $\mu\text{g N/l}$ )	OrthoP ( $\mu\text{g N/l}$ )	Total N ( $\mu\text{g P/l}$ )	Total P ( $\mu\text{g N/l}$ )	
05-02-00							
<b>Station 1</b>	1255	< 1	2	6	102	10	
<b>Station 2</b>	1300	< 1	4	9	96	11	
<b>Station 3</b>	1255	< 1	1	6	104	9	
<b>Station 4</b>	1300	< 1	1	6	110	9	

On the whole there was very little difference between the stations sampled in May 2000, with the exception of a slightly elevated turbidity at Station 1 in comparison with the others. Concentrations of the nutrients nitrate + nitrite, orthophosphate, and total phosphate were slightly higher at Station 2 than elsewhere, while total n was lowest at this location. All differences are sufficiently small to conclude that the stations are representative of the same water mass.

The results obtained in May 2000 are compared with the summary of the results from August 1991 in Table 4. The number of samples analyzed each event was too small to determine whether the data for each event are normally distributed. The results were therefore analyzed using a parametric (Student's t-test which assumes normal distribution of data points) and a non-parametric test (Mann-Whitney test)

Table 4. Comparison of water quality result summaries (means) for the waters off the Kahauola Street Relief Drain at Sunset Beach in 1991 and 2000.

	Sal. (ppt)	pH (pH units)	Turbidity (ntu)	Ammonia ( $\mu\text{g N/l}$ )	Nitrate + nitrite ( $\mu\text{g N/l}$ )	OrthoP ( $\mu\text{g N/l}$ )	Total N ( $\mu\text{g P/l}$ )	Total P ( $\mu\text{g N/l}$ )	Chl. a ( $\mu\text{gN/l}$ )
<b>August 1991</b>	---	8.0	0.6	1.	4	8	156	8	0.3
<b>May 2000</b>	34.7	8.2	0.9	< 1	2	7	103	10	0.3
<i>t-test (p)</i>		0.00	0.01	0.30	0.07	0.217	0.030	0.116	0.73
<i>Mann-Whitney (p)</i>		<u>0.02</u>	<u>0.02</u>	0.30	0.11	0.247	—	0.148	—
WQ Stds. (dry season)		7.6-	0.20	2.0	3.5	—	110	16	0.15

\* Indicates a significant difference between August 1991 and May 2000 means.

The statistical tests (both parametric and non-parametric) indicate pH, turbidity, and total N were each significantly different comparing May 2000 with August 1991 results. Nutrient concentrations, with the exception of phosphorus, were lower in 2000 than 1991, although significantly different only for total N (Table 4).

State of Hawaii water quality criteria (DOH, 1992) were exceeded for turbidity, nitrate + nitrite, total N, and chlorophyll  $\alpha$  in August 1991, and for turbidity and chlorophyll  $\alpha$  only in May 2000 (Table 4). The reasons for significantly higher turbidity levels comparing 1991 with 2000 means is unknown, but could simply reflect difference in sea state or turbulence over the shallow reef platform from one date to another. The numerical difference in the means is quite small given the range of turbidities commonly encountered in nearshore environments. Similarly the cause of the significance difference between mean pH from the two events is unknown, but not of any particular concern. A higher rate of primary productivity by marine algae could alter pH by the amount noted. Given that the benthic

alga, *Turbinaria ornata*, was present in great abundance in May 2000 compared with August 1991, higher photosynthesis levels (causing an increase in pH) could be expected. This supposition is supported by the fact that the inorganic nutrients (nitrate + nitrite, ammonia, and ortho-phosphate) are reduced in concentration in 2000 as compared with 1991. Greater uptake of nutrients could also occur with increased benthic algal productivity.

## Biological Observations

Given the rather homogeneous environment and minimal change in depth, it is not surprising that our reconnaissance observations detected at most rather subtle changes in abundance of dominant species across the reef platform. The most apparent change in biological community composition occurs within about 20 meters of the end of the culvert structure, leading us to define two zones along the "transect." A nearshore Zone 1 is characterized by large numbers of boring urchins (*Echinometra mathaei* and *E. oblonga*) and an algal assemblage dominated by different species (most particularly *Padina japonica* and *Dictyosphaeria versluysi*) than those characteristic of Zone 2. A review of the transect data presented in Table 2 of AECOS (1991) suggests that the change between our Zones 1 and 2 occurred then between meter marks 18 and 22, where declines were recorded in the abundance of *Echinometra* spp. and *Padina* sp. compared with points further offshore along the line. Careful quantitative transects in the inshore area might reveal the presence of two zones within our Zone 1 based upon the distribution of the algal flora, but this level of detail is beyond our present interest.

Table 5 is a species list based upon the observations made in 1991 and 2000. Abundance estimates made in 2000 using the scale presented above in Table 1 are given for the two zones as described above. The column marked "1991" contains a check mark if the species was observed in August 1991. If there is only a dash entry in either the Zone 1 or Zone 2 columns, the species was not seen again in May 2000.

As in 1991, our Zone 1 harbored large numbers of boring urchins and a diverse algal assemblage (see Table 5). Algae typical of this inshore area include *Dictyosphaeria versluysii*, *Padina japonica*, *Styopodium hawaiiensis*, and *Dictyota* spp. Most of these were not found in Zone 2, or occurred there in much reduced

Table 5. Checklist of biota observed off Kahauola Street Drain  
in August 1991 and May 2000.

Species	Common name	1991	ABUNDANCE	
<b>MACROALGAE</b>				
<b>CYANOPHYTA</b>	blue-green algae		ZONE 1	ZONE 2
<i>Lyngbya cf. majuscula</i> Gomont			--	R
indet.	dark-brown patches		--	U
<b>CHLOROPHYTA</b>	green algae			
<i>Cladophora</i> sp.		▲	--	R
<i>Codium</i> sp.		▲	--	--
<i>Dictyosphaeria verskysii</i> Weber-von Bosse		▲	A	A
<i>Halimeda discoidea</i> Decaisne		▲	--	O
<i>Neomeris annulata</i> Dickie			--	R
<b>PHAEOPHYTA</b>	brown algae			
<i>Colpomenia sinuosa</i> (Roth) Derbes & Solier	<i>puha</i>	▲	--	R
<i>Dictyota acutiloba</i> J. Agardh	<i>alani</i>	▲	A	--
<i>D. bartayresii</i> Lamouroux		▲	--	--
<i>D. sandvicensis</i> Kützing	<i>alani</i>	▲	A	--
<i>Padina japonica</i> Boergesen		▲	A	C
<i>Sargassum echinocarpum</i> J. Agardh		▲	--	--
<i>S. polyphyllum</i> J. Agardh		▲	--	--
<i>Styopodium hawaiiensis</i> (Doty & Newh.) Abb.			C	--
<i>Ralfsia pangoensis</i> Setchell			--	U
<i>Turbinaria ornata</i> (Turner) J. Agardh.		▲	C	AA
<b>RHODOPHYTA</b>	red algae			
<i>Galaxaura fastigiata</i> Decaisne		▲	--	A
<i>G. rugosa</i> (Ellis & Solander) Lamouroux			--	O
<i>Hydrolithon breviclavium</i> (Foslie) Foslie			--	U
<i>Jania</i> sp.		▲		
<i>Laurencia crustiformis</i>		▲	--	--
<i>L. nidifica</i> J. Agardh.	<i>mane `one `o</i>	▲	--	U
<i>L. succisa</i> Cribb	<i>lipo `epe `e</i>		--	R
<i>Liagora cf. papenfussii</i> Abbott		▲	--	U
<i>Porolithon gardineri</i> (Foslie) Foslie		▲	--	A
<i>Porolithon onkoides</i> (Heydrich) Foslie		▲	A	A
<i>Trichogloea requienii</i> (Montagne) Kützing			--	R

Table 5 (continued)

Species	Common name	1991	ABUNDANCE	
			ZONE 1	ZONE 2
<b>MACROINVERTEBRATES</b>				
<b>CNIDARIA. ANTHOZOA</b>				
corals				
<b>Order Zoanthinaria</b>				
<i>Palythoa caesia</i> Dana (= <i>P. tuberculosa</i> )	blue-gray soft coral		--	--
<b>POCILLOPORIDAE</b>				
<b>Order Scleractinia</b>				
<i>Pocillopora meandrina</i> Dana	cauliflower coral		--	O
<b>ACROPORIDAE</b>				
<i>Montipora flabellata</i> Studer	blue rice coral		--	A
<b>PORITIDAE</b>				
<i>Porites lobata</i> Dana	lobe coral		--	AA
<i>P. compressa</i> Dana	finger coral		--	--
<b>AGARICIIDAE</b>				
<i>Pavona duerdeni</i> Vaughan	duerden's coral		--	R
<i>Pavona varians</i> Verrill	corrugated coral		--	R
<b>XENIIDAE</b>				
<i>Anthelia edmondsoni</i>	blue octocoral		?	C
<b>MOLLUSCA,</b>				
<b>Order Nudibranchia</b>				
<b>HEXIBRANCHIDAE</b>				
<i>Hexabranhus aureomarginatus</i>	Spanish dancer		--	R
<b>ECHINODERMATA</b>				
<b>ECHINOIDEA</b>				
<b>DIADEMATIDAE</b>				
<i>Echinothrix diadema</i> (L.)	blue-black urchin		--	O
<b>ECHINOMETRIDAE</b>				
<i>Echinometra oblonga</i> (de Blainville)			A	O
<i>E. mathaei</i> (de Blainville)			A	O
<i>Echinostrephus aciculatus</i> A. Agassiz	needle-spined urchin		--	--
<i>Heterocentrotus mammillatus</i> (L.)	slate-pencil urchin		--	--
<b>TOXOPNEUSTIDAE</b>				
<i>Tripneustes gratilla</i> (L.)			--	O
<b>HOLOTHUROIDEA</b>				
<b>HOLOTHURIIDAE</b>				
<i>Actinopyga mauritiana</i> (Quoy & Gaimard)	<i>loli</i>		--	R
<i>Holothuria atra</i> Jaeger	<i>loli okuhi kuhi</i>		--	O

Table 5 (continued)

Species	Common name	1991	ABUNDANCE	
<i>VERTEBRATES</i>				
FISHES			ZONE 1	ZONE 2
<b>HEMIRAMPHIDAE</b>				
	halfbeaks			
	<i>Hyporhamphus acutus</i> Günther		U	--
<b>CIRRHITIDAE</b>				
	hawkfishes			
	<i>Cirrhitis pinnulatus</i> (Bloch & Schneider)	▲	--	--
<b>MULLIDAE</b>				
	goatfishes			
	<i>Parupeneus bifasciatus</i> (Lacepede)		--	R
<b>CHAETODONTIDAE</b>				
	butterflyfishes			
	<i>Chaetodon auriga</i> Forsskal		--	R
	<i>Chaetodon quadrimaculatus</i> Gray		--	U
<b>POMACENTRIDAE</b>				
	damsel-fishes			
	<i>Chromis hanui</i> Randall & Swerdloff		--	R
	<i>Pectroglyphidodon imparpennis</i> (V & S)	▲	--	C
	<i>P. sindonus</i> (Jordan & Evermann)	▲	--	O
	<i>Stegastes fasciolatus</i> (Ogilby)	▲	--	--
<b>LABRIDAE</b>				
	wrasses			
	<i>Anampses cuvier</i> (Quoy & Gaimard)		--	R
	<i>Coris flavovittata</i> (Bennett)	▲	--	--
	<i>Pseudocheilinus octotaenia</i> Jenkins	▲	--	--
	<i>Stethojulis balteata</i> (Quoy & Gaimard)		--	U
	<i>Thalassoma duperrey</i> (Quoy & Gaimard)	▲	--	A
	<i>T. trilobatum</i> (Lacepede)	▲	--	A
<b>BLENNIDAE</b>				
	scarface blenny	▲	--	R
<b>ACANTHURIDAE</b>				
	surgeonfishes			
	<i>Acanthurus guttatus</i> Forster & Schneider		--	R
	<i>Acanthurus nigrofuscus</i> (Forsskal)		--	C
	<i>Acanthurus nigroris</i> Valenciennes		--	R
	<i>Acanthurus triostegus</i> (L.)	▲	--	C
<b>BALISTIDAE</b>				
	triggerfishes			
	<i>Rhinocanthus rectangulus</i> (Bloch & Schneider)	▲	--	U
<b>OSTRACIOTIDAE</b>				
	boxfishes			
	<i>Ostracion meleagris</i> (Shaw & Nodder)	▲	--	--
<b>TETRAODONTIDAE</b>				
	pufferfishes			
	<i>Arothron hispidis</i> (L.)	▲	--	R
	<i>Canthigaster amboinensis</i> (Bleeker)		--	R
	<i>Canthigaster jactator</i> (Jenkins)		--	R

numbers. *D. versluysii* was abundant in the inshore part of Zone 2, decreasing offshore. Zone 2 was characterized by extensive coverage by *Turbinaria ornata*, (generally increasing seaward) with scattered but abundant growths of *Galaxaura* spp., *Porolithon* spp. Coral coverage was sparse in Zone 1. Although somewhat more species of algae were observed in 2000 as compared with 1991, the differences are minor, involving species that were uncommon to rare at this location. The biggest differences involved *Turbinaria ornata* observed to be rare in August 1991, but nearly dominating the substratum in May 2000. A related genus, *Sargassum*, was uncommon or occasional in 1991, but absent in 2000. These large brown algae are seasonal in appearance, and grow most luxuriantly during the colder months of the year. Thus, the results of the August 1991 survey are understandable. The absence of *Sargassum* in May 2000 is not explained, however.

In 1991, the hermatypic (reef-building) coral, *Porites lobata*, appeared closest to shore at around the 10 m mark, after which coverage by this species increased steadily offshore to around 30 percent of the substratum at meter mark 22. Encrusting *P. lobata* colonies and smaller, blue encrusting *Montipora flabellata* dominate the bottom presently, although macroalgae are the most abundant organisms on the reef platform. *Porites* within the first 20 m of shore was estimated to cover some 5 to 10% of the bottom in May 2000, and coverage was estimated to be 50-60% in the outer part of the transect area. These values are certainly comparable to those obtained in 1991. There are no reasons to conclude that coral coverage on this reef platform has declined during the intervening period.

Other invertebrates reported by the two surveys are generally very comparable, with a predominance of echinoderms, especially sea urchins. Species seen on one or the other survey, but not both, are species reported as rare or uncommon.

The fish faunas recorded in 1991 and 2000 likewise demonstrate considerable consistency between the two periods. Considerably more species were observed in the recent survey, but this may be owing to the stronger interest in reef fishes of the biologists conducting the survey in 2000. With the exception of *ma'i'i'i* or *Acanthurus nigrofuscus*, all of the species noted in 2000 not seen in 1991 were rare or uncommon species (that is, in many cases, only a single individual was observed in the area). It is concluded that the fish fauna has changed very little if at all in a qualitative sense since 1991.

## Conclusions

The results of a revisitation to the reef environment off the proposed Kahauola Street Relief Drain indicate that no substantial changes have occurred in this environment since previously surveyed (AECOS, 1991). The limited water quality measurements (single events in 1991 and May 2000) also indicate substantial similarity between the two sampling events. The conclusions of the original survey with regard to the impacts anticipated from the proposed extension of the drain pipe seaward, still have relevance (AECOS, 1991, p. 16-18):

Extending the existing storm drain outfall any distance beyond 5 m seaward from its present terminus will clearly have some negative impact on the coral reef communities in the immediate area in both the short and the long term. Preparation of a right of way for a pipeline, construction of the pipe and reinforcement of the pipe against wave forces will all involve short term direct damage to the reef and associated increases in sedimentation and turbidity during the construction phase. In the longer term periodic runoff from the outfall will be likely to impinge on corals and associated reef organisms, producing mortality and other physiological damage due to reduced salinity, increased turbidity and smothering of reef surfaces by sedimentation.

The extent of negative effects to be expected is difficult to assess rigorously with the present information. Direct construction impacts will be unavoidable in the immediate zone of construction, and complete mortality can be expected within an immediate zone of influence. Arbitrarily, a zone of 10 m around the construction zone may be proposed for the limited construction that would be necessary for extending the outfall. In reality, the actual size of this zone will be unimportant, since construction impacts are temporary, and a normal complement of reef organisms will rapidly re-establish themselves after construction completion, if no other sources of stress to the reef continue.

The longer term stresses of reduced salinity, increased turbidity and sedimentation due to release of storm water runoff on the reef are of much greater importance. Corals and associated reef organisms are known to be killed by salinity reductions below 20 parts per thousand, or about 60% of normal ocean salinity, when these salinities persist for more than a day. Salinity reductions due to massive storms have produced two major mortality events to the coral reefs in Kaneohe Bay in the last 30 years, and similar massive die offs of reef organisms have been reported from storm runoff throughout the world (See review by Coles and Jokiel, [1992]). The increased turbidity and sedimentation which accompany such storm events are additional stresses which are themselves damaging and may act synergistically to wipe out

reefs where a normal community has become established over many years.

Given that the Kahauola culvert provides drainage for a substantial land area, it is likely that significant volumes of turbid, sediment-laden water presently has reached the shoreline during rainy seasons. Since fresh water is lower in density than seawater, runoff has remained on the ocean surface and passed rapidly offshore, due to unrestricted access to open ocean waters and rapid circulation of the area. This perception is reinforced by the observation that reef corals grow on the reef as close as 10 m directly off the present outfall, and zonation on the transect appeared to be no different from anywhere else in the area. Extension of the outfall onto the reef into the zone of active coral growth will result in direct impingement onto present live coral areas, resulting in destruction of any coral or coralline algae recruitments that may occur after ..... construction. Data are not available to quantitatively evaluate this mortality from runoff, but given the shallowness of the area a mortality zone with a radius of 10 to 20 m is a realistic estimate.

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**Appendix B -  
Shoreline Assessment**

**Table B-2: Coastal Hazards Events, North Shore, Oahu**

Date	Cause	Affected Areas	Damages
January 16, 1921 <sup>a</sup>	Storm	Island of Oahu	Floods, 4 deaths and property damage
November 18, 1930 <sup>a</sup>	Storm	Island of Oahu (especially southern side)	Floods, 11 deaths and property damage
February 25, 1935 <sup>a</sup>	Rain	Waialua-Haleiwa	14 deaths, \$1 million damages
February 27, 1935 <sup>a</sup>	Storm	Island of Oahu	10 deaths, several houses washed away
April 1, 1946 <sup>b</sup>	Tsunami	All, especially Kewela Bay, Sunset Beach, Mokuleia	6 deaths, 67 homes demolished, 3335 damaged, OR&L railroad track destroyed.
January 4-5, 1947 <sup>b</sup>	High waves	Kahuku Point	Flooding
February 7, 1949 <sup>a</sup>	Storm	Oahu	Flooding, property damage
November 4, 1952 <sup>b</sup>	Tsunami	Waialua, Haleiwa, Mokuleia	Schools and homes damaged
January 4, 1953 <sup>b</sup>	High waves	Waialua to Kahuku Point	24 homes flooded, Kam. Highway blocked
November 27-28, 1954 <sup>a</sup>	Storm	Oahu	2 deaths and property damage
December 19-21, 1955 <sup>b</sup>	Rain	All Islands	2 deaths
February 25, 1956 <sup>b</sup>	Rain	Sunset Beach	Property damage
November 27-28, 1956 <sup>b</sup>	High waves	Haleiwa, Kawailoa, Sunset Beach	11 homes badly damaged, Kam. Highway blocked
January 21, 1957 <sup>b</sup>	Rain	Sunset Beach, Kam. Highway	Kam. highway under 3 feet of water
March 9, 1957 <sup>b</sup>	Tsunami	Especially Waialua, Mokuleia to Waimea	Severe damage; over 100 homes damaged.
May 22, 1960 <sup>b</sup>	Tsunami	Waialua, Haleiwa	Property damage
January 21, 1962 <sup>b</sup>	Rain	Waialua	Small Flood
March 13-14, 1962 <sup>b</sup>	Rain	Waimea	Property damage to 5 homes, a church tower, and quarry tower
January 31, 1963 <sup>b</sup>	Rain	Mokuleia	Crop damage
April 15, 1963 <sup>b</sup>	Rain	Sunset Beach, Waimea River	Kam. Highway Flooded
March 27, 1964 <sup>b</sup>	Tsunami	Haleiwa	Slight property damage
December 9-10, 1964 <sup>b</sup>	Rain	Oahu	Slides on roads
December 23, 1964 <sup>b</sup>	Rain	Waialua	Property damage
December 23, 1964 <sup>b</sup>	High waves	Sunset Beach to Kahuku Point	Homes damaged
November 11, 1965 <sup>b</sup>	Rain	Sunset Beach	Kam. Highway flooded
February 1, 1969 <sup>b</sup>	Rain	Waialua-Haleiwa	
December 1-5, 1969 <sup>b</sup>	High waves	Sunset Beach, Mokuleia, Haleiwa	2 Dead, 11 injured, 25 homes destroyed, 90 damaged.
November 24, 1970 <sup>b</sup>	High waves	Mokuleia	24 homes damaged, Farrington Highway flooded

Date	Cause	Affected Areas	Damages
January 7-8, 1974 <sup>b</sup>	High waves with unusually high tide	Haleiwa, Kawaihoa, Sunset Beach	35 foot waves damaged buildings and caused flooding
March 25, 1974 <sup>b</sup>	High waves	Sunset Beach	5 killed, property damage
April 19, 1974 <sup>b</sup>	Large storm	Paukauila Stream through Haleiwa	3 deaths and property damage
July 18, 1974 <sup>b</sup>	Storm	Sunset Beach to Kahaluu	Flooding
January 6-14, 1980 <sup>a</sup>	Storm	Oahu	High winds and waves, intense rains cause flooding and property damage
November 23, 1982 <sup>a</sup>	Hurricane Iwa	Oahu	Hurricane causes flooding and property damage
09 June 1996 <sup>c</sup>	Heavy rains	Haleiwa to Kahuku	Minor flooding on roads
June 12, 1996 <sup>c</sup>	Heavy showers	Central Oahu, northward	Small stream and street flooding
June 29, 1996 <sup>c</sup>	Heavy showers	Central and Northern Koolaus	Localized flooding of streams and streets
07 September, 1996 <sup>c</sup>	Heavy rains	Haleiwa to Kahuku	Minor street flooding
November 14, 1996 <sup>c</sup>	Heavy rains	Oahu	Major flooding occurred along Kam. Highway from Kahuku to Haleiwa
April 3, 1997 <sup>c</sup>	Rains	Makaha to Sunset Beach	Minor street flooding
May 16, 1999 <sup>c</sup>	Heavy rainfall	North shore	Water ponding in low lying areas and streets
December 10, 1999 <sup>c</sup>	Rains	Waialua to Waimanalo	Urban/small stream flooding
February 20, 2000 <sup>c</sup>	High waves	North Shore	High waves

Note: Data included in this table is specific to the proposed project site, the North Shore of Oahu and the island of Oahu, so that only events that may have affected the proposed project site are included. a = Lee, 1990. b = Scudder, 1972. c = NOAA, 2000.



**Photo 1: Makai View of Kahauola Street**  
Unlined channel and inlet structure in the foreground.

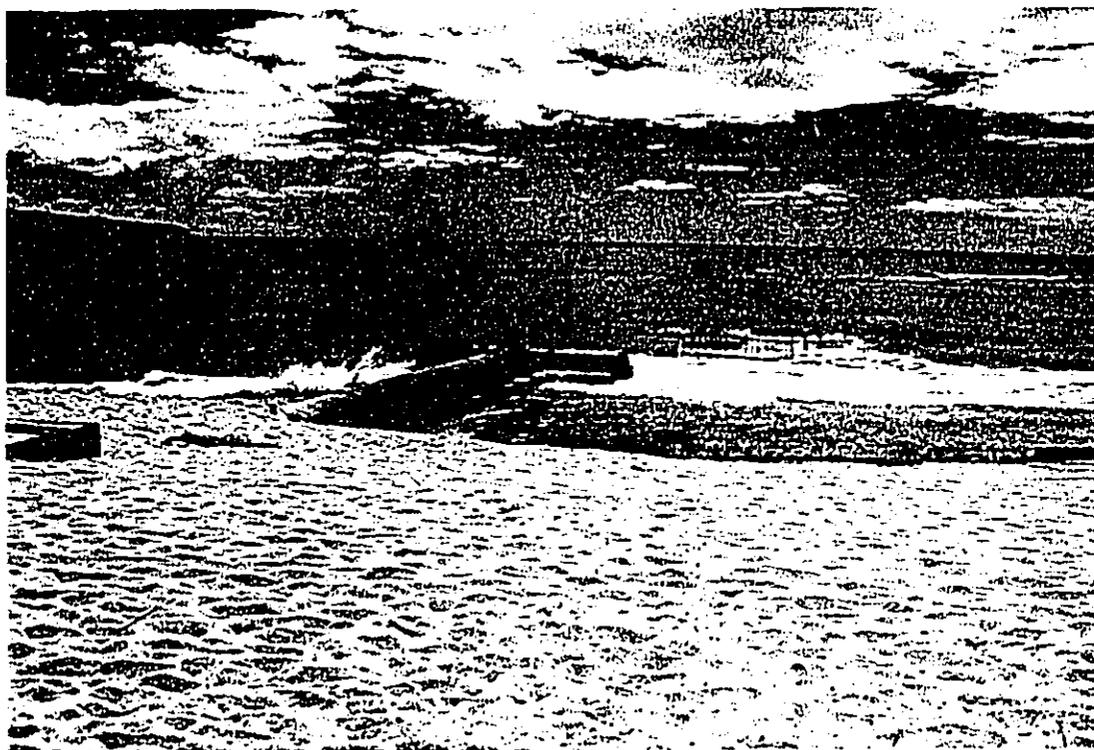


**Photo 2: Residential Area Mauka of Kamehameha Highway**

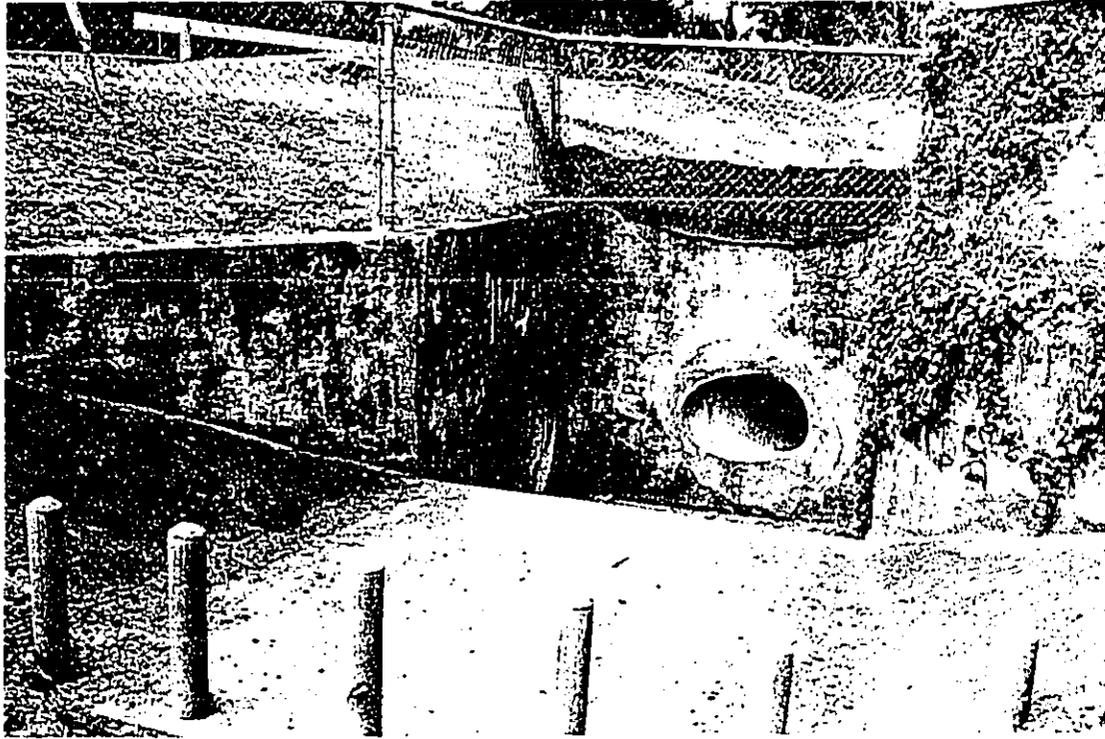
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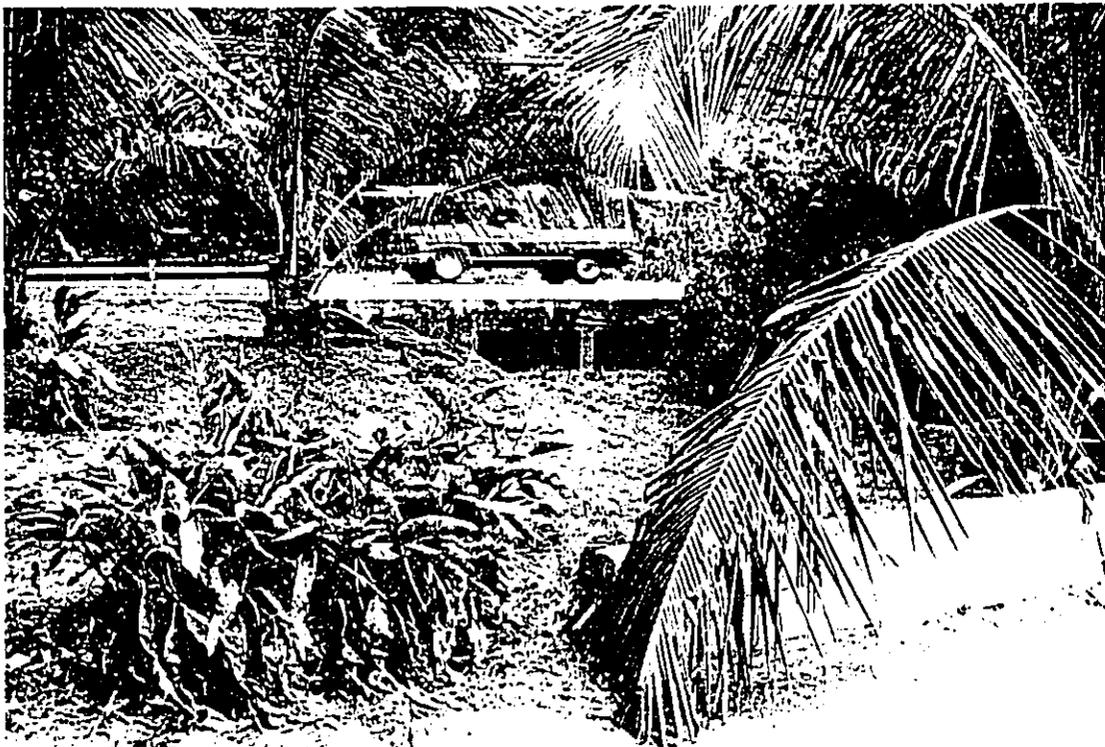
**Photo 3: Kamehameha Highway, Waimea-bound**  
Unlined channel on the right.



**Photo 4: Beach Outlet Structure**



**Photo 5: Inlet Structure for Kahauola Street Drainline**  
Inlet of pipe culvert on far inlet wall.



**Photo 6: Double Box Culvert Crossing Kamehameha Highway**

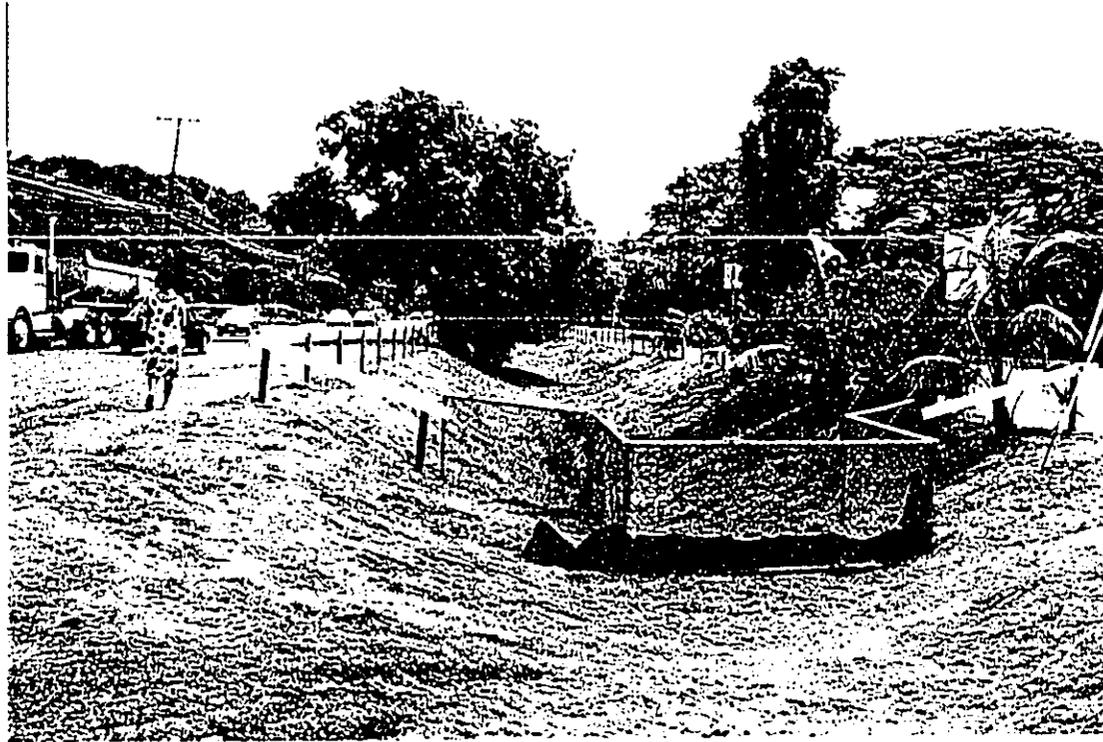


Photo 7: Unlined Channel Along Kamehameha Highway

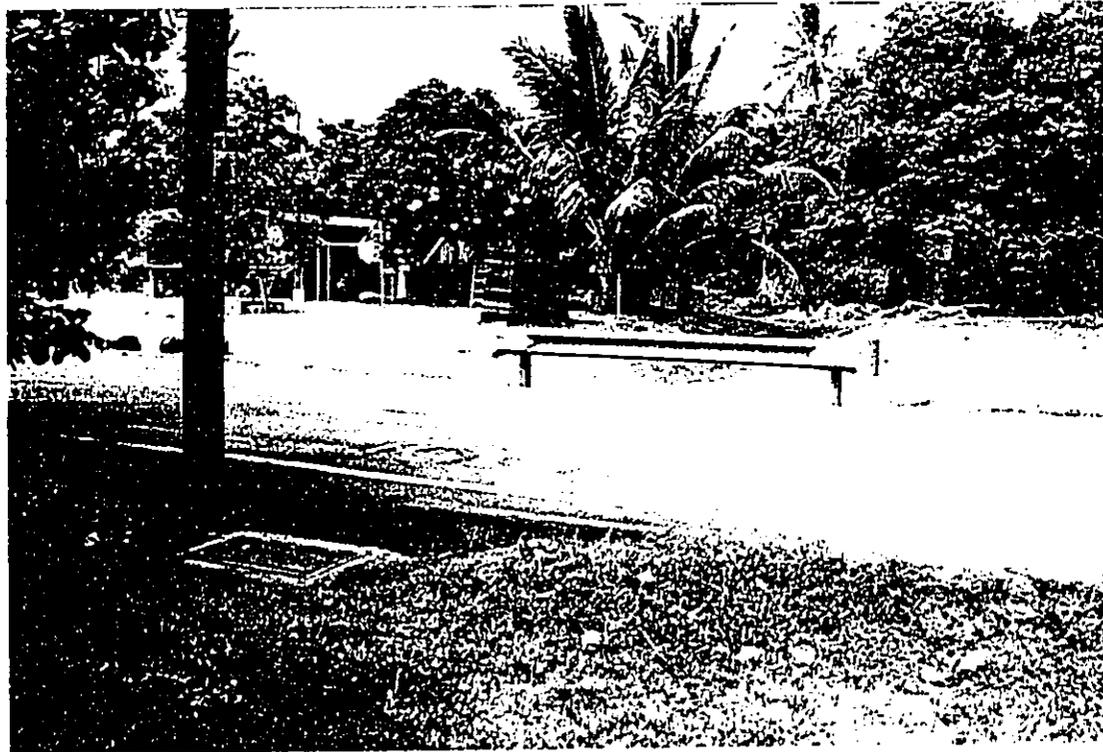


Photo 8: Typical Inlet Structure

Kahauola Street Relief Drain Draft Environmental Assessment

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Photo 9: Kahauola Street looking mauka from the beach access

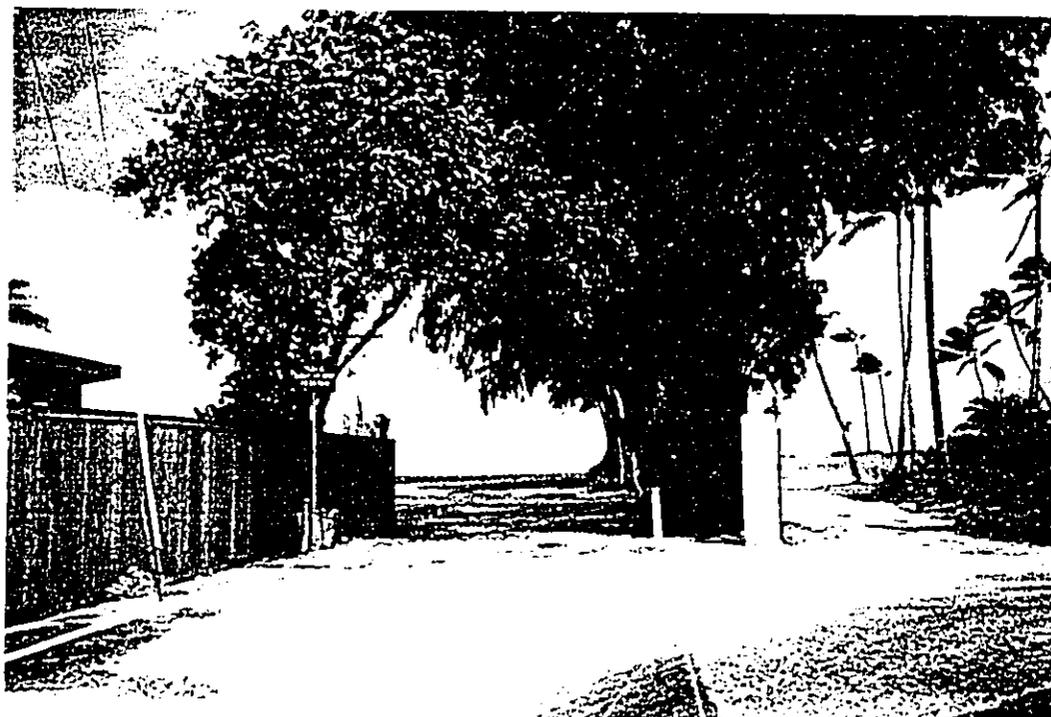


Photo 10: The beach access at Kahauola Street



**Photo 11: The exposed drainline and outlet**  
Note the vegetation in the vicinity of the drainline.



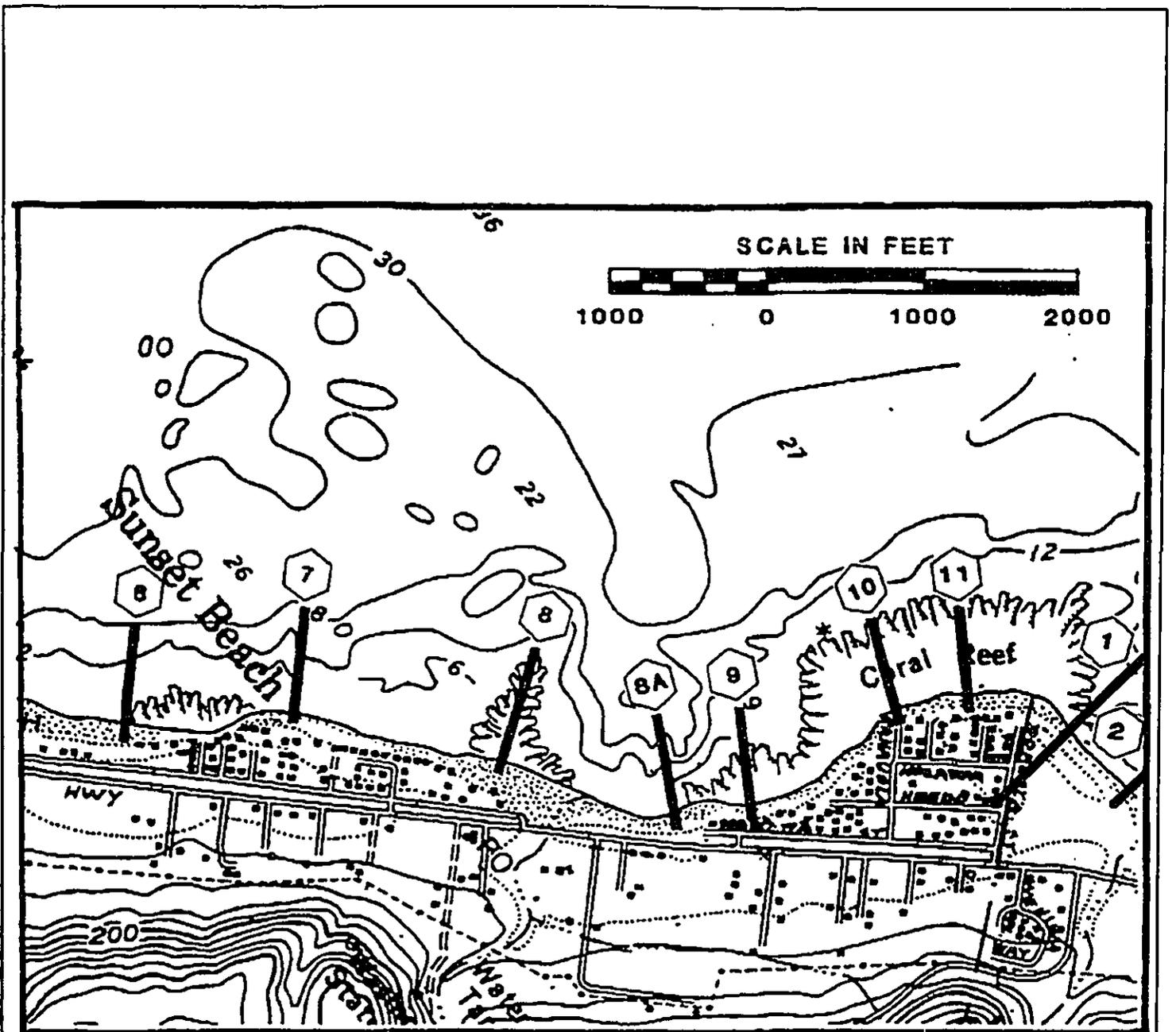
**Photo 12: View mauka of the exposed drainline and manhole**



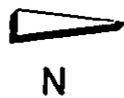
**Photo 13: View (towards Haleiwa) of the outlet, reef and sand**



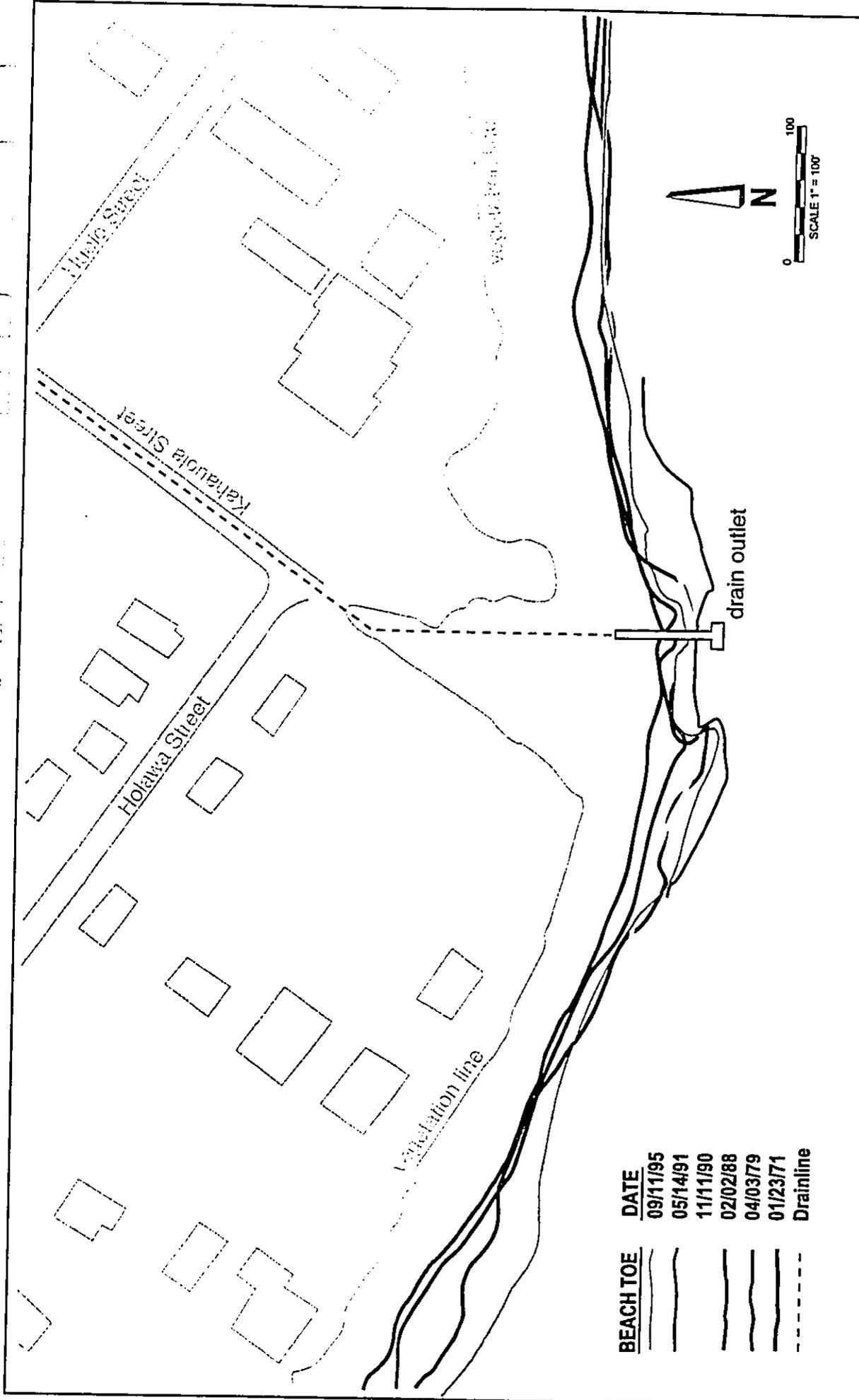
**Photo 14: View (towards Kahuku) of Sunset Point**  
Note the shoreline protection structures.



Source:  
HWANG, 1981  
Sea Engineering, 1988



Kahauola Street Relief Drain Environmental Assessment		
Sunset Beach Changes in the Vegetation Line Transects		
Date 05-2000		Figure
Project No. 25887	EARTH  TECH	B-1



SOURCES: SEA Engineering, 1992  
R.M. Towill, 9/11/95

Kahaula Street Relief Drain Environmental Assessment

### Beach Changes as Indicated by Aerial Photographs

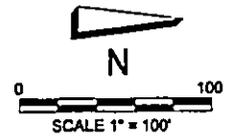
Date 05-2000		Figure B-2
Project No. 25867		

**DOCUMENT CAPTURED AS RECEIVED**



Source: R.M. Towill

DOCUMENT CAPTURED AS RECEIVED



Kahauola Street Relief Drain Environmental Assessment

Sunset Point Aerial  
Photograph 12-3-74

Date 05-2000

Project No.  
25867

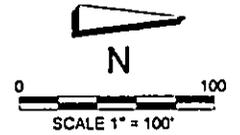


Figure

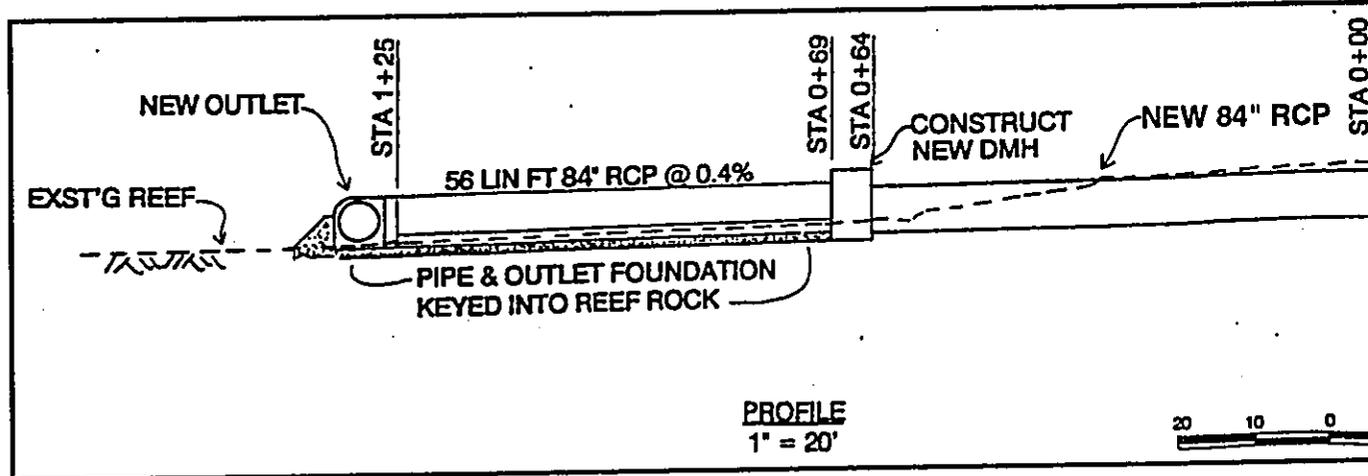
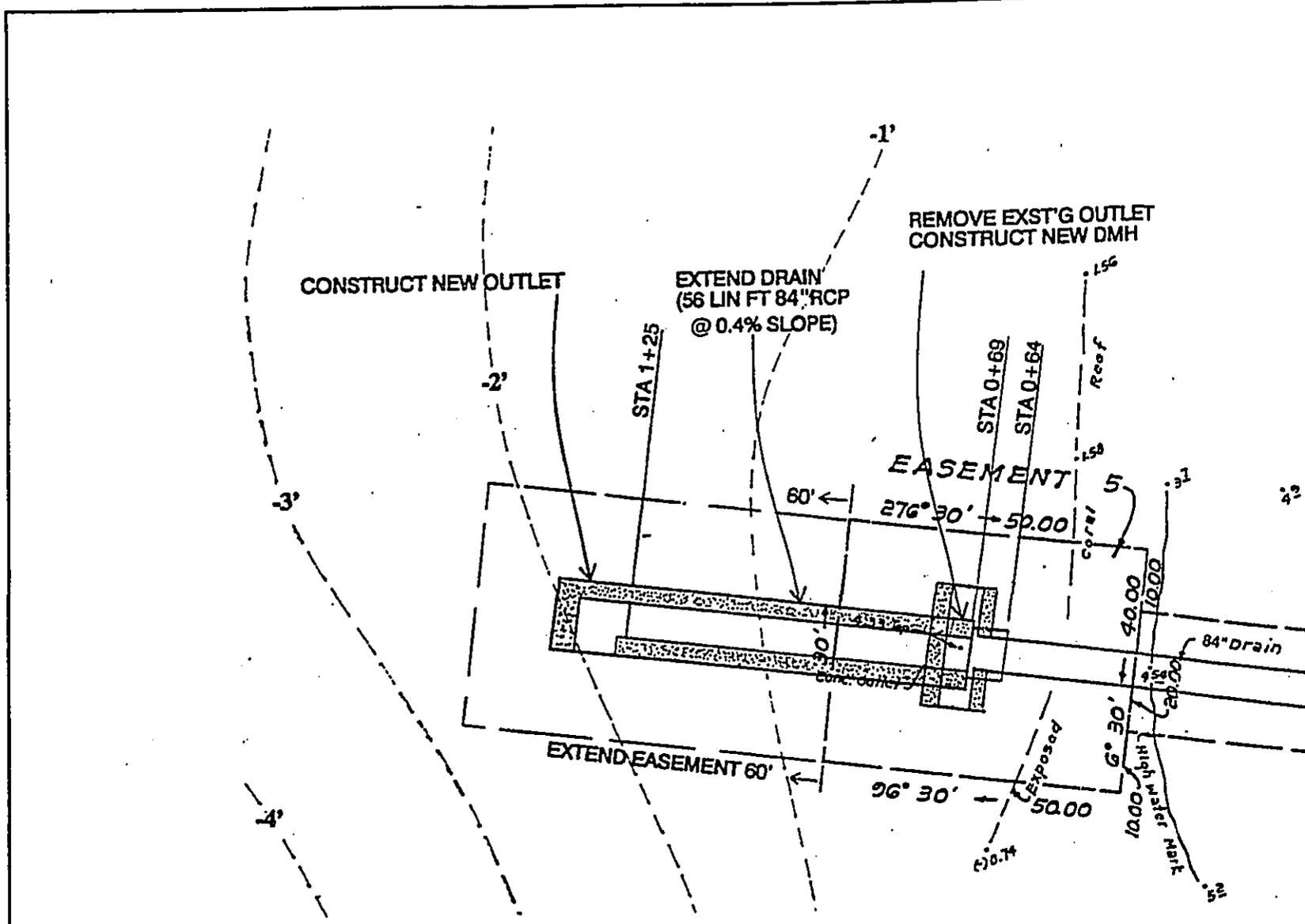
B-3



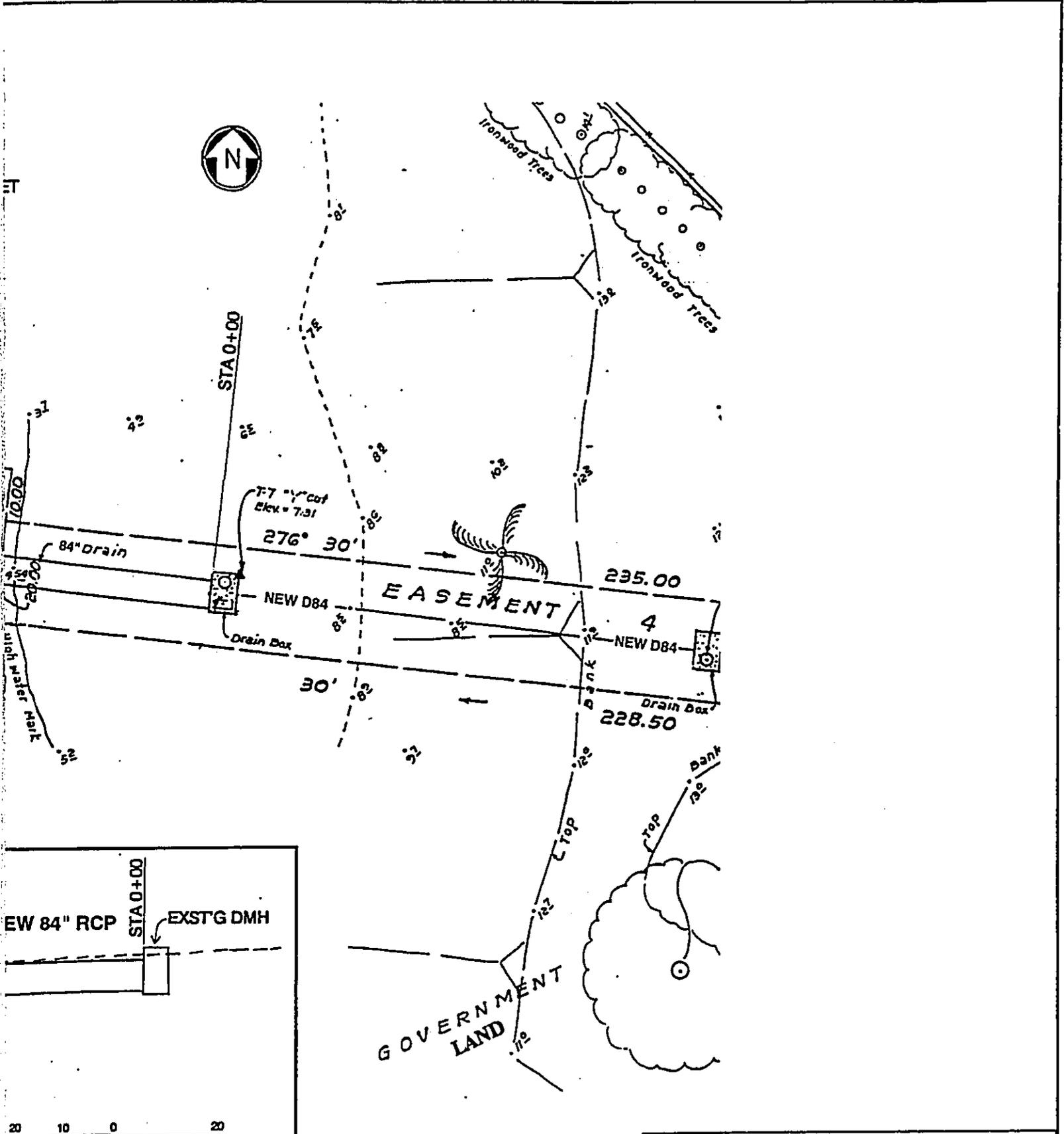
Source: R.M. Towill



Kahauola Street Relief Drain Environmental Assessment	
Sunset Point Aerial Photograph 9-11-95	
Date 05-2000	Figure
Project No. 25867	EARTH  TECH B-4



Legend	
DMH	- DRAIN MANHOLE
RCP	- REINFORCED CONCRETE PIPE
STA	- STATION
LIN	- LINEAR



Kahauola Street Relief Drain Environmental Assessment		
<b>Relief Drain Outlet Extension Plan and Profile</b>		
Date 05-2000		Figure
Project No. 25867	EARTH  TECH	B-5

**Appendix C -  
Coastal Resources**

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**COASTAL ENGINEERING EVALUATION UPDATE FOR  
OUTLET IMPROVEMENTS AT THE  
KAHAUOLA STREET RELIEF DRAIN,  
SUNSET BEACH, O'AHU**

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**Prepared for:**

**Earth Tech, Inc.**

**700 Bishop Street, Suite**

**Honolulu, Hawai'i 96813**

**Prepared by:**

**Sea Engineering, Inc.**

**Makai Research Pier**

**41-202 Kalaniana'ole Highway, Suite 8**

**Waimānalo, Hawai'i 96795-1820**

**March 2000**

**#20-05**

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## COASTAL ENGINEERING EVALUATION UPDATE FOR OUTLET IMPROVEMENTS AT THE KAHAUOLA STREET RELIEF DRAIN, SUNSET BEACH, O'AHU

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### Introduction

In January, 1992, Sea Engineering, Inc. (SEI), completed a report titled "Coastal Engineering design guidelines for outlet improvements at the Kahauola Street relief drain, Sunset Beach, Oahu" commissioned by the Dept. of Public Works, City and County of Honolulu. The report was generated to address the recurring problem of sand blockage in the 66-inch RCP (reinforced concrete pipe) Kahauola Street relief drain. The drain is located at Sunset Point, just north of Sunset Beach Park. The drain outlet lies near the toe of the sand beach in a zone of active sand transport, and sand was being pushed up into the pipe by wave action until the pipe was no longer functional.

Alternatives considered to solve the problem at the time included relocation of the relief drain to another site on the coast, relocation of the drain inland of the beach and zone of sand transport, and extension of the existing pipe and outlet seaward beyond the zone of active sand transport. Relocation along the beach was not chosen because Sunset Point appeared to be the most stable part of the immediate coastline in terms of sand movement, and relocation inland was not feasible due to the high backshore crest elevation. The recommended alternative was therefore to extend the drain 60 feet seaward, beyond the zone of active sand transport. At present, in addition to the pipe extension, plans for pipeline construction call for increasing the diameter of the pipe from 66 inches to 84 inches.

The 1992 SEI report contained extensive analyses of oceanographic conditions at the site, including the site bathymetry and beach topography, wave height distribution and wave force calculations, littoral processes and beach changes from historical data as well as biological studies and water quality sampling. The site was re-visited on 3-9-2000 to observe current conditions around the storm drain, and to assess the continued validity of the 1992 report.

Conditions at the site remain remarkably the same as in the previous study. The beach has not changed appreciably except for minor differences in beach profile that are expected as a natural course of varying wave conditions.

### Site Conditions

Figure 1 is an aerial photograph of Sunset Point taken in July 1996 showing the unusual occurrence of a summertime northwest swell event. The vegetation line behind the storm-drain is not appreciably different and the overall condition is very similar to that shown in the 1992 report. Figures 2 and 3 are photographs of the outlet looking southwest toward Sunset Beach Park. The outlet is imbedded in reef rock that is extensive along this stretch of beach. Exposure



Figure 1. Aerial Photograph of Sunset Point, 7/8/96 (Air Survey Hawai'i)



Figure 2. Kahauola Street Storm Drain Outlet

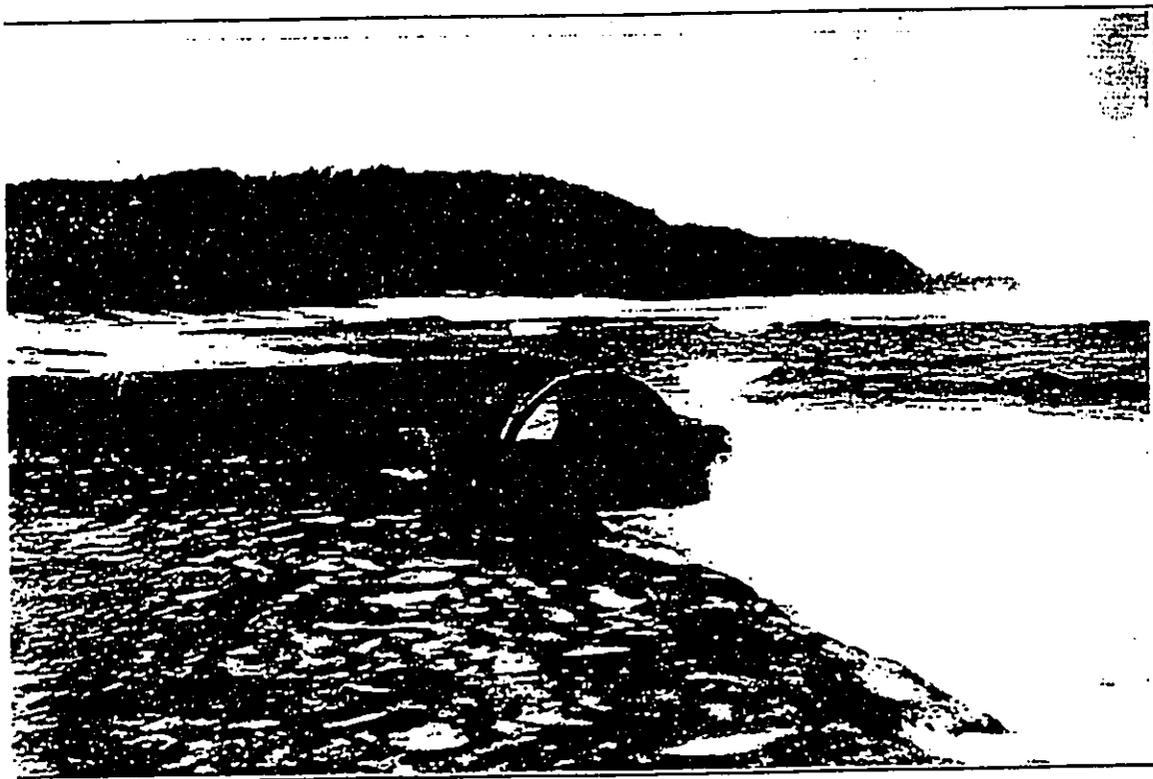


Figure 3. Reef Rock at Drain Outlet

of reef rock is less on the southeast side of the pipe (Figure 4) and the sand toe of the beach therefore extends out further, a prevailing condition shown in the analysis of aerial photographs in the 1992 report. An offshore profile was taken on the alignment of the drain, and Figure 5 is a photograph of the survey rod-man at the proposed new discharge location 60-feet offshore.

Offshore and onshore profiles are shown in Figure 6. The bottom of the outlet tee was filled with approximately 1.5 feet of sand (Figure 7), and the sand grew progressively thicker in the onshore direction until the pipe was completely sealed 26 feet back from the outlet. Anecdotal reports from residents and lifeguards at Sunset Beach indicate that this blockage is present most or all of the time.

The offshore profile in Figure 6 shows a shallow and flat but irregular shelf extending in front of the outlet. An elevation of -3 ft MSL was measured at the proposed new outlet location. However, the 1992 study showed an elevation of -2 feet. There are two possible reasons for the difference: 1) depth readings in 1992 were not taken directly on the pipe alignment but interpolated from widely spaced spot readings, 2) the bottom is irregular, with numerous channels, holes, and high spots. It is important that the new outlet not be positioned in a low spot on the reef, as sand will tend to collect there and work its way up the pipe.

The 1992 report discussed the effects of the pipeline on coastal processes in detail, and concluded that the effects were not significant over the long term. However, the pipe is perpendicular to the beach and therefore functions as a groin, blocking longshore transport of sand. The pipe's effectiveness as a groin is diminished by 1) wave overtopping of the pipe, with resultant sand transport from one side to the other, and 2) the small amount of longshore drift at that location varies with the wave conditions, and can be in either direction. In large part this is seasonal, with transport to the northeast during high winter wave conditions, and transport to the southeast during tradewind conditions in the summer.

Wave overtopping of the pipe is also dependent on the incident wave conditions. Although the drain pipe location is protected by a shallow fringing reef, the wave climate on O'ahu's north shore is especially vigorous and results in high wave run-up heights, as shown by the relatively high beach crest elevations. At present the beach profile slope is approximately 1:10 vertical to horizontal, with the top of the pipe buried in beach sand about 46 feet from the outlet tee. Backshore profiles vary from 1:10 to 1:15. Previous photos and surveys of the site show similar conditions, with the top of the pipe buried between 40 and 50 feet back from the outlet tee. Elevation of the pipe at that location is slightly less than 5 feet. The presence of freshly deposited sand on top of the pipe on 3-10-2000, a day of mild wave and tide conditions, shows that the pipe in its present configuration is easily overtopped at the 5-foot level.

Figure 8 is a photograph of recently deposited sand on top of the pipe illustrating the overtopping process and the transport of sand from one side of the pipe to the other (from left to right in the photo). However, as demonstrated in the photo, the process does not completely equilibrate the beaches on each side of the pipe. The sand on the southwest side of the pipe is about a foot higher than sand on the northeast side, indicating, in this case, sand transport from southwest to northeast.

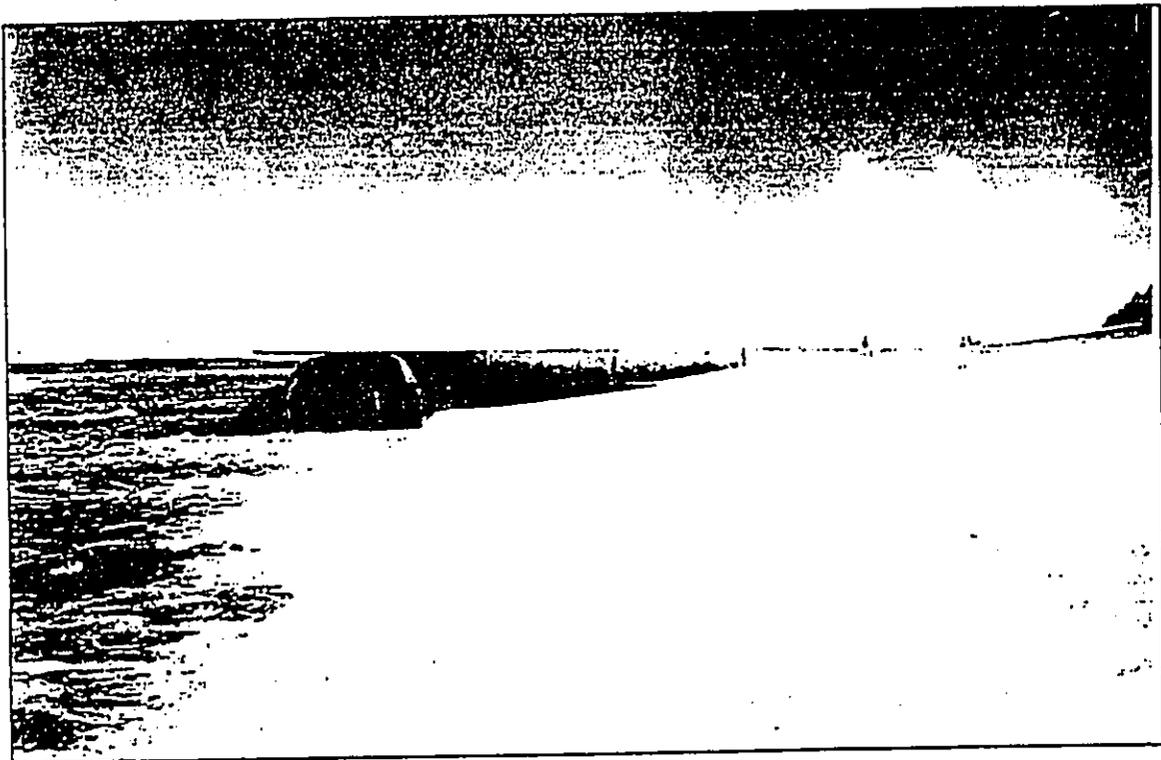


Figure 4. Southeast Side of Drain-Pipe

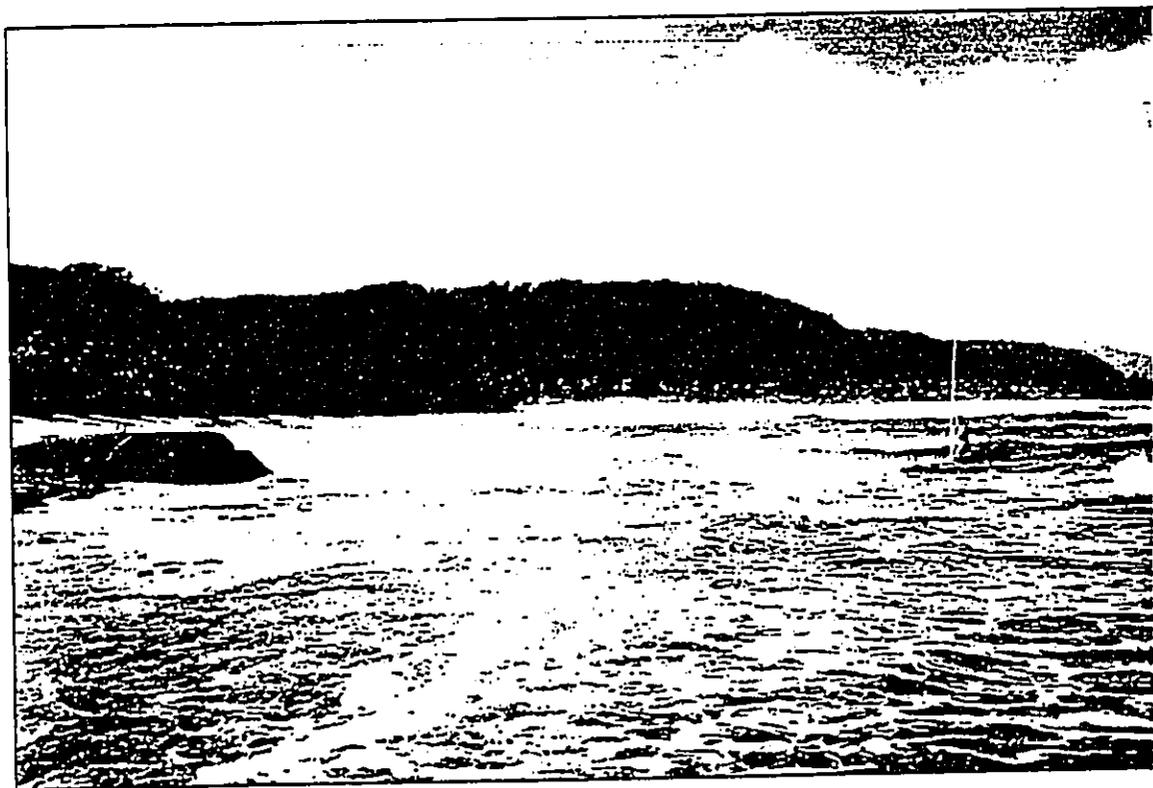


Figure 5. Offshore Location of New Outlet

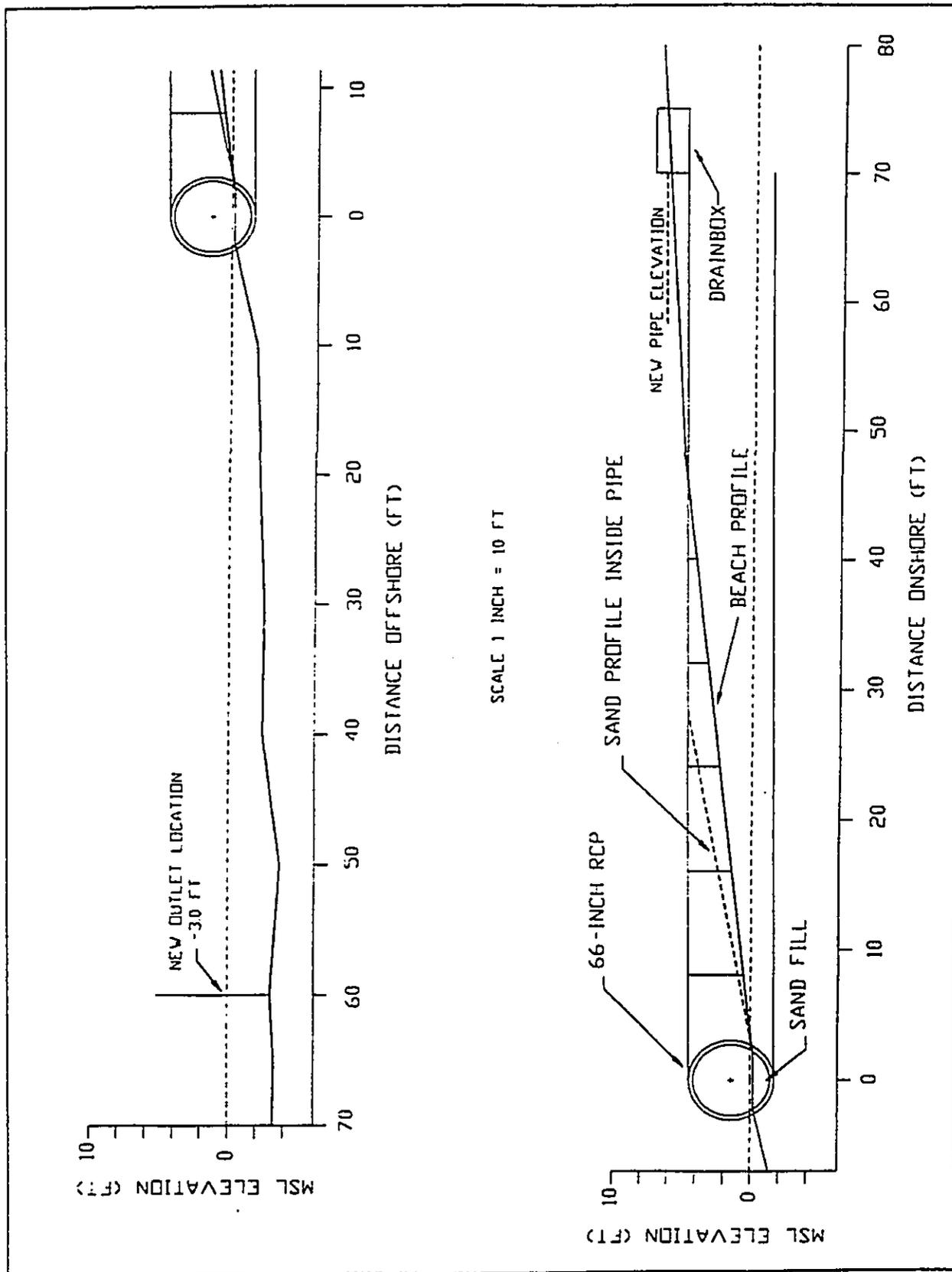


Figure 6. Onshore and Offshore Profiles of the Storm Drain

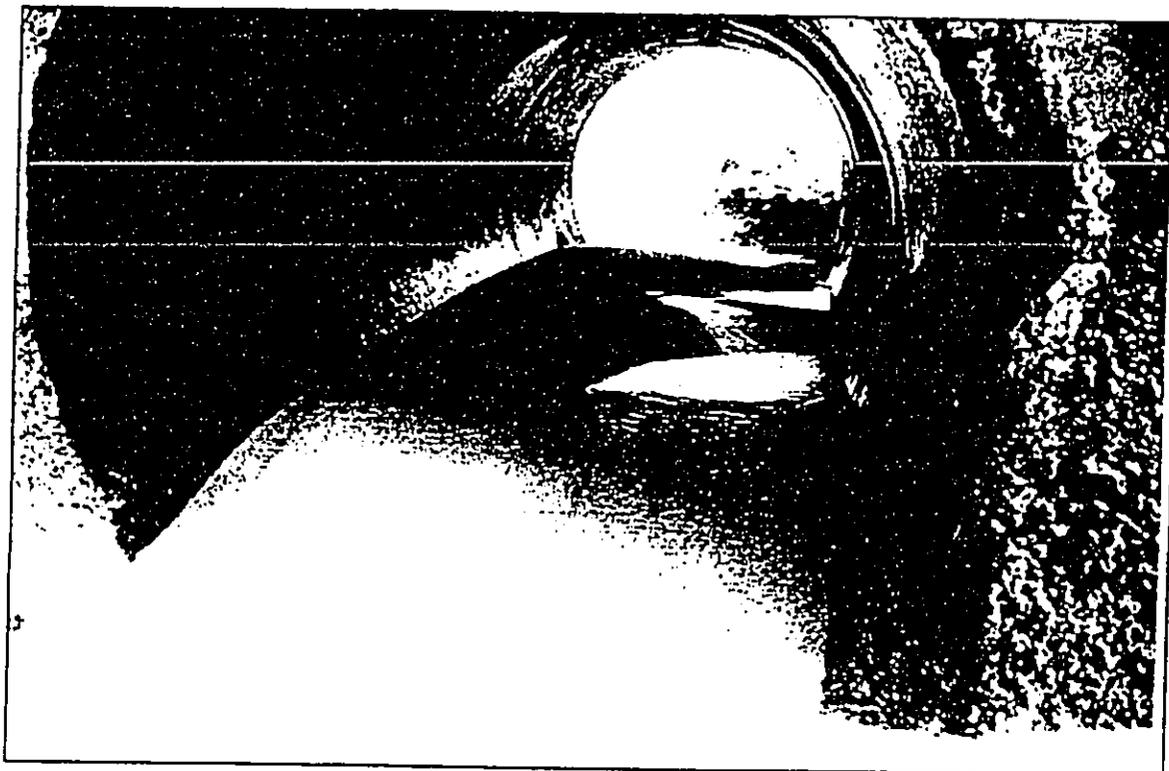


Figure 7. Sand Deposits Inside Drain-Pipe Outlet



Figure 8. Interruption of Longshore Transport

The 1992 study documented sand transport in the reverse direction, typically as a result of summertime conditions with tradewind-generated waves approaching from the northeast. Photos in that report, taken in May after the end of the winter wave season, show sand build-up on the northeast side, and they also show a relatively steep shore-face beach profile produced by the typically steep and short crested tradewind waves. The present winter wave season, characterized by long-crested waves coming from the west, has produced sand build-up on the southwest side of the pipe.

#### **Effects Of The New Pipe On Longshore Transport**

Assuming that the new drain-pipe will be placed at the same elevation across the beach as the existing one, the effective height of the top of the pipe on the beach will be about 1.5 ft higher (Figure 2). Assuming similar beach profiles between 1:10 and 1:15, the new pipe will be exposed on the beach for 15 to 22 feet more along its length, or to the approximate position of the drain-box, before burial by sand. The greater height and length of the new pipe will increase its effectiveness as a groin by allowing greater blockage of sediment transport along the beach. Sand transport over the pipe by overtopping will be diminished due to the increased wave heights needed. This could result in increased beach profile differential between the up-drift and down-drift sides of the pipe. As is now the case, the differential would likely be a short term, seasonal effect that would balance out with changing longshore drift directions. One way to reduce the sand blockage would be to position the pipe on saddles with about 0.5 ft of clearance between the bottom of the pipe and the seafloor. This would only need to be done at the location of the beach toe, and would allow sand transport from one side of the pipe to the other. However, this would increase the height of the pipe and the visual impact. Excavation of channels under the pipe would not be effective, as these would quickly fill in with sand.

#### **Conclusions**

Site conditions at the location of the Kahauola Street Relief Drain outlet at Sunset Point have not changed appreciably since the 1992 SEI report. There has been no advance or retreat of the vegetation line on aerial photographs, and the character of the beach profile, including the location of the beach toe and the location where the pipe disappears into the sand, is nearly the same. This site visit documented longshore transport in the northeast direction, in contrast to the southeast transport noted in the previous report. This difference is a result of seasonal changes in wave climate.

The additional height of the new pipe is likely to increase the interruption of longshore drift and increase the seasonal contrast in beach profiles from one side of the pipe to the other. This will probably be a seasonal effect that will balance in the long term.

Since the intent of the discharge extension is to alleviate the problem of sand blockage, it is important that the invert of the pipeline, at the point of discharge, not be below the level of the surrounding reef. Observations at the discharge location show an irregular bottom. A detailed

survey of the immediate alignment area will be required to ensure that the outlet is not placed in a low spot on the reef.

## **Appendix D - Correspondence**

DEPARTMENT OF LAND UTILIZATION  
**CITY AND COUNTY OF HONOLULU**

110 SOUTH KING STREET  
HONOLULU, HAWAII 96813 • (808) 523-4432



JOHN P. WHALEN  
DIRECTOR

JOHN P. WHALEN  
DIRECTOR

JOHN P. WHALEN  
DIRECTOR

89/CUPT-8(NN)

December 19, 1989

Mrs. Genevieve Rawlings  
59-048E Kamehameha Highway  
Haleiwa, Hawaii 96712

Dear Mrs. Rawlings:

Drainage Report and Update  
Conditional Use Permit, Type 1  
COMSAT, Paumalu Earth Station Addition  
Tax Map Key: 5-9-6; Portion 5

In April, 1989, the Department of Land Utilization (DLU) issued a Conditional Use Permit, Type 1, for the above-mentioned facility, subject to seven conditions. Condition No. 2 requires the applicant to submit a drainage study analyzing the concerns of adjacent residents and proposing measures to mitigate these concerns prior to issuance of a Certificate of Occupancy.

We have recently received a copy of the drainage study and have been notified by the Department of Public Works (DPW) that the study satisfactorily analyzes the existing drainage problems and potential mitigative measures. A copy of the Executive Summary is shown in Attachment A. The channels and culverts referred to in the Executive Summary is shown in Attachment B.

The applicant intends to implement Recommendation No. 4, which is estimated to cost \$20,000. This involves constructing a cut-off ditch in the vicinity of the Comsat facilities and diverting a portion of the runoff to Paumalu Gulch. The remaining recommendations are estimated to cost approximately \$400,000, excluding the cost of purchasing easements to build a concrete drainage channel.

According to the DPW, the improvements outlined in Recommendation No. 4 sufficiently addresses the increase in run-off attributable to the existing and proposed facilities and that Recommendation Nos. 1 - 3 are beyond the scope and responsibility of COMSAT. Further, since the drainage channel obstructing the flow of water is owned by private landowners, not the City, residents must be organized and must agree on a common solution. Should government assistance be required, discussions should be held with elected City and State officials.

Mrs. Genevieve Rawlings  
Page 2  
December 19, 1989

While the proposed drainage ditch at the Comsat site will reduce the runoff attributable by the facility, your drainage problems will not disappear. The drainage study shows that new drainage channels need to be constructed and a maintenance system put in place to significantly improve the drainage in your area.

We hope that the information from the drainage report clarifies the steps that need to be taken and costs associated with needed improvements. Copies of this letter will be forwarded to elected officials who are aware of the drainage problems in your area and have expressed their concerns to the DLU.

Should you have any questions, please contact Hadine Nakamura of our staff at 527-6274.

Very truly yours,

*John P. Whalen*

JOHN P. WHALEN  
Director of Land Utilization

JPM:ik  
02/19/84  
Attachments

cc: Councilmember Rene Mansho, District I  
Representative Joseph Leong  
Senator Gerald Hagino

Tyrone Kusao  
Northshore Neighborhood Board No. 27  
Department of Public Works, Drainage Division ✓

II. EXECUTIVE SUMMARY

The existing drainage facilities for the Comsat site and surrounding areas consist of various culverts crossing the access road and a drainage channel easement below which are intended to direct and convey storm runoff to the adjacent Paumalu Gulch. The drainage channel, however, is presently overgrown with brush and has been filled in some areas. During heavy rainfall, the runoff cannot be contained within the channel, rather, it overflows the banks causing flooding problems to adjacent areas downstream of the channel.

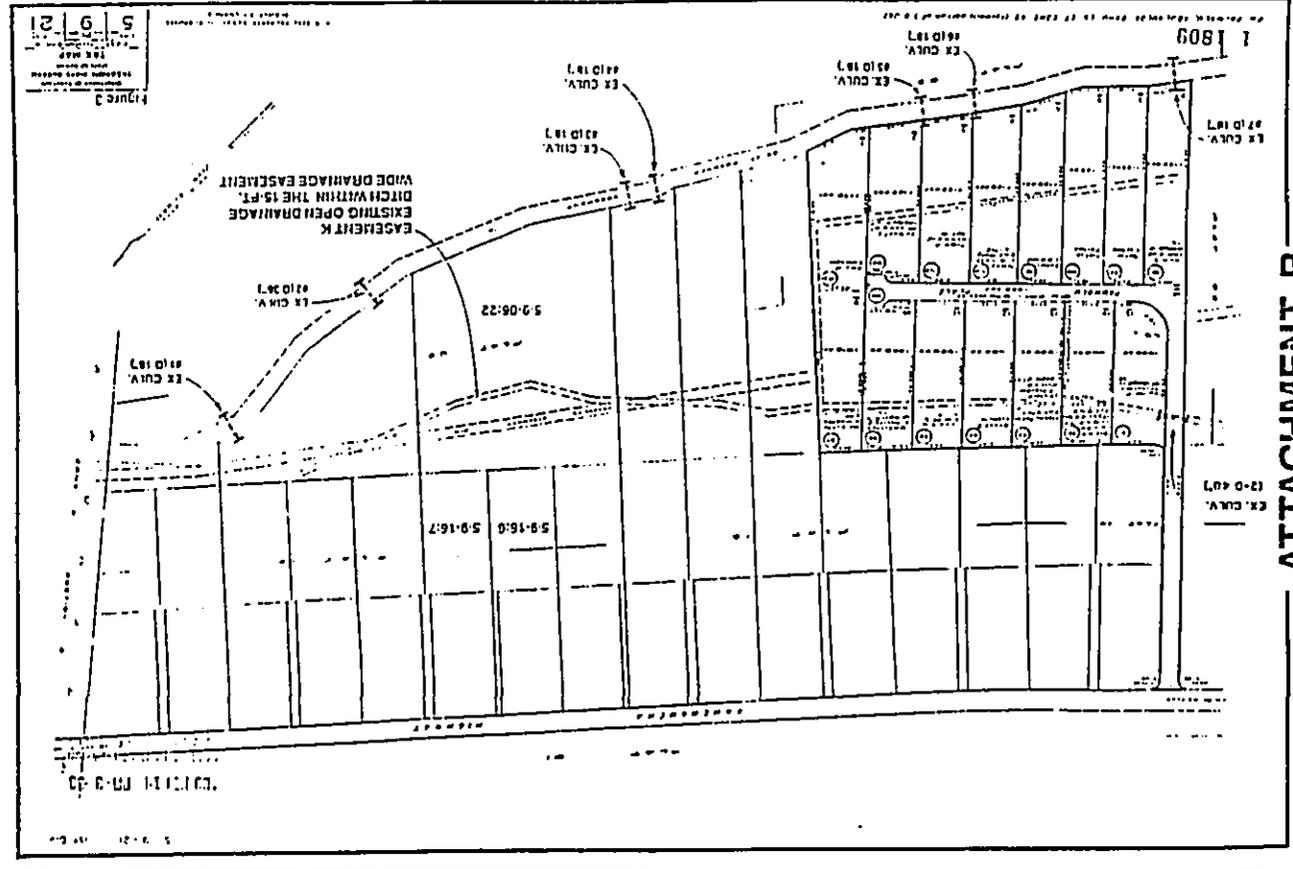
To alleviate the problem, we recommend the following:

- (1) Constructing a new concrete-lined drainage channel within the easement to convey the runoff from culverts 1 and 2 to the two existing 48-inch diameter culverts beneath Paumalu Place.
- (2) Cleaning the two existing 48-inch culverts at the end of the ditch, beneath Paumalu Place of all debris.
- (3) Constructing a new concrete drainage channel downstream of the two existing 48-inch culverts for an approximate length of 150-feet to convey the runoff directly to Paumalu Gulch.
- (4) Constructing a cut-off ditch above the Comsat facilities to divert a portion of the runoff to Paumalu Gulch approximately 2,500 feet upstream of the existing drainage channel entry.

These measures are intended to keep the runoff from a 10-year storm within the channel, conveying it to Paumalu Gulch.

Source: Field Notes 9/89 Paumalu Drainage Study

ATTACHMENT A



ATTACHMENT R

RECEIVED  
DEPT OF PUBLIC WORKS  
APR 10 2 10 PM '97  
ENG  
97-1152

Box 523, Kaneohe, Hawaii 96741

April 8, 1997

Mr. Jonathan K. Shinada  
Acting Director and Chief Engineer  
Department of Public Works  
950 South King Street, 22nd Floor  
Honolulu, Hawaii 96813

Dear Mr. Shinada:

As President of the Sunset Beach Community Association, I have been asked to contact the Public Works Department regarding the proposed improvements to the Kahaula Street drainage system. At our January 15, 1997 meeting, it was cancelled, to being put back on the drawing board, due to the November 1996 flooding. Several residents and property owners expressed concerns and had questions at our SAC meeting.

On January 28, 1997, I called your engineering division and spoke with Mr. Mel Takakura. He informed me that your department is in the process of making a list of qualified consultants for this project. Has the status changed?

It was apparent at our meeting that the residents want to have their concerns addressed before the design is done and the work is started. Some of the concerns are:

1. When were the last studies done and what were the findings?
2. What is the history of flooding on Sunset Point?
3. Did Mr. Char's clearing and filling of his property affect everyone else?
4. Did the fact that Mr. Char tied into the existing drainage system cause any additional problems?
5. If the proposal is to extend the pipe further into the ocean, then how far, how deep and at what angle to the shoreline will it be?
6. The sand blockage continues to be a problem: what effect does large surf have on an out-flow pipe?
7. Where is all this rain run-off coming from?

97-10-5275

April 21, 1997

Mr. Chip Hartman, President  
Sunset Beach Community Association  
P.O. Box 471  
Haleiwa, Hawaii 96712

Dear Mr. Hartman:

Subject: Kahaula Street Relief Drain Project, T.M.K. 5-2-1

Thank you for your letter of April 8, 1997, expressing your community's concern about the design of the Kahaula Street Relief Drain project.

We are in the processing of finalizing our selection for the consultant to perform the design work. This process should be completed in May.

We wish to clarify that our project is intended to address the blockage problem of the drain outlet at the beach and not to improve the existing drainage system along Kahaula Street. However, if funds are available, we will ask our consultant to evaluate the adequacy of the drainage system along Kahaula Street. Until a consultant has been selected and a preliminary assessment made by the consultant, it would be premature to attempt to answer specific design questions the community members may have. At the appropriate time, we will address the community association's concerns.

If you have any questions, please call Laverne Higa of the Division of Engineering at 527-6246.

Very truly yours,

*Jonathan K. Shinada*  
Jonathan K. Shinada, PhD  
Director and Chief Engineer

HM:it

cc: Councilmember Rene Nantho  
bcc: Program Coordinator

XEROX COPY WITH NON-REMOVABLE ATTACHMENT

FROM : FRABEL/DASHIEL

DATE: 05/10/81

TO : 523 8950



Sunset Beach Community Association  
P.O. Box 171, Haliimaui, Maui 96712

8. Why can't the water be directed to a stream bed instead of an out-flow pipe?

No doubt there will be more questions and concerns that will need to be addressed.

Would you please keep us abreast of this project, and send a representative to one of our meetings in order to meet with the community? Our next meetings are scheduled for Wednesday May 21 and Wednesday July 16. They are held at the Pupukea Recreation Center and start at 7:30 p.m. Please let me know if and when someone from your office can address this drainage issue, and I will put it on our agenda.

Mahalo.

Sincerely,

Chip Hartman  
President, SBCA  
Phone: 638-7210

CC: Representative Alex Santiago  
Councilperson Rene Hansho

Post-it™ brand fax transmittal memo 7571	1 of 1 pages
To: KAREL BRUNDT	From: JAKKE
Date:	Phone: 523 8331
Fax: 523 8950	

MAR 15 '00 15:31

E08 593 8330

PAGE 01

Sunset Beach Community Association

170 Box 471 Haleiwa Hawaii 96712

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Good H  
1 year

RECEIVED

99 FEB 20 AM '99

DESIGN & CONSTRUCTION  
DIV OF PUBLIC WORKS  
DESIGN & CONSTRUCTION

RECEIVED  
Feb 21 11 24 AM '99

Mr. Randall K. Fujiki, Director  
Department of Design and Construction  
650 South King Street, 2nd Floor  
Honolulu, Hawaii 96813

December 10, 1999

Re: Sunset Beach Point Flooding Project

Aloha Mr. Fujiki,

On November 2, 1999, I spoke with Mr. Tyler Sugihara, in the IDE Section, about the Sunset Beach flooding project. He was very helpful and brought me up to date on the project.

I reported the information as best as I could to our association during our last meeting in November. Several questions came up and that is the reason for this letter. First, was there illegal grading done by the developer in this flood zone and is there / was there a law suit as a result? There are health hazard concerns because many homes have been built within this flood zone during the last 24 months. Also several residents have strong reservations about extending the the existing drain pipe further out into the ocean.

When does your department and the design firm Earth Tech feel that the project is ready to present to our community? Our next meetings will be on January 19, 2000 and again March 15, 2000. We meet at 7:30 PM at the Pupukea Recreation Center located beside the Sunset Beach Fire Station.

Mahalo

Sincerely,

*Chip Hartman*

Chip Hartman, Interim President

CITY AND COUNTY OF HONOLULU

450 SOUTH KING STREET, 2ND FLOOR HONOLULU, HAWAII 96813  
Phone: (808) 523-4500 • Fax: (808) 523-4507  
www.ci.honolulu.hi.us



GARY Q. L. YEE, AIA  
ACTING DIRECTOR

ROLAND O. LISKY, JR., AIA  
SENIOR DIRECTOR

IDEA 00-008

January 18, 2000

Post-It • brand fax transmittal memo 7671	# of pages • 2
To: <i>Sgt. B. B. B.</i>	From: <i>Tyler Sugihara</i>
cc: <i>Patrick Tuck</i>	ca: <i>CBC Honolulu</i>
Phone: <i>523 4932</i>	Fax: <i>523 4932</i>
Fax: <i>523 8450</i>	Fax: <i>523 6107</i>

Mr. Chip Hartman, Interim President  
Sunset Beach Community Association  
P.O. Box 471  
Haleiwa, Hawaii 96712

Dear Mr. Hartman:

Subject: Kahaoula Street Relief Drain, CIP 97511, Pupukea, Oahu, Hawaii

Thank you for your letter dated December 10, 1999 concerning the subject project. We wish to inform you that we are processing an amendment to our contract with Earth Tech, Inc. to expand their scope of work to include preparation of an environmental assessment and land use permits for the project. As part of the environmental assessment process, we had discussed having a meeting with the community to receive input on the project. We believe that your invitation to make a presentation of the project during the SBCA's March 15, 2000 meeting was most timely and would be an appropriate forum for receiving community input.

In response to your questions on illegal grading work in the vicinity of the project, discussions with the staff from the Department of Planning and Permitting who issue grading permits indicated that the City is not aware of any grading violations or lawsuits involving illegal grading activities for the properties makai of Kamehameha Highway in the vicinity of Kahaoula Street. If illegal grading activities are occurring, please inform the Department of Planning and Permitting as soon as possible.

Should you have any questions, please call Tyler Sugihara of the Division of Infrastructure Design and Engineering at 523-4932.

Very truly yours,

*Gary Q. L. Yee*

GARY Q. L. YEE  
Acting Director

TS:GS:eh



4/16/00

DEAR MS. PARNELL,

MY CONCERN IS WITH THE QUALITY OF THE WATER BEING DRAINED DIRECTLY INTO THE HIGH USAGE AREA. WHEN THE RIVERS RUN, MOST PEOPLE KNOW THE WATER IN THE IMMEDIATE AREA IS CONTAMINATED BY ITS BROWN COLOR. IF YOU ARE FACING THE OCEAN, DIRECTLY TO THE LEFT HAND SIDE OF THE DRAIN PIPE IS THE PLACE I LEARNED TO SURF SHORBREAKS (EARLS REEF) AND NOW CALLED MOTHERS BEACH. KIDS SURF AND PLAY THERE CONSTANTLY. ENCLOSED ARE MY BUSINESS CARDS AND I WOULD GREATLY APPRECIATE BEING INFORMED. IN THE 20 YEARS I'VE GROWN UP LIVING AROUND AND EVEN PLAYING IN THE PIPE AS A KID FLOODING HAS BEEN MINIMAL AS IS.

MAMALO, RAINOS HAYES

1801 2547215 FAX 246-7225  
308 HAWAIIAN STREET  
KAILUA, HAWAII 96734

MAY 15 '00 11:02

808 593 8330

PAGE.03

CARDS ENCLOSED WITH LETTER



Rainos Hayes  
Hawaii Surf Team Manager  
34-010 Luaha Place  
Kona Beach, HI 96712  
Phone: (808) 431-8415  
Cell: (808) 331-3304  
www.reef.biz.com



Rainos Hayes

Team Coordinator

348 Fishard Street  
Kailua, HI 96734

Ph: (808) 266-7218 Ext. 228  
Fax: (808) 266-7225  
e-mail: hc@hiscrafts.com

MAY 15 '00 11:02

808 593 8330

PAGE.04

I Mrs & Mrs HART VOICE OUR  
CONCERNS AGAINST ANY  
CHANGES OF EXISTING DRAIN  
PIPE DO TO ENVIRONMENTAL  
DISTRUCTION OF OUR  
PRECIOUS REEF AND SHORE  
LINE. WE STRONGLY OPPOSE  
ANY CHANGES PROTECT OUR  
PRECIOUS ENVIRONMENT.

KAHEA & HIRIATA HART

JACQUELINE A PARNELL  
FAX # 593-8330

Chip Hartman  
59-208 B Kamehameha Hwy.  
Haleiwa, Hawaii 96712

April 20, 2000

Jackie Parnell, AICP  
1314 South King Street, Suite 951  
Honolulu, Hawaii 96814

Re: Kahaoula Street Relief Drain Project

Aloha Jackie,

Thank you for giving me the opportunity to comment on the Kahaoula Street Project. It is unfortunate that the run-off generated mauka to the drainage boundary is not/can not be addressed in this project. If it could then much of the water causing the problem could be redirected before reaching the Sunset Beach neighborhood around Kahaoula Street.

I have seen the area in question flood many times over the last 25 years. Long time residents have stories that go back 40, 50, and 60 years. Several Novembers ago it flooded big time. This was after the residential lots had been raised with fill and additional drains tied into the existing pipe. I was on duty with the Fire Dept. that night and when we approached that area at 1:00 AM the water level was from Kamehameha Hwy. straight across in the makai direction. The difference about this flood was that the water was all gone by 7:00 AM that morning. In the past it would pond for 3 to 7 days. This leads me to believe that the additional drains do work if the pipe is clear of sand and debris.

I have some questions about the pipe and outlet extension. How are you going to bury a larger pipe and have it deep enough while still maintaining the present slope (or lack of slope) especially as it gets to the shoreline? Are you sure that 100% of the sand that blocks the pipe comes from the ocean? Perhaps rain water or a cracked pipe add to the accumulation.

The sand moving up and down that section of beach is being blamed for the outlet blockage. I am not so sure a 60 foot extension will solve the problem because the sand will still have to move out and around in front of the pipe and it will get sucked in and create the same problem as now. I don't know how to engineer it but a pipe that is off of the bottom will let the currents carry the sand without having it pass by the opening. Perhaps a rectangular pipe that is say 30 inches high by 72 inches wide could be suspended 6 to 12 inches off the bottom and only need to go out another 25 feet or less and give the same benefits that this project is trying to achieve.

I know the area fairly well because of much time spent in and around the water

there. It is very shallow and the currents are very strong when there is surf. I am not overly concerned about reef damage due to the pipe installation nor am I worried about the water quality exiting the pipe. But a pipe this size (66") and length (60') is going to create some very negative impact to that section of beach because of how it is going to alter the the current and sand distribution cycles that already exist. The water is only 1 to 4 feet deep so this pipe at 60 feet in length will act as a groin and these are not so often in the best interest of shoreline management.

I am not so sure that studying this thing to death is going to get this project to an acceptable level for the community and various agencies to accept the final plan. Three ideas come to mind. One is to run a pipe under ground along Kamehameha Hwy to Kaunala Stream. Elevation changes might be a problem but what is the cost and logistics of getting the water to a natural stream outlet? Two- The source of all or most of the water responsible for the flooding needs to be addressed. Where is it coming from, why is it following the route it takes and can it be redirected without a great deal of energies spent on private lands. Three- This one is maybe the most simple. Regularly scheduled pipe and outlet maintenance done by one or several state and/or county departments. I know the C & C tries to do this. Ten months ago I saw 6 guys with buckets and shovels cleaning out the pipe for more than one day. There must be a better way and it done more frequently then it would be alot less involved. Perhaps 2 workers with a high pressure hose every other month would be all that is needed to remedy the blockage.

The flooding is a problem and over the years I've had various friends loose much do to water damage in that area. I wish I could feel good about the project and believe it will remedy the build up of water but I have a hard time getting behind the project as being planned. I want this letter to be positive and perhaps add to the planning process. Mahalo.

Sincerely,



Chip Hartman ph.: 638-7210

Date: 5/12/00 12:40 PM  
Received: 5/12/00 9:23 AM  
From: Andy St. Onge, paumalu@lava.net  
To: KRP, krplan@ngea.org

Attention Jaqueline Parnell:

I am a homeowner at Sunset Point (Huelo Street). I would like to express my strong opposition to the planned pipe extension at Sunset Point. Not only is this project unnecessary, costly and bothersome (as are most City and County construction projects); it is also anathema to the environmental and aesthetic integrity of this beautiful site. Perhaps you are unaware of the fact that Sunset Point is one of the finest surfing spots in the world (and the best on this island). Moreover, the proposed pipe project would compromise the sanctity and safety of our beloved Sunset Point. I do not stand alone in this regard, and everyone I speak to in the neighborhood is opposed to this project.

Please take into consideration what I have stated here, and consider also that the time, funds and energy that would be devoted to this proposed project could be better applied elsewhere.

Sincerely,  
Richard A. St. Onge

From: JA Parnell [mailto:krplan@ngea.org]  
Sent: Monday, May 15, 2000 5:49 AM  
To: Nicole Griffin  
Subject: Fwd: Sunset Point Drain Pipe

In addition to the e-mail from Andy St. Onge, I have received two letters from Chip Hartman and Rainos Hayes and a fax from Kahea and Hiriata Hart.

I also got two phone calls. The first was from Christy Ladia on May 9, speaking for herself and her stepfather, Eric Wagenman. (He is with Aquatic Resources at DLNR so expect we will be hearing directly from him through the agency.) She wants to get a copy of the DEA. Her address is 59-049 Huelo, Haleiwa. Phone 638-7393.

The other call was from Andrea Wood, President of Sunset Beach Community Association (638-8208). She wanted to know our schedule. I told her we had to get document to City by May 29 and anticipated filing the DEA in mid-July. They are meeting on May 17 to finalize their comments so I said get it to us ASAP after the meeting and absolutely no later than Monday the 22nd. She also said 70% of people polled (however many that was) were against it, including half the people in the flood areas.

Sunset Beach Community Association  
 P.O. Box 471 - Haleiwa, Hawaii 96712



Post-it brand fax transmittal memo 7871	04/14/00 9
TO: KAREN GAMBRELL	FROM: JACQUE P
CC: NICOLE RIFFA	
PHONE: 593 8331	
FAX: 523 8950	FAX: 593 8530

May 17, 2000  
 Mr. Gary Yee, Director  
 Department of Design and Construction  
 City and County of Honolulu  
 650 South King Street, 2<sup>nd</sup> Floor  
 Honolulu HI 96813

Dear Mr. Yee,  
 We oppose the recommended plan for the Kahaoula Drain Relief, as stated in the "Preliminary Engineering Report Kahaoula Street Relief Drain" November 1999, prepared by Earth Tech, Inc.  
 Review of the reports and studies as well as information gathered from Earth Tech, Inc. representatives, has led us to the following conclusions:

1. The enlarged and elongated drain system would be inadequate because it is sized only for water runoff generated on the maalei side of Kahaoula Highway. All the water coming down from Conusut was not factored into the calculations.
2. An informal survey of affected residents showed approximately 70% to be opposed to this project. More scientific polling could be conducted, but it would show questionable judgment to proceed with a project, which is not supported by the residents directly involved.
3. Not enough alternatives were explored in trying to solve the problem  
 Suggestions:  
 > Clean out pipe monthly for 1 year and conduct biweekly monitoring survey of amount of sand plugging pipe during that year. Use this data to plan and execute a periodic maintenance program.  
 > Install a check valve at the t end of the pipe to prevent sand inflow. (Per attached letter from Jim Critzenden dated 11 May 2000)  
 > Block off the northeast side of the t as a means of reducing sand in the pipe.  
 > Install a flushing mechanism to push sand out of the pipe.  
 > Install a manual valve to be controlled by a designated organization such as Civil Defense.  
 > Consider installation of injection wells in area to aid with percolation.

Environmental Impact

1. A 60-foot pipe extending into the ocean will have some affect on adjacent beaches. The current pipe, installed in the early 1970's, changed the shoreline to such a degree that within 7 years, the sand had eroded and the lava rock wall with its concrete foundation (built in the 1940's) collapsed.
2. This change in shoreline formation can affect the world famous surf break called "Sunset".
3. This proposed 60-foot pipe is essentially a groin or revetment, which current DLNR guidelines generally oppose.
4. As long as pipe is at or near water level, even if it is 60 feet from shore, it will eventually fill with sand or coral dredged up after high surf. The task of cleaning the pipe would become even more problematic due to its length and partial submerision in the ocean.

Safety and Liability

1. "Attractive Nuisance"
  - a. Children walking on pipe and slipping.
  - b. Children trying to "shoot" up into the pipe when there is large surf.
  - c. Children jumping off end of pipe and waves pushing them back into it.
2. Surfers and windsurfers who lose their boards during high surf are carried right into the area where the proposed pipe would extend. They could be rammed onto the pipe.

Aesthetics, Economic Impact

1. Sunset Beach is one of the best beaches in Hawaii. A pipe extending 60 feet into the ocean would certainly mar the beauty of this important resource. DBED and the Hawaii Tourism Authority spend millions of dollars promoting Hawaii, and degrading one of the resources we are offering our visitors (as well as residents) is self-defeating.
2. Potential shoreline changes could negatively change the Sunset surf break itself. This surf spot is generating money both directly and indirectly through tourism, surf contest, real estate, and taxes.

Summary

The many negatives listed are reason enough to abandon this project, but any arguments in favor of the new drain would have to prove a) how it could function adequately when not sized for all the water coming across the highway, and b) what would prevent this longer pipe from becoming plugged over time?

A priority is to catch the maalei storm water and direct it to Paumotu stream. There is an existing drainage easement below Conusut, which runs parallel to Kahaoula Highway. Land deeds need to be examined so the status of the drainage easement for each property can be ascertained. Once this is done, the City can direct remedial work and improvements on this easement. Secondly, more emphasis needs to be placed on preventing pipe blockage, rather than just installing bigger and longer pipes.

We hope a solution can be found which takes into account the many concerns mentioned above.

Sincerely,

*Andrea Woods*

Andrea Woods  
 President

Sunset Beach Community Association

Enclosure

- cc: Mayor Jeremy Harris  
 Council Member Renee Manno  
 Representative Alex Santiago  
 Senator Robert Burns  
 Robert Fishman, Hawaii Tourism Authority  
 Jacqueline Pansell, KRP Info Services

11 May 2000

To: Kahauola Drain System Committee  
C/O Andrea Woods via fax @ 638-8208

Thank you for inviting me to the Kahauola Storm Drain Committee meeting held last night at your home. As a 15-year resident (1974-1989) of Holawa St., my experience with the Kahauola storm drain system is that it is full of sand when it is needed. That is to say, the present frequency of manual cleanout by the City and County crews is not high enough to guarantee the drain pipe will be clear when a rainstorm event occurs. The proposed high-cost solution of increased size and length of the outfall may or may not solve the problem of sand plugging. At best, it will work as proposed, yet have other drawbacks such as upsetting the beach sand transport, providing a larger attractive nuisance that could lead to injuries and lawsuits, being a safety hazard to surfers, and, generally, just being a bigger eyesore than the one that is there now. At worst, it will not prevent sand plugging, thus becoming a larger, longer pipe that must be maintained. Therefore, I think some relatively inexpensive ideas ought to be tried with the existing drain system before the proposed major construction project is undertaken.

Idea to improve existing Kahauola drain system:

1. From the engineering report, it is suggested the prevailing sand transport is east to west. There is some question if this is true in all seasons, but one easy test of this would be to block off the eastern end of the "T" now and see if the sand plugging is lessened. This brings up the point raised by Mike Kahanashi: there is not any study that determines the frequency of sand plugging in the present configuration. It seems this information would be essential to implement an effective cleanout schedule by City and County.
2. Install a low-head check valve in the pipe at the "T" near the cross. This could be a rubber "duckbill" valve such as a Reflex valve made by Red Valve Company, (412)279-0044. There are probably other types of valves that would work, too. All residents agree that the cross of the "T" never gets plugged with sand, so there would always be a clear area in the cross for the check valve to open.
3. Install a manual knife valve, of suitable metallurgy, at the end of the outfall. This valve would remain closed and locked until required during a rainstorm event. Control of the valve could be the responsibility of City and County, Civil Defense, and perhaps a couple of reliable neighbors.

4. Install a less labor-intensive cleanout procedure. This could be the installation of a valve near the cleanout manhole by the Holawa St./Kahauola St. corner and several pressure water connections along the drainpipe from the valve to the ocean. The procedure would be to close the big valve and, starting from the ocean side, sequentially pressurize the pressure-water connections, forcing the sand back to the ocean. Fire hydrant water would be the source of pressure water. Done periodically, before sand is hopelessly packed into the pipe, could make the oneous task of manual cleanout unnecessary.

5. The committee agreed that maintenance of the ditches/swales, designed to shunt the mauka runoff water to Paumalu stream, is imperative for proper operation of the Kahauola drainage system. I believe this is required even if the proposed project is built.

I can be reached at 637-4230(w) or 637-0418(h), for any questions and/or further discussion.

Respectively submitted,



James C. Crittendon

700 Bishop Street, Suite 900, Honolulu, Hawaii 96813



DEPARTMENT OF THE ARMY  
U.S. ARMY ENGINEER DISTRICT, HONOLULU  
FT SHAFTER, HAWAII 96858-3440

REPLY TO  
ATTENTION OF

May 2, 2000

Regulatory Branch

Commander and Division Engineer  
U.S. Army Corps of Engineers  
Pacific Ocean Division  
Building 230  
Fort Shafter, Hawaii 96858-5440

Early coordination is requested from the U.S. Army Corps of Engineers regarding an Environmental Assessment (EA) to be prepared by the Design and Construction Division of the City and County of Honolulu (CCH) and Earth Tech Inc. (Earth Tech) for the Kahaoula Street Relief Drain Project. The purpose of this proposed project is to alleviate flooding in the Sunset Beach residential area (Figures 1 and 2). The CCH, after evaluating several alternatives, plans to increase the pipe size to 84 inches and extend the pipe 60 feet seaward of the shoreline.

The EA will analyze and assess the potential environmental impacts the proposed project may have and develop mitigation measures to minimize them.

Land use permits for the initial phase of the project include:

- Coastal Zone Management consistency determination from DBEDT;
- Conservation District Use Permit from DLNR; and
- Special Management Area Permit and Shoreline Setback Variance from CCH.

Additional permits to be acquired later will include: Department of Army Permit; U.S. Army Corps of Engineers Section 404 Permit; Department of Health 401 Water Quality Certification application, including appropriate construction Best Management Practices and water quality monitoring plans.

If you have any comments or questions, please contact Karl Bromwell, the Earth Tech Project Manager, at 523-8874.

Very truly yours,  
Earth Tech, Inc.

*Karl B. Bromwell*

Karl Bromwell, M.P.H.  
Project Manager

Attachments: Figures 1 and 2



EARTH TECH

Mr. Karl Bromwell, M.P.H.  
Earth Tech  
700 Bishop Street, Suite 900  
Honolulu, Hawaii 96813

Dear Mr. Bromwell:

This letter responds to your request dated April 15, 2000 for early coordination regarding an environmental assessment (EA) for the Kahaoula Street Relief Drain Project.

Your letter correctly indicates that a Department of the Army (DA) permit will be required for the project. Since the project will take place in navigable waters of the U.S., both a Clean Water Act Section 404 permit and a Rivers and Harbors Act of 1899 Section 10 permit will be required.

Your EA should include a good discussion of alternatives; potential impacts to surf sites; public involvement; and types and quantities of material to be placed in the water.

If you have any questions concerning this matter, please contact William Lerman of my staff at 436-6986 or FAX 436-4000, and reference File No. 000000163.

Sincerely,

*George E. Young*

George E. Young, P.E.  
Chief, Regulatory Branch

DEPARTMENT OF PLANNING AND PERMITTING  
CITY AND COUNTY OF HONOLULU

1555 KALANOAUAVI STREET, HONOLULU, HAWAII 96813  
PHONE: 531-2300 FAX: 531-2300



5/1/2000

2000/CLOG-2166 (ST)

May 1, 2000

Mr. Karl Bromwell, M.P.H.  
Project Manager  
Earth Tech  
700 Bishop Street, Suite 900  
Honolulu, Hawaii 96813

Dear Mr. Bromwell:

Early Consultation  
Kahaola Street Relief Drain Project  
Sunset Beach, Koolauloa, Oahu  
Tax Map Key 9-5-1

We have reviewed the information for the above-referenced project transmitted by your letter dated April 5, 2000, and have the following comments:

1. We confirm that the drain line is located within the Special Management Area (SMA) and that portions of this line is within the shoreline setback area;
2. However, drain line construction that is conducted within the existing drainage easement will not require approval of a SMA Use Permit pursuant to Section 25-1.3(2)(M), Revised Ordinances of Honolulu; and
3. A Shoreline Setback Variance (SV) will be required for construction activities which are conducted within 40 feet of the shoreline as determined by the State Department of Land and Natural Resources (DLNR).

Should you have any questions, please contact Steve Tagawa of our Land Use Approvals Branch at 523-4817.

Sincerely yours,

For RANDALL K. FUJIKI, AIA  
Director of Planning  
and Permitting

RKF:lg  
2005782

April 5, 2000

Director  
Department of Planning and Permitting  
City and County of Honolulu  
630 South King Street  
Honolulu, Hawaii 96813

Early coordination is requested from the Department of Planning and Permitting regarding an Environmental Assessment (EA) to be prepared by the Design and Construction Division of the City and County of Honolulu (CCH) and Earth Tech, Inc. (Earth Tech) for the Kahaola Street Relief Drain Project. The purpose of this proposed project is to alleviate flooding in the Sunset Beach residential area (Figures 1 and 2). The CCH, after evaluating several alternatives, plans to increase the pipe size to 84 inches and extend the pipe 60 feet seaward of the shoreline.

The EA will analyze and assess the potential environmental impacts the proposed project may have and develop mitigation measures to minimize them.

Land use permits for the initial phase of the project include:

- Coastal Zone Management consistency determination from DBEDT;
- Conservation District Use Permit from DLNR; and
- Special Management Area Permit and Shoreline Setback Variance from CCH.

Additional permits to be acquired later will include: Department of Army Permit; U.S. Army Corps of Engineers Section 404 Permit; Department of Health 401 Water Quality Certification application, including appropriate construction Best Management Practices and water quality monitoring plans.

If you have any comments or questions, please contact Karl Bromwell, the Earth Tech Project Manager, at 523-8874.

Very truly yours,

Earth Tech, Inc.

Karl Bromwell, M.P.H.  
Project Manager

Attachments: Figures 1 and 2

E A R T H T E C H



BOARD OF WATER SUPPLY  
CITY AND COUNTY OF HONOLULU  
630 SOUTH BERETANIA STREET  
HONOLULU, HAWAII 96813

TERRY HOBBS, Mayor  
EDDE FLORES, JR., Chairman  
CHARLES A. STEWART, Vice Chairman  
JAMALI Y. AMIN  
HERBERT S. K. KAGIPIA, SR.  
DANBAUM KIM STANTON  
KAZU HAYASHIDA, E-Office  
ROSS S. SASAMURA, E-Office  
CLIFFORD S. JAMMIE  
Manager and Chief Engineer



May 2, 2000

Mr. Karl Bromwell, M.P.H.  
Earth Tech  
700 Bishop Street, Suite 900  
Honolulu, Hawaii 96813

Dear Mr. Bromwell:

Subject: Your Letter of April 5, 2000 Requesting  
Pre-Consultation Comments for the Draft  
Environmental Assessment for the  
Kahaoula Street Relief Drain Project

Thank you for the opportunity to provide comments on the proposed Kahaoula Street Relief Drain project.

We have the following comments:

1. There is an existing 8-inch waterline within Kahaoula Street. The location of this waterline should be indicated on the construction plans and addressed in the Draft Environmental Assessment (DEA) to insure the protection and integrity of our water system.
2. The DEA and construction plans should be submitted for our review.

If there are any questions, please contact Sam Mirreola at 577-5221

Very truly yours,

*Clifford S. Jammie*  
CLIFFORD S. JAMMIE  
Manager and Chief Engineer

700 BISHOP STREET, SUITE 900, HONOLULU, HAWAII 96813

April 5, 2000

Chief Engineer  
Board of Water Supply  
630 South Beretania Street  
Honolulu, Hawaii 96813

Early coordination is requested from the Board of Water Supply regarding an Environmental Assessment (EA) to be prepared by the Design and Construction Division of the City and County of Honolulu (CCH) and Earth Tech Inc. (Earth Tech) for the Kahaoula Street Relief Drain Project. The purpose of this proposed project is to alleviate flooding in the Sunset Beach residential area (Figures 1 and 2). The CCH, after evaluating several alternatives, plans to increase the pipe size to 84 inches and extend the pipe 60 feet seaward of the shoreline.

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If you have any comments or questions, please contact Karl Bromwell, the Earth Tech Project Manager, at 523-8874.

Very truly yours,

Earth Tech, Inc.

*Karl S. Bromwell*

Karl Bromwell, M.P.H.  
Project Manager

Attachments: Figures 1 and 2



1000 BISHOP STREET, SUITE 500, HONOLULU, HAWAII 96813

OFFICE OF THE CITY ENGINEER  
CITY AND COUNTY OF HONOLULU

April 5, 2000  
Chief  
Fire Department  
City & County of Honolulu  
3375 Kopaopaka Street, Suite H425  
Honolulu, Hawaii 96819



Early coordination is requested from the Fire Department regarding an Environmental Assessment (EA) to be prepared by the Design and Construction Division of the City and County of Honolulu (CCH) and Earth Tech Inc. (Earth Tech) for the Kahaloa Street Relief Drain Project. The purpose of this proposed project is to alleviate flooding in the Sunset Beach residential area (Figures 1 and 2). The CCH, after evaluating several alternatives, plans to increase the pipe size to 84 inches and extend the pipe 60 feet seaward of the shoreline.

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If you have any comments or questions, please contact Karl Bromwell, the Earth Tech Project Manager, at 523-8874.

Very truly yours,

Earth Tech, Inc.  
*Karl Bromwell*  
Karl Bromwell, M.P.H.  
Project Manager

Attachments: Figures 1 and 2



PROJECT NUMBER  
DATE

April 20, 2000

Mr. Karl Bromwell, M.P.H.  
Project Manager  
Earth Tech  
7100 Bishop Street, Suite 900  
Honolulu, Hawaii 96813

Dear Mr. Bromwell:

We received your letter dated April 5, 2000, regarding the Environmental Assessment for the Kahaloa Street Relief Drain Project.

The Honolulu Fire Department requests that you comply with the following:

1. Maintain fire apparatus access throughout the construction site for the duration of the project.
2. Notify the Fire Communication Center (523-4411) of any interruption in the existing fire hydrant system during the project.

Should you have any questions, please call Battalion Chief Kenneth Silva of our Fire Prevention Bureau at 831-7778.

Sincerely,  
*Attilio K. Leonard*  
ATTILIO K. LEONARDI  
Fire Chief

AKL/KS:jo

3000 Bishop Street, Suite 3000, Honolulu, Hawaii 96813

April 5, 2000

Mr. John Naughton  
Pacific Islands Area Office  
National Marine Fisheries Service  
1601 Kapiolani Blvd., Suite 1110  
Honolulu, Hawaii 96814

Early coordination is requested from the Pacific Islands Area Office regarding an Environmental Assessment (EA) to be prepared by the Design and Construction Division of the City and County of Honolulu (CCH) and Earth Tech Inc. (Earth Tech) for the Kahaoula Street Relief Drain Project. The purpose of this proposed project is to alleviate flooding in the Sunset Beach residential area (Figures 1 and 2). The CCH, after evaluating several alternatives, plans to increase the pipe size to 84 inches and extend the pipe 60 feet seaward of the shoreline.

The EA will analyze and assess the potential environmental impacts the proposed project may have and develop mitigation measures to minimize them.

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- Conservation District Use Permit from DLNR; and,
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If you have any comments or questions, please contact Karl Bromwell, the Earth Tech Project Manager, at 523-8874.

Very truly yours,

Earth Tech, Inc.

*Karl Bromwell*

Karl Bromwell, M.P.H.  
Project Manager

Attachments: Figures 1 and 2



EARTH TECH

3000 Bishop Street, Suite 3000, Honolulu, Hawaii 96813

April 5, 2000

Pacific Islands Administrator  
U.S. Fish and Wildlife Services  
Department of the Interior  
300 Ala Moana Blvd., Room 3108  
Honolulu, Hawaii 96850

Early coordination is requested from the U.S. Fish and Wildlife Services regarding an Environmental Assessment (EA) to be prepared by the Design and Construction Division of the City and County of Honolulu (CCH) and Earth Tech Inc. (Earth Tech) for the Kahaoula Street Relief Drain Project. The purpose of this proposed project is to alleviate flooding in the Sunset Beach residential area (Figures 1 and 2). The CCH, after evaluating several alternatives, plans to increase the pipe size to 84 inches and extend the pipe 60 feet seaward of the shoreline.

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If you have any comments or questions, please contact Karl Bromwell, the Earth Tech Project Manager, at 523-8874.

Very truly yours,

Earth Tech, Inc.

*Karl Bromwell*

Karl Bromwell, M.P.H.  
Project Manager

Attachments: Figures 1 and 2



EARTH TECH

100 HONOLULU STREET, SUITE 500, HONOLULU, HAWAII 96813

100 HONOLULU STREET, SUITE 500, HONOLULU, HAWAII 96813

April 5, 2000

State Historic Preservation Officer  
Historic Preservation Office  
Department of Land and Natural Resources  
601 Kamohila Blvd., Room 555  
Kapolei, Hawaii 96707

Early coordination is requested from the Historic Preservation Office regarding an Environmental Assessment (EA) to be prepared by the Design and Construction Division of the City and County of Honolulu (CCH) and Earth Tech Inc. (Earth Tech) for the Kalaupala Street Relief Drain Project. The purpose of this proposed project is to alleviate flooding in the Sunset Beach residential area (Figures 1 and 2). The CCH, after evaluating several alternatives, plans to increase the pipe size to 84 inches and extend the pipe 60 feet seaward of the shoreline.

The EA will analyze and assess the potential environmental impacts the proposed project may have and develop mitigation measures to minimize them.

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If you have any comments or questions, please contact Karl Bromwell, the Earth Tech Project Manager, at 523-8874.

Very truly yours,

Earth Tech, Inc.

*Karl B. Bromwell*

Karl Bromwell, M.P.H.  
Project Manager

Attachments: Figures 1 and 2



April 5, 2000

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

Early coordination is requested from the Office of Environmental Planning regarding an Environmental Assessment (EA) to be prepared by the Design and Construction Division of the City and County of Honolulu (CCH) and Earth Tech Inc. (Earth Tech) for the Kalaupala Street Relief Drain Project. The purpose of this proposed project is to alleviate flooding in the Sunset Beach residential area (Figures 1 and 2). The CCH, after evaluating several alternatives, plans to increase the pipe size to 84 inches and extend the pipe 60 feet seaward of the shoreline.

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Very truly yours,

Earth Tech, Inc.

*Karl B. Bromwell*

Karl Bromwell, M.P.H.  
Project Manager

Attachments: Figures 1 and 2

1000 BUSH ST. STE. 404 HONOLULU, HI 96813

April 5, 2000

Administrator  
Office of Hawaiian Affairs  
711 Kapiolani Blvd., Suite 500  
Honolulu, Hawaii 96813

Early coordination is requested from the Office of Hawaiian Affairs regarding an Environmental Assessment (EA) to be prepared by the Design and Construction Division of the City and County of Honolulu (CCI) and Earth Tech Inc. (Earth Tech) for the Kahaoula Street Relief Drain Project. The purpose of this proposed project is to alleviate flooding in the Sunset Beach residential area (Figures 1 and 2). The CCI, after evaluating several alternatives, plans to increase the pipe size to 84 inches and extend the pipe 60 feet seaward of the shoreline.

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Very truly yours,

Earth Tech, Inc.

*Karl D. Bromwell*

Karl Bromwell, M.P.H.  
Project Manager

Attachments: Figures 1 and 2



E A R T H T E C H

1000 BUSH ST. STE. 404 HONOLULU, HI 96813

April 5, 2000

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

Early coordination is requested from the Department of Land and Natural Resources regarding an Environmental Assessment (EA) to be prepared by the Design and Construction Division of the City and County of Honolulu (CCI) and Earth Tech Inc. (Earth Tech) for the Kahaoula Street Relief Drain Project. The purpose of this proposed project is to alleviate flooding in the Sunset Beach residential area (Figures 1 and 2). The CCI, after evaluating several alternatives, plans to increase the pipe size to 84 inches and extend the pipe 60 feet seaward of the shoreline.

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Very truly yours,

Earth Tech, Inc.

*Karl D. Bromwell*

Karl Bromwell, M.P.H.  
Project Manager

Attachments: Figures 1 and 2



E A R T H T E C H

700 BISHOP STREET, SUITE 5000 HONOLULU, HAWAII 96813

April 5, 2000

Chief  
Police Department  
City & County of Honolulu  
801 South Beretania Street  
Honolulu, Hawaii 96813

Early coordination is requested from the Police Department regarding an Environmental Assessment (EA) to be prepared by the Design and Construction Division of the City and County of Honolulu (CCH) and Earth Tech Inc. (Earth Tech) for the Kahauloa Street Relief Drain Project. The purpose of this proposed project is to alleviate flooding in the Sunset Beach residential area (Figures 1 and 2). The CCH, after evaluating several alternatives, plans to increase the pipe size to 84 inches and extend the pipe 60 feet seaward of the shoreline.

Telephone:  
808 523 5871

Fax:  
808 523 5800

The EA will analyze and assess the potential environmental impacts the proposed project may have and develop mitigation measures to minimize them.

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- Conservation District Use Permit from DLNR; and,
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Very truly yours,

Earth Tech, Inc.

*Karl Bromwell*

Karl Bromwell, M.P.H.  
Project Manager

Attachments: Figures 1 and 2



E A R T H T E C H

700 BISHOP STREET, SUITE 5000 HONOLULU, HAWAII 96813

April 5, 2000

Director  
Office of Environmental Quality Control  
State Office Tower, Suite 702  
235 South Beretania Street  
Honolulu, Hawaii 96813

Early coordination is requested from the Office of Environmental Quality Control regarding an Environmental Assessment (EA) to be prepared by the Design and Construction Division of the City and County of Honolulu (CCH) and Earth Tech Inc. (Earth Tech) for the Kahauloa Street Relief Drain Project. The purpose of this proposed project is to alleviate flooding in the Sunset Beach residential area (Figures 1 and 2). The CCH, after evaluating several alternatives, plans to increase the pipe size to 84 inches and extend the pipe 60 feet seaward of the shoreline.

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808 523 5871

Fax:  
808 523 5800

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Very truly yours,

Earth Tech, Inc.

*Karl Bromwell*

Karl Bromwell, M.P.H.  
Project Manager

Attachments: Figures 1 and 2



E A R T H T E C H

THE HONOLULU STREET LIGHT AND SIGNAGE IMPROVEMENT PROJECT

April 6, 2000

Mr. Michael Y. Magaoy  
Chair, Neighborhood Board #27  
P.O. Box 893940  
Mililani, Hawaii 96789

The City and County of Honolulu (CCH), Design and Construction Division has contracted Earth Tech Inc. (Earth Tech) to conduct an Environmental Assessment (EA) for the Kahaoula Street Relief Drain Project. The purpose of this proposed project is to alleviate flooding in the Sunset Beach residential area (Figures 1 and 2). The CCH, after evaluating several alternatives, plans to increase the pipe size to 84 inches and extend the pipe 60 feet seaward of the shoreline.

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Additional permits to be acquired later will include: Department of Army Permit; U.S. Army Corps of Engineers Section 404 Permit; Department of Health 401 Water Quality Certification application, including appropriate construction Best Management Practices and water quality monitoring plans.

Public participation and input is encouraged in the EA process. The notice of submittal of the draft EA is anticipated to be listed in the July 23 edition of the semi-monthly Environmental Notice published by the Office of Environmental Quality Control (OEQC). Copies of the draft EA will be made available for public review at the Kahuku and Waialua libraries. During the 30-day comment period following the submittal of the draft EA to OEQC, an informal meeting can be arranged if there is sufficient interest in the proposed project.

If you have any comments or questions, please contact Karl Bromwell, the Earth Tech Project Manager, at 521-8874.

Very truly yours,

Earth Tech, Inc.

*Karl Bromwell*  
Karl Bromwell, M.P.H.  
Project Manager

Attachments: Figures 1 and 2



THE HONOLULU STREET LIGHT AND SIGNAGE IMPROVEMENT PROJECT

April 5, 2000

Environmental Center  
University of Hawaii at Manoa  
2550 Campus Road, Crawford 317  
Honolulu, HI 96822

Early coordination is requested from the Environmental Center regarding an Environmental Assessment (EA) to be prepared by the Design and Construction Division of the City and County of Honolulu (CCH) and Earth Tech Inc. (Earth Tech) for the Kahaoula Street Relief Drain Project. The purpose of this proposed project is to alleviate flooding in the Sunset Beach residential area (Figures 1 and 2). The CCH, after evaluating several alternatives, plans to increase the pipe size to 84 inches and extend the pipe 60 feet seaward of the shoreline.

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If you have any comments or questions, please contact Karl Bromwell, the Earth Tech Project Manager, at 521-8874.

Very truly yours,

Earth Tech, Inc.

*Karl Bromwell*  
Karl Bromwell, M.P.H.  
Project Manager

Attachments: Figures 1 and 2



700 HONOLULU STREET, SUITE 200 HONOLULU, HAWAII 96803

April 6, 2000

Mr. Jeff Mikulina  
Sierra Club  
P.O. Box 2377  
Honolulu, Hawaii 96803

The City and County of Honolulu (CCH), Design and Construction Division has contracted Earth Tech, Inc. (Earth Tech) to conduct an Environmental Assessment (EA) for the Kalaheola Street Relief Drain Project. The purpose of this proposed project is to alleviate flooding in the Sunset Beach residential area (Figures 1 and 2). The CCH, after evaluating several alternatives, plans to increase the pipe size to 84 inches and extend the pipe 60 feet seaward of the shoreline.

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Very truly yours,

Earth Tech, Inc.  
*Karl Bromwell*  
Karl Bromwell, M.P.H.  
Project Manager

Attachments: Figures 1 and 2

Tel: phone
NON 523 8874
Fax number
NON 523 8874



THE HONOLULU CITY ENGINEERS' BOARD HAS REVIEWED THIS PROJECT.



BENJAMIN J. CAVETANO  
DIRECTOR  
SELIE F. NAYA, PH.D.  
DEPUTY DIRECTOR  
PHILIP J. ROBERTS  
DEPUTY DIRECTOR  
DAVID W. BLANE  
DIRECTOR OF PLANNING

**DEPARTMENT OF BUSINESS,  
ECONOMIC DEVELOPMENT & TOURISM**

**OFFICE OF PLANNING**

235 South Beretania Street, 6th Floor, Honolulu, Hawaii 96813  
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

Ref. No. P-8570

April 14, 2000

Mr. Karl Bromwell  
Earth Tech  
700 Bishop Street, Suite 900  
Honolulu, Hawaii 96813

Dear Mr. Bromwell:

**Subject:** Early Coordination for the Kahauola Street Relief Drain Project  
Environmental Assessment (EA), Sunset Beach, Oahu

This responds to your request of April 5, 2000, for early coordination on an environmental assessment for the Kahauola Street Relief Drain Project at Sunset Beach, Oahu, to be prepared by the Department of Design and Construction of the City and County of Honolulu and Earth Tech Inc. The coordination letter correctly identifies CZM consistency as a required approval for the project. However, we wish to clarify that the CZM consistency review is triggered by the application for the Department of the Army Permit from the U.S. Army Corps of Engineers. It would be premature to submit your CZM consistency determination to our office before applying for the Department of the Army Permit. Also, it is the Office of Planning, not the Department of Business, Economic Development and Tourism, that is the designated lead agency for the Hawaii CZM Program and authorized by the federal government to act on CZM consistency determinations.

Given the very limited information provided in your letter we have identified general areas of potential concern based on CZM objectives and policies, as outlined below.

**Recreational Resources.** The EA should discuss whether the project, particularly the drain outfall, will conflict with recreational resources such as surf sites and beaches, and if recreational uses such as swimming, diving, fishing and surfing will be affected.

**Coastal Ecosystems.** Discuss the projects effects on aquatic resources, including benthic and reef resources, water quality, and endangered and threatened species.

April 5, 2000

Director  
Office of Planning  
DBEDT  
P.O. Box 2359  
Honolulu, Hawaii 96804

Early coordination is requested from the Office of Planning regarding an Environmental Assessment (EA) to be prepared by the Design and Construction Division of the City and County of Honolulu (CCH) and Earth Tech Inc. (Earth Tech) for the Kahauola Street Relief Drain Project. The purpose of this proposed project is to alleviate flooding in the Sunset Beach residential area (Figures 1 and 2). The CCH, after evaluating several alternatives, plans to increase the pipe size to 84 inches and extend the pipe 60 feet seaward of the shoreline.

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If you have any comments or questions, please contact Karl Bromwell, the Earth Tech Project Manager, at 523-8874.

Very truly yours,

Earth Tech, Inc.  
*Karl Bromwell*  
Karl Bromwell, M.P.H.  
Project Manager

Attachments: Figures 1 and 2



Telephone  
508 424 8474  
Facsimile  
508 424 8050

Mr. Karl Bromwell  
Page 2  
April 14, 2000

**Coastal Hazards and Beach Protection.** The EA should evaluate whether the presence of the drain outfall will cause a change in ocean currents and sand transport. Such changes can contribute to or cause beach erosion either at the location of the drain outfall and/or further from site.

In addition to the above, details about the pipe installation and layout need to be provided. No information was given about installation methods and whether the pipe will be placed on or under the ocean bottom. Maintenance requirements for the drain outfall, e.g., clearing accumulated sand and sediment from the pipe, should be described. In certain circumstances maintenance activities may require permits.

These CZM concerns will be considered in reviewing the project for CZM federal consistency. Thank you for consulting with the Hawaii CZM Program. If you have any questions, please call John Nakagawa at 587-2878.

Sincerely,

  
David W. Blane  
Director  
Office of Planning

c: U.S. Army Corps of Engineers, Regulatory Branch  
U.S. National Marine Fisheries Service, Pacific Area Office  
U.S. Fish and Wildlife Service, Pacific Islands Ecoregion  
Office of Environmental Quality Control  
Department of Health, Clean Water Branch  
Department of Land & Natural Resources,  
Planning & Technical Services Branch  
Department of Planning and Permitting, City & County of Honolulu  
Department of Design and Construction, City & County of Honolulu



700 Bishop Street, Suite 900, Honolulu, Hawaii 96813

June 15, 2000

Christy Ladia  
59-049 Huelo Street  
Haleiwa, HI 96712

Subject: Early Coordination for Kahaola Street Relief Drain Project  
Environmental Assessment (EA), Sunset Beach, Oahu, HI

Dear Reviewer:

Thank you for your response to early coordination efforts regarding the EA for the subject project. The concerns and issues identified in your communications will be addressed in the draft EA (DEA). The DEA is anticipated to be announced in the August 8<sup>th</sup> issue of the *Environmental Bulletin* published by the Office of Environmental Quality Control. A copy of the DEA will be available at the Waialua Public Library and copies will be sent to the North Shore Neighborhood Board and Sunset Beach Community Association.

We appreciate your efforts in the preconsulting process and look forward to your comments after review of the DEA. If there are any additional questions or comments regarding the report or proposed project, please call Mr. Karl Bromwell at 523-8874.

Very truly yours,  
Earth Tech, Inc.

*Karl B. Bromwell*

Karl B. Bromwell, M.P.H.  
Project Manager

Telephone  
808.523.8874  
Facsimile  
808.523.8910

700 Bishop Street, Suite 900, Honolulu, Hawaii 96813

June 15, 2000

Andrea Woods  
Sunset Beach Community Association  
P.O. Box 471  
Haleiwa, HI 96712

Subject: Early Coordination for Kahaola Street Relief Drain Project  
Environmental Assessment (EA), Sunset Beach, Oahu, HI

Dear Reviewer:

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Very truly yours,  
Earth Tech, Inc.

*Karl B. Bromwell*

Karl B. Bromwell, M.P.H.  
Project Manager

Telephone  
808.523.8874  
Facsimile  
808.523.8910

EARTHTECH



A EPCOR INTERNATIONAL LTD COMPANY

EARTHTECH



A EPCOR INTERNATIONAL LTD COMPANY

June 15, 2000

James C. Crittendon  
% Andrea Woods, Sunset Beach Community Association  
P.O. Box 471  
Haleiwa, HI 96712

Subject: Early Coordination for Kahaoula Street Relief Drain Project  
Environmental Assessment (EA), Sunset Beach, Oahu, HI

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Very truly yours,

Earth Tech, Inc.



Karl B. Bromwell, M.P.H.  
Project Manager

Telephone

HON. 523.8874

Facsimile

HON. 523.8930

June 15, 2000

Peter V.Z. Cole  
Corresponding Secretary  
Oahu Chapter, Surf rider Foundation  
P.O. Box 356  
Haleiwa, HI 96712

Subject: Early Coordination for Kahaoula Street Relief Drain Project  
Environmental Assessment (EA), Sunset Beach, Oahu, HI

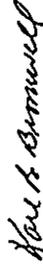
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Karl B. Bromwell, M.P.H.  
Project Manager

Telephone

HON. 523.8874

Facsimile

HON. 523.8930

700 Bishop Street, Suite 900, Honolulu, Hawaii 96813

June 15, 2000

Commander and Division Engineer  
U.S. Army Corps of Engineers, Pacific Ocean Division  
Attn: William Lennan  
Building 230  
Fort Shafter, HI 96858-5440

Subject: Early Coordination for Kahauloa Street Relief Drain Project  
Environmental Assessment (EA), Sunset Beach, Oahu, HI

Dear Reviewer:

Thank you for your response to early coordination efforts regarding the EA for the subject project. The concerns and issues identified in your communications will be addressed in the draft EA (DEA). The DEA is anticipated to be announced in the August 8<sup>th</sup> issue of the *Environmental Bulletin* published by the Office of Environmental Quality Control. A copy of the DEA will be available at the Waialua Public Library and copies will be sent to the North Shore Neighborhood Board and Sunset Beach Community Association.

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Karl B. Bromwell, M.P.H.  
Project Manager

Telephone

HON. 523.8874

Facsimile

HON. 523.8930

700 Bishop Street, Suite 900, Honolulu, Hawaii 96813

June 15, 2000

Steve Tagawa  
Land Use Approvals Branch  
City & County of Honolulu Planning Department  
630 South King Street  
Honolulu, HI 96813

Subject: Early Coordination for Kahauloa Street Relief Drain Project  
Environmental Assessment (EA), Sunset Beach, Oahu, HI

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Very truly yours,

Earth Tech, Inc.

Karl B. Bromwell, M.P.H.  
Project Manager

Telephone

HON. 523.8874

Facsimile

HON. 523.8930

EARTH TECH

EARTH TECH

A EPCOR INTERNATIONAL LTD COMPANY

A EPCOR INTERNATIONAL LTD COMPANY

June 15, 2000

Chief Engineer  
Board of Water Supply  
Attn: Scot Muroka  
630 South Beretania Street  
Honolulu, HI 96813

Subject: Early Coordination for Kahaloa Street Relief Drain Project  
Environmental Assessment (EA), Sunset Beach, Oahu, HI

Dear Reviewer:

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Earth Tech, Inc.

Karl B. Bromwell, M.P.H.  
Project Manager

Telephone

HON. 523-8874

Facsimile

HON. 523-8930

June 15, 2000

Director  
Office of Environmental Quality Control  
State Office Tower, Suite 702  
235 South Beretania Street  
Honolulu, HI 96813

Subject: Early Coordination for Kahaloa Street Relief Drain Project  
Environmental Assessment (EA), Sunset Beach, Oahu, HI

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Earth Tech, Inc.

Karl B. Bromwell, M.P.H.  
Project Manager

Telephone

HON. 523-8874

Facsimile

HON. 523-8930

June 15, 2000

Don Hibbard, Administrator  
State Historic Preservation Division  
Department of Land and Natural Resources  
Kakuhihewa Building, Room 555  
601 Kamokila Boulevard  
Kapolei, HI 96707

**Subject:** Early Coordination for Kahauola Street Relief Drain Project  
Environmental Assessment (EA), Sunset Beach, Oahu, HI

Telephone  
#08-423-8874  
Facsimile  
#08-423-8950

Dear Reviewer:

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Very truly yours,  
Earth Tech, Inc.

Karl B. Bromwell, M.P.H.  
Project Manager



A EPCOR INTERNATIONAL LTD. COMPANY

June 15, 2000

John Nakagawa  
Office of Planning, State DBEDT  
P.O. Box 2359  
Honolulu, HI 96804

**Subject:** Early Coordination for Kahauola Street Relief Drain Project  
Environmental Assessment (EA), Sunset Beach, Oahu, HI

Telephone  
#08-423-8874  
Facsimile  
#08-423-8950

Dear Reviewer:

Thank you for your response to early coordination efforts regarding the EA for the subject project. The concerns and issues identified in your communications will be addressed in the draft EA (DEA). The DEA is anticipated to be announced in the August 8<sup>th</sup> issue of the *Environmental Bulletin* published by the Office of Environmental Quality Control. A copy of the DEA will be available at the Waialua Public Library and copies will be sent to the North Shore Neighborhood Board and Sunset Beach Community Association.

We appreciate your efforts in the preconsulting process and look forward to your comments after review of the DEA. If there are any additional questions or comments regarding the report or proposed project, please call Mr. Karl Bromwell at 523-8874.

Very truly yours,  
Earth Tech, Inc.

Karl B. Bromwell, M.P.H.  
Project Manager



A EPCOR INTERNATIONAL LTD. COMPANY

300 Bishop Street, Suite 900, Honolulu, Hawaii 96813

June 15, 2000

Department of Land Utilization  
City & County of Honolulu  
650 South King Street  
Honolulu, HI 96813

Subject: Early Coordination for Kahauola Street Relief Drain Project  
Environmental Assessment (EA), Sunset Beach, Oahu, HI

Dear Reviewer:

Thank you for your response to early coordination efforts regarding the EA for the subject project. The concerns and issues identified in your communications will be addressed in the draft EA (DEA). The DEA is anticipated to be announced in the August 8<sup>th</sup> issue of the *Environmental Bulletin* published by the Office of Environmental Quality Control. A copy of the DEA will be available at the Waialua Public Library and copies will be sent to the North Shore Neighborhood Board and Sunset Beach Community Association.

We appreciate your efforts in the preconsulting process and look forward to your comments after review of the DEA. If there are any additional questions or comments regarding the report or proposed project, please call Mr. Karl Bromwell at 523-8874.

Very truly yours,

Earth Tech, Inc.

*Karl B. Bromwell*

Karl B. Bromwell, M.P.H.  
Project Manager

Telephone  
808.533.8874  
Facsimile  
808.533.8950

DEPARTMENT OF DESIGN AND CONSTRUCTION  
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR  
HONOLULU, HAWAII 96813  
PHONE: (808) 523-4564 • FAX: (808) 523-4567  
WEB SITE ADDRESS: www.co.honolulu.hi.us



JEREMY HARRIS  
MAYOR

GARY Q. L. YEE, AIA  
DIRECTOR  
ROJALDO D. LIBRY, JR., AIA  
DEPUTY DIRECTOR

IDEA 00-0130

June 19, 2000

Mr. Gary Yamamoto  
Vice President  
Earth Tech, Inc.  
700 Bishop Street, Suite 900  
Honolulu, Hawaii 96813

Dear Mr. Yamamoto:

Subject: Kahauola Street Relief Drain, Project 97511  
Pupukea, Oahu, Hawaii  
Contract No. F 60018

The Department of Design and Construction has completed its review of the Draft Environmental Assessment (EA) for the subject project which was submitted on May 31, 2000. We have noted our comments on the enclosed copy of the draft EA. In summary, our review indicated that revisions to the report appear to be necessary to clarify the City's position concerning the mauka drainage easement "K" and to include duckbill-type valve outlet alternatives since there is significant community opposition to the extension of the outlet 60 feet into the ocean. The duckbill-type valve outlet alternatives should include the replacement of the existing T outlet with a 66" duckbill-type valve and a second alternative involving the replacement of the existing drainlines with larger drainlines and installation of a 84" duckbill-type valve at the existing outlet location. Please address our concerns and resubmit the revised draft EA along with the enclosed copy indicating our comments.

Should you have any questions, please call Tyler Sugihara of the Division of Infrastructure Design and Engineering at 523-4932.

Very truly yours,

*Gary Q. L. Yee*  
GARY Q. L. YEE, AIA  
Director

Encl.

EARTHTECH

A SPANISH INTERNATIONAL LTD. COMPANY



July 5, 2000

Mr. Gary Yee  
Director of Design and Construction  
City and County of Honolulu  
630 South King Street, 2nd Floor  
Honolulu HI 96813

Dear Mr. Yee,

This past March, Department of Design and Construction (DDC) staff and contractors met with our community association to bring us up to date on the Kahaoula Drain Relief Project. We provided comments under my May 17, 2000 letter to you. Such drain systems for Oahu's lowlands may be technologically feasible, however, from reactions of the audience, they are not palatable from a cultural, social, and environmental viewpoint.

This difference of opinion between DDC staff and contractors and the community for potential solutions to water management has brought up a more general question of how DDC projects are initiated. It seems that a great deal of money is spent initially on preliminary engineering studies or developing "bandaid," "spot treating" solutions to area-wide problems. When the public reacts in a negative manner towards these studies or "solutions", a lot of time, energy and money have been wasted. Could the process be modified somewhat so that the community is approached first, before any engineering work begins? The suggestions and ideas of the residents could then be continuously incorporated via a community-based planning process. Waiting for the environmental assessment phase before approaching the very people who are to be impacted by a project simply is backward and creates stress between the City and our community.

We would like to work with you to improve this process in order to maximize our precious City resources on concentrating efforts on feasible and desirable solutions. Instead of an antagonistic City versus community situation, we would like to have the City working with us to find solutions that work for both parties.

We would be appreciative if you could attend our July 19, 2000 meeting to address this concern. Could you please present a short (fifteen-minute) talk explaining how DDC projects are initiated, how community input is gathered, and how we can increase our collaboration with your department? Thereafter, representatives from SBCA's Kahaoula Drain Relief Committee and the Kahaoula Watershed Watershed Initiative Executive Council will report on the status of their DDC-community efforts.

Thank you very much for your attention. Please do not hesitate to give me a call at 634-8208 for further discussion.

Sincerely,

*Andrea Woods*  
Andrea Woods  
President

- cc: Mayor Jeremy Harris
- Council Member Rene Mansho
- Representative Alex Santiago
- Senator Robert Bunka
- Robert Fishman, Hawaii Tourism Authority
- Jacqueline Parnell, KRP Info Services
- Earth Tech, Inc. V
- Charlie Ahitong, WOSWCD

Carl B

DEPARTMENT OF DESIGN AND CONSTRUCTION  
CITY AND COUNTY OF HONOLULU  
850 SOUTH KING STREET, 11TH FLOOR  
HONOLULU, HAWAII 96813  
PHONE: (808) 523-4584 • FAX: (808) 523-4587  
WEB SITE ADDRESS: www.ddc.honolulu.hi.us



JEREMY HARRIS  
MAYOR

GARY O. L. YEE, AIA  
DIRECTOR  
ROLAND D. LIBBY, JR., AIA  
DEPUTY DIRECTOR

July 24, 2000

IDEA 00-0148

Ms. Andrea Woods, President  
Sunset Beach Community Association  
P.O. Box 471  
Haleiwa, Hawaii 96712

Dear Ms. Woods:

Subject: Sunset Beach Community Input Concerns  
Pupukea, Oahu, Hawaii

Thank you for your letter dated July 5, 2000, concerning community input to City projects. I fully support community input in our projects and believe that community involvement is essential for the effective implementation of City projects.

Although I appreciate your invitation to meet with the Sunset Beach Community Association, I was unable to attend your July 19 meeting due to a prior commitment. In my place, Eugene Lee, our department's Program Coordinator, made a presentation of the implementation process for City projects. I believe that many of your concerns were addressed by Mr. Lee's presentation.

If you should have any questions, please call me at 523-4564.

Very truly yours,

*Gary O. L. Yee*  
GARY O. L. YEE, AIA  
Director

TS:GS:pto

- cc: Mayor Jeremy Harris
- Councilmember Rene Mansho
- bcc: Earth Tech, Inc.
- Jacqueline Parnell, KRP Info Services
- Managing Director

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

September 20, 2000

REPLY TO  
ATTENTION OF

Regulatory Branch

Ms. Jackie Parnel  
KRP InfoServices  
1314 South King Street, Suite 951  
Honolulu, Hawaii 96813

Dear Ms. Parnel:

This letter responds to the request dated September 14, 2000 for review and comment regarding an environmental assessment (EA) for the Kahaula Street Relief Drain Project.

The EA correctly indicates that a Department of the Army (DA) permit will be required for the project. Phase A will require a Rivers and Harbors Act of 1899 Section 10 permit since the project will take place in navigable waters of the U.S. A Clean Water Act Section 404 permit may be required depending upon construction methods used for removal of the "T" section of pipe and the installation of the duckbill valve. Phase B will require both a Section 10 and Section 404 permit for the installation of the 84-inch pipe.

If you have any questions concerning this matter, please contact William Lennan of my staff at 438-6986 or FAX 438-4060, and reference File No. 200000163.

Sincerely,

  
George P. Young, P.E.  
Chief, Regulatory Branch

700 Bishop Street, Suite 900, Honolulu, Hawaii 96813

December 5, 2000

Mr. George P. Young, P. E.  
Chief, Regulatory Branch  
U.S. Army Engineer District, Honolulu  
Ft. Shafter, Hawaii 96858-5440

Subject: Kahaula Street Relief Drain Project Final Environmental Assessment (FEA), Sunset Beach, Oahu, Hawaii

Dear Mr. Young:

Thank you for your letter of September 20, 2000 commenting on the subject project.

Removal of the tee outlet and the installation of the duckbill valve is planned to be accomplished at low tide when the pipe is entirely out of the water. We believe that this Phase A work may be covered under Nationwide Permit No. 31. An application for permit coverage will be submitted during preparation of the construction plans. If the City and County of Honolulu is only required to apply for a Section 10 Letter of Permission, a description of how the outlet and pipe section will be removed without in-water work and how the duckbill valve will be installed will be submitted.

If you have any additional questions or comments regarding the proposed project, please call Mr. Karl Bromwell at 523-8874.

Very truly yours,

Earth Tech, Inc.



Karl B. Bromwell, M.P.H.  
Project Manager

Telephone

808.523.8874

Facsimile

808.523.8930

EARTHTECH  
  
A TECO INTERNATIONAL LTD. COMPANY

PHONE (808) 594-1888



STATE OF HAWAII  
OFFICE OF HAWAIIAN AFFAIRS  
711 KAPOLANI BOULEVARD, SUITE 500  
HONOLULU, HAWAII 96813

FAX (808) 594-1885

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



October 6, 2000

JEREMY HARRIS, Mayor  
EDDIE FLORES, JR., Chairman  
CHARLES A. STED, Vice-Chairman  
JAN W. LY. AMI  
HERBERT S.K. KAOPUA, SR.  
BARBARA MASTANTON  
KAZU HAYASHIDA, E-0606  
ROSS S. SAKAMURA, E-0606  
CLIFFORD S. JAMILE  
Manager and Chief Engineer

Ms. Jackie Parnell  
KRP InfoServices  
1314 South King Street, Suite 951  
Honolulu, Hawaii 96814-1944

Dear Ms. Parnell:

Subject: Your Transmittal of September 14, 2000 of the Draft Environmental Assessment for the Kahaoula Street Relief Drain, Sunset Beach, Oahu,  vicinity of TMK: 5-09-01

Thank you for the opportunity to review the subject document for the proposed drainage project.

We have no objections to the proposed improvements. Our pre-consultation comments of May 2, 2000 are still applicable and included in Appendix D of the document.

If you have any questions, please contact Scot Muraoka at 527-5221.

Very truly yours,

FOR CLIFFORD S. JAMILE  
Manager and Chief Engineer

cc: Department of Design and Construction  
Earth Tech, Inc.

To: Jackie Parnell  
KRP InfoServices  
1314 South King Street, Suite 951  
Honolulu, HI 96818-1944

Re: OHA position on Draft EA - Kahaoula Street Relief Drain, Sunset Beach, Oahu

Dear Ms. Parnell:

Thank you for the opportunity to review and comment on the environmental assessment for the above-referenced project. After reviewing your draft EA, it is OHA's position at this time that it has no comment about the adequacy of the present draft EA with regard to Hawaiian rights and concerns. Should facts, upon which OHA relied in reaching this position, change or turn out to be inaccurate, OHA reserves the right to withdraw this statement and to issue a new comment letter.

We look forward to your response and an opportunity to review the final EA. If you have any questions, please contact Barry L. Soosalu, policy analyst, at 594-1966, or email him at [bsoosalu@oha.org](mailto:bsoosalu@oha.org).

Sincerely,

Colin Kippen, Jr.  
Deputy Administrator

CK:bls

cc: HRD  
BOT

POLICE DEPARTMENT  
**CITY AND COUNTY OF HONOLULU**

801 SOUTH BERETANIA STREET  
HONOLULU, HAWAII 96813 - AREA CODE (808) 929-3111  
<http://www.honolulu.gov>  
[www.co.honolulu.hi.us](http://www.co.honolulu.hi.us)



JEREMY HARRIS  
MAYOR

LEE D. DONOHUE  
CHIEF  
MICHAEL CARVALHO  
ROBERT AU  
DEPUTY CHIEFS

OUR REFERENCE CS-TL

September 25, 2000

Ms. Jackie Parnell  
KRP InfoServices  
1314 South King Street, Suite 951  
Honolulu, Hawaii 96814-1944

Dear Ms. Parnell:

Subject: Draft Environmental Assessment for Kahauola Street Relief Drain,  
Sunset Beach, Oahu, Project

Thank you for the opportunity to review the subject document.

Dust, noise, and traffic complaints during the construction phase of this project will inevitably cause an increase in calls for police service to the area. Further, because Kamehameha Highway is the only thoroughfare through the area, it is advisable that the contractor coordinate with District 2 (Wahiawa) when any work is to be done so potential traffic problems can be minimized.

If there are any questions, please call Carol Soderani of the Support Services Bureau at 529-3658.

Sincerely,  
LEE D. DONOHUE  
Chief of Police

By   
EUGENE UEMURA  
Assistant Chief  
Support Services Bureau

December 5, 2000

Chief Lee D. Donohue  
Honolulu Police Department  
801 South Beretania Street  
Honolulu, Hawaii 96813

Subject: Kahauola Street Relief Drain Project Final Environmental Assessment  
(FEA), Sunset Beach, Oahu, Hawaii

Dear Chief Donohue:

Thank you for your letter of September 25, 2000 commenting on the subject project.

Please be assured that the contractor will coordinate with District 2 (Wahiawa) during construction so that potential traffic problems can be minimized.

If you have any additional questions or comments regarding the proposed project, please call Mr. Karl Bromwell at 523-8874.

Very truly yours,  
Earth Tech, Inc.

  
Karl B. Bromwell, M.P.H.  
Project Manager

Telephone  
808-523-8874  
Facsimile  
808-523-8930



FIRE DEPARTMENT  
**CITY AND COUNTY OF HONOLULU**

3375 KOAHPA STREET, SUITE 1425 • HONOLULU, HAWAII 96819-1425  
TELEPHONE: (808) 831-7761 • FAX: (808) 831-7750 • INTERNET: WWW.CC.HONOLULU.HI



STEFEN HARRIS  
UNIT 102

ATTILIO K. LEONARDI  
FIRE CHIEF

JOHN CLARK  
ADJUTANT FIRE CHIEF

October 2, 2000

Mr. Jackie Parnell  
KRP InfoServices  
1314 South King Street, Suite 951  
Honolulu, Hawaii 96814-1944

Dear Mr. Parnell:

Subject: Draft Environmental Assessment for Kahauola Street Relief Drain  
Sunset Beach, Oahu

We received a letter from Mr. Karl B. Bromwell dated September 14, 2000, regarding the above-mentioned project. The Honolulu Fire Department requests that you comply with the following:

1. Maintain fire apparatus access throughout the construction site for the duration of the project.
2. Notify the Fire Communication Center (523-4411) of any interruption in the existing fire hydrant system during the project.

Should you have any questions, please call Battalion Chief Kenneth Silva of our Fire Prevention Bureau at 831-7778.

Sincerely,

ATTILIO K. LEONARDI  
Fire Chief

AKL/KS:jo

700 Bishop Street, Suite 900, Honolulu, Hawaii 96813

December 5, 2000

Chief Attilio K. Leonard  
Honolulu Fire Department  
3375 Koaopa Street, Suite H425  
Honolulu, Hawaii 96819-1869

Subject: Kahauola Street Relief Drain Project Final Environmental Assessment  
(FEA), Sunset Beach, Oahu, Hawaii

Dear Chief Leonard:

Thank you for your letter of October 2, 2000 commenting on the subject project.

Please be assured that we will maintain fire apparatus access throughout the construction site for the duration of the project and will notify the Fire Communication Center should there be any interruption in the existing fire hydrant system.

If you have any additional questions or comments regarding the proposed project, please call Mr. Karl Bromwell at 523-8874.

Very truly yours,

Earth Tech, Inc.

Karl B. Bromwell, M.P.H.  
Project Manager

Telephone

808-523-8874

Facsimile

808-523-8910

E A R T H T E C H  
  
A EPOCH INTERNATIONAL LTD. COMPANY

H.B. NO. 2893 H.D. 1

HOUSE OF REPRESENTATIVES  
TWENTIETH LEGISLATURE, 2000  
STATE OF HAWAII

A BILL FOR AN ACT  
RELATING TO ENVIRONMENTAL IMPACT STATEMENTS.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF HAWAII:

SECTION 1. The legislature finds that there is a need to clarify that the preparation of environmental assessments or environmental impact statements should identify and address effects on Hawaii's culture, and traditional and customary rights.

The legislature also finds that native Hawaiian culture plays a vital role in preserving and advancing the unique quality of life and the "Aloha spirit" in Hawaii. Articles IX and XII of the state constitution, other state laws, and the courts of the State impose on government agencies a duty to promote and protect cultural beliefs, practices, and resources of native Hawaiians and other ethnic groups.

Moreover, the past failure to require native Hawaiian cultural impact assessments has resulted in the loss and destruction of many important cultural resources and has interfered with the exercise of native Hawaiian culture. The legislature further finds that the consideration of the effects of human activities on native Hawaiian culture and the exercise thereof is necessary to ensure the continued existence, development, and exercise of native Hawaiian culture.

The purpose of this Act is to: (1) Require that environmental impact statements include the disclosure of the effects of a proposed action on the cultural practices of the community and State; and (2) Amend the definition of "significant effect" to include adverse effects on cultural practices.

SECTION 2. Section 343-2, Hawaii Revised Statutes, is amended by adding the definitions of "environmental impact statement" or "assessment" and "significant effect", to read as follows:

"Environmental impact statement" or "assessment" means an informational document prepared in compliance with the rules adopted under section 343-6 and which discloses the environmental effects of a proposed action, effects of a proposed action on the economic [and] welfare, social welfare, and cultural practices of the community and State, effects of the economic activities arising out of the proposed action, measures proposed to minimize adverse effects, and alternatives to the action and their environmental effects.

The initial statement filed for public review shall be referred to as the draft statement and shall be drafted from the final statement which is the document that has incorporated the public's comments and the responses to those comments. The final statement is the document that shall be evaluated for acceptability by the respective accepting authority.

"Significant effect" means the sum of effects on the quality of the environment, including actions that irrevocably commit a natural resource, curtail the range of beneficial uses of the environment, are contrary to the State's environmental policies or long-term environmental goals as established by law, or adversely affect the economic [or] social welfare, [or] cultural practices of the community and State.

SECTION 3. Statutory material to be repealed is bracketed. New statutory material is underscored.

SECTION 4. This Act shall take effect upon its approval.

Approved by the Governor on April 26, 2000



BENJAMIN J. CAVETANO  
Director

GENEVIEVE SALLMONSON  
Director

STATE OF HAWAII  
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

248 SOUTH BERTLAND STREET  
SUITE 1700  
HONOLULU, HAWAII 96813  
TELEPHONE: (808) 552-1100  
FAX: (808) 552-1100

October 10, 2000

Gary Yee, Director  
Department of Design & Construction  
650 South King Street  
Honolulu, Hawaii 96813

Attention: Tyler Sughart

Dear Mr. Yee:

Subject: Draft Environmental Assessment (EA) for Kahanoia Street Relief Drain

We have the following comments to offer:

Cultural Impact Assessment: Enclosed is a copy of Act 50, passed by the Legislature in April of this year. This mandates an assessment of impacts to local cultural practices by this proposed project. In the final EA include such an assessment. For assistance in the preparation refer to our *Guidelines for Assessing Cultural Impacts*. Contact our office for a paper copy or go to our homepage at <http://www.state.hi.us/health/oeqc/guidance/cultural.htm>.

Beach erosion: We are concerned about beach erosion in the area. Since the State Department of Land & Natural Resources and the City & County Department of Planning & Permitting are the primary agencies dealing with this issue, be sure to document all contacts and enclose copies of all correspondence with these two agencies in the final EA.

If you have any questions call Nancy Heinrich at 586-4185.

Sincerely,

GENEVIEVE SALLMONSON  
Director

Enc.

c: Karl Bromwell

December 5, 2000

Ms. Genevieve Salmonson, Director  
Office of Environmental Quality Control  
236 South Beretania Street, Suite 702  
Honolulu, Hawaii 96813

Subject: **Kahaoula Street Relief Drain Project Final Environmental Assessment (FEA), Sunset Beach, Oahu, Hawaii**

Dear Ms. Salmonson:

Thank you for your letter of October 10, 2000 commenting on the subject project and follow-up fax regarding traditional and customary rights in Hawaii. The preliminary document you faxed over indicates the following:

1. King Kamehameha III set up new land ownership during the Great Mahele, and reserved the right of access to privately owned lands for native ahupua'a tenants.
2. The National Historic Preservation Act mandates that federal agencies evaluate the impacts of their actions on traditional practices and cultural resources.
3. The State Environmental Council has prepared guidelines for assessing cultural resources. Some of the elements for this assessment include:
  - a. Observations regarding the current or past practice of traditional practices like the presence of native plants, trails, caves, harvesting of limu/sea-weed or medicinal plants, fishing, and hunting.
  - b. Documentary research including analysis of Mahele and land records;
  - c. Consulting with community groups and expert and responsible Hawaiian practitioners.

Telephone

808-533-8874

Facsimile

808-533-8930

Many of these elements have been addressed during the preparation of the Kahaoula EA, as follows:

Responses to items a and b: The site is located in the ahupua'a of Paumalu in the Koolauloa District. Pre-contact Hawaiian inhabitants of the Sunset Beach area probably utilized the beach to obtain marine resources while living farther inland. Since the narrow sea-plain has little fresh water, and these gulches were reportedly not terraced for taro farming, it is likely that small gardens were planted with sweet potatoes, yams and gourds. The beach area was probably seasonally used due to high winter waves. Marine resources, such as fish, shell fish and probably sea weed were collected, however, the big-eyed scad was forbidden from removal from this area. Land Commission Awards from the Great Mahele in 1848 indicate

that several Hawaiian families utilized the areas mauka of Sunset Beach for growing foods similar to those listed above. It was also reported that more families were also in the area, but had not claimed lands in the Great Mahele (Athens and Magnuson, 1998).

Response to item c: During the preparation of the Kahaoula EA, two community meetings were held to discuss the project and obtain community input. Community groups included the Sunset Beach Community Association and the North Shore Neighborhood Board. Additionally, the State Historic Preservation Division and Office of Hawaiian Affairs (OHA) were pre-consulted and provided with copies of the draft EA. To date, there have been no comments indicating that the proposed project would negatively impact traditional uses of the project area.

To ensure compliance with Act 50, Earth Tech is requesting that any traditional Hawaiian practitioners in the Sunset Beach area provide statements regarding past or current traditional uses of the proposed project area. Requests have been made through the North Shore Neighborhood Board (11/28/00), Vicky Takamine (Traditional Hawaiian Practitioner), Kepa Maly (Big Island Historian and Cultural Resources Specialist), and additional requests are planned for OHA, Alu Like and other Hawaiian civic organizations. In the event that statements are made that would indicate negative impacts to traditional cultural uses, mitigating actions would be enacted. The original schedule of the FEA will continue, with any statements and/or mitigation actions appended, if they are provided.

Additionally, the proposed project should have positive impacts on traditional cultural practices. These include restoration of natural sand transport and natural beach processes and increased beach and shoreline as well as cessation of direct discharge of stormwater into nearshore water. Also, since the proposed project is a City and County utility improvement, public access is not restricted. Based on the findings of the Kahaoula EA, meetings with community groups, positive impacts and unrestricted access, we believe that traditional and customary rights of native Hawaiians will not be impaired due to the proposed project. However, Earth Tech will continue to seek and address statements from traditional Hawaiian practitioners.

If you have any additional questions or comments regarding the proposed project, please call Mr. Karl Bromwell at 523-8874.

Very truly yours,

Earth Tech, Inc.

*Karl B. Bromwell*

Karl B. Bromwell, M.P.H.

Project Manager

DEPARTMENT OF PLANNING AND PERMITTING  
**CITY AND COUNTY OF HONOLULU**

650 SOUTH KING STREET • HONOLULU, HAWAII 96813  
TELEPHONE: (808) 523-4414 • FAX: (808) 527-8743 • INTERNET: [www.ci.honolulu.hi.us/planning](http://www.ci.honolulu.hi.us/planning)



JEREMY HARRIS  
MAYOR

RANDALL K. FUJIKI, AIA  
DIRECTOR

SONNETA A.C. CHEE  
DEPUTY DIRECTOR  
2000/CLOG-5096 (PD)

October 17, 2000

Ms. Jackie Parnell  
KRP InfoServices  
1314 South King Street, Suite 951  
Honolulu, Hawaii 96814-1944

Dear Ms. Parnell:

Draft Environmental Assessment (EA)  
Kahaola Street Relief Drain  
Near Sunset Beach—North Shore, Oahu

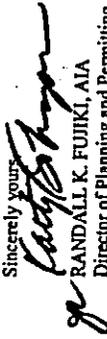
This is in response to the September 14, 2000 letter from Mr. Karl Bromwell, requesting comments on the above-referenced document. We offer the following comments pertaining to Special Management Area (SMA) requirements, and the project's consistency with the provisions of the North Shore Sustainable Communities Plan (SCP).

Flooding is a recurring natural hazard facing the North Shore region. One of the key elements of the SCP vision includes improvement of drainage controls to mitigate storm runoff and flood hazards. The proposed project conforms to this element of the vision. According to the draft EA document, the project involves drainage improvements which are designed to increase efficiency of the drainline system, minimizing the effects of flooding in the area. The document states that installation of the duckbill valve will prevent active sand transport from entering the pipe, which will in turn eliminate the problem of sand blockage within the pipe. No anticipated negative impacts to public health and safety are anticipated. In fact, the EA states that the proposed improvements may have a positive long-term effect by reducing the effects of flooding. It is noted, however, that new construction within the 40-foot shoreline setback area will require approval of a shoreline setback variances from our department. An SMA Use Permit will not be required for construction within the existing drainage easements.

One of the guidelines of the SCP, pertaining to shoreline areas, is to maintain and enhance existing views. The EA states that the proposal will have a positive visual effect by improving upon the current view of the exposed pipe and outlet, and locating the duckbill valve in the backshore.

If you have any questions, please contact Pamela Davis of our staff at 523-4807.

Sincerely yours,

  
RANDALL K. FUJIKI, AIA  
Director of Planning and Permitting

RKF:lh  
Parnell.psd

700 Bishop Street, Suite 900, Honolulu, Hawaii 96813

December 5, 2000

Mr. Randall K. Fujiki, AIA  
Director of Planning & Permitting  
City and County of Honolulu, 650 South King Street  
Honolulu, Hawaii 96813

Subject: Kahaola Street Relief Drain Project Final Environmental Assessment  
(FEA), Sunset Beach, Oahu, Hawaii

Dear Mr. Fujiki:

Thank you for your letter of October 17, 2000 commenting on the subject project.

We concur with your statement that an SMA Use Permit will not be required since no new construction will take place. Removal of the tee outlet and the installation of the duckbill valve is planned to be accomplished at low tide when the pipe is entirely out of the water.

If additional work is needed in the future to alleviate flooding, a shoreline setback variance will be requested.

If you have any additional questions or comments regarding the proposed project, please call Mr. Karl Bromwell at 523-8874.

Very truly yours,

Earth Tech, Inc.



Karl B. Bromwell, M.P.H.  
Project Manager

Telephone

808.523.8874

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E A R T H T E C H  
  
A TPCO INTERNATIONAL LTD. COMPANY

58-034 Kapuai Place  
Haleiwa HI 96712  
638-8208

October 22, 2000

Jackie Parnell  
KRP InfoServices  
1314 South King Street, Suite 951  
Honolulu HI 96814-1944

Subject: Draft Environmental Assessment for Kahauola Street Relief  
Drain, Sunset Beach, Oahu, Project

Dear Ms. Parnell,

I was pleased and relieved to read that the flapper valve was to be considered as the first option in flood control. The Department of Public Works has also been at the site this past week, cleaning out the pipe, so perhaps a regular maintenance schedule is being adhered to.

My big concern is Part B of the plan. I realize the scope of the engineering project includes only the makai side of Kamehameha Highway, but I just cannot see spending all that money on larger pipes and their installation when the problem stems from the mauka side of Kamehameha Highway. The report admits that even new pipes are sized for only runoff generated on the makai side, so flood control measures would still be inadequate should a big storm send water sheeting across the highway from the mauka side.

The draft EA mentions the problem of the Paumalu drain easement being on private land. I strongly urge the city to find a way to encourage the Paumalu Street homeowners to cooperate in maintaining the drain, instead of just saying it can't be done. Mayor Harris speaks of the partnership between the private and public sector, and here is an excellent opportunity to put that into practice.

For the time being, I hope the flap valve proves adequate, and meanwhile, I will be communicating with my city representative to further discuss alternatives.

Sincerely,

*Andrea Woods*  
Andrea Woods

cc: Mayor Jeremy Harris  
City Council Member Rene Mansho

700 Bishop Street, Suite 900, Honolulu, Hawaii 96813

December 5, 2000

Ms. Andrea Woods  
58-034 Kapuai Place  
Haleiwa, Hawaii 96712

Subject: Kahauola Street Relief Drain Project Final Environmental Assessment  
(FEA), Sunset Beach, Oahu, Hawaii

Dear Ms. Woods:

Thank you for your efforts and assistance in improving this project. We appreciate your concerns regarding this project scope in regards to regional drainage issues and large storm events. The City and County of Honolulu is addressing matters under its control with available funding.

At this time, modest funds were appropriated to begin addressing drainage issues in the Kahauola Street area. These include costs of \$100,000 for planning, and \$50,000 for design. Additional design and construction funds have been requested in the fiscal year 2002 budget to implement the Phase A improvements. Funding for Phase B will not be requested until the Phase A improvements can be evaluated under different storm conditions.

In the meantime, we agree that additional efforts should be made to create a regional solution to the drainage problems of the Sunset Beach area.

If you have any additional questions or comments regarding the proposed project, please call Mr. Karl Bromwell at 523-8874.

Very truly yours,

Earth Tech, Inc.

*Karl Bromwell*

Karl B. Bromwell, M.P.H.  
Project Manager

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EARTH TECH  
A HYCO INTERNATIONAL LTD COMPANY



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
HISTORIC PRESERVATION DIVISION  
Lukahiwa Building, Room 515  
601 Kamehameha Boulevard  
Honolulu, Hawaii 96813  
Telephone: (808) 548-1111  
Fax: (808) 548-1112

THURSDAY, OCTOBER 23, 2008  
OFFICE OF THE HISTORIC PRESERVATION DIVISION

DIPI/08  
JANET L. LAMMERS  
LANDS MANAGER

AGRICULTURE  
BALTIC AND OCEAN RESOURCES  
CONSERVATION AND RESOURCES  
DEPARTMENT  
CONVEYANCES  
HAWAIIAN ARTS AND CULTURE  
LAND AND NATURAL RESOURCES  
LAND  
STATE PARKS  
WATER RESOURCE MANAGEMENT

October 24, 2000

Mr. Karl B. Bromwell, Project Manager  
EarthTech  
700 Bishop Street, Suite 900  
Honolulu, Hawaii 96813

LOG NO: 26371 ✓  
DOC NO: 0010SC12

Dear Mr. Bromwell:

**SUBJECT:** Chapter 6E-8 Historic Preservation Review of a Draft Environmental Assessment (DEA) for the Proposed Kahaoula Street Relief Drain at Sunset Beach  
Paumotu, Ko'olaupua, O'ahu  
TMK: 5-9-006: Portion of 003

Thank you for the opportunity to review and comment on a DEA for the proposed Kahaoula Street relief drain to be installed at Sunset Beach, O'ahu. The proposed drain will replace an existing drainage system which has been deemed inadequate by the City and County of Honolulu. Our review is based on historic maps, aerial photographs, records, and reports maintained at the State Historic Preservation Division. In addition, Sara Collins of our staff has conducted the recovery of an inadvertent burial discovery in the vicinity of the proposed project site.

We previously responded to a pre-DEA request for comments, and provided the following statements, in part (see letter dated May 30, 2000, Hibbard to Bromwell, DOC NO: 0005E1Z6):

The proposed area of potential effect of the project passes through Jaukas sand substrates, which are deposits known to contain subsurface cultural layers and human burials. Since the subject action has the potential to have an "adverse effect" on significant historic sites, we recommend that a qualified archaeologist conduct on-site monitoring of all ground disturbance in the project area. We also recommend that a written archaeological monitoring plan be submitted to this office for review and acceptance prior to any ground disturbance.

Mr. Karl B. Bromwell, Project Manager  
Page Two

An archaeological monitoring plan must contain the following eight specifications: (1) The kinds of remains that are anticipated and where in the construction area the remains are likely to be found; (2) How the remains and deposits will be documented; (3) How the expected types of remains will be treated; (4) The archaeologist conducting the monitoring has the authority to halt construction in the immediate area of a find in order to carry out the plan; (5) A coordination meeting between the archaeologist and construction crew is scheduled, so that the construction team is aware of the plan; (6) What laboratory work will be done on remains that are collected; (7) A schedule for report preparation; and (8) Details concerning the archiving of any collections that are made.

Therefore, we believe that if a qualified archaeologist conducts on-site monitoring of the proposed project, in accordance with an approved monitoring plan, the planned Kahaoula Street Relief Drain will have "no adverse effect" on significant historic sites.

Should you have any questions, please feel free to contact Sara Collins at 692-8026.

Aloha,

DON HIBBARD, Administrator  
State Historic Preservation Division

cc Mr. Kala'au Wahiaka, Burial Sites Program  
Chair, O'ahu Island Burial Council

700 Bishop Street, Suite 900, Honolulu, Hawaii 96813

December 5, 2000

Mr. Don Hibbard, Administrator  
State Historic Preservation Division  
Kakuhiwea Building, Room 535  
601 Kapiolani Boulevard  
Kapolei, Hawaii 96707

Subject: Kahaoula Street Relief Drain Project Final Environmental Assessment  
(FEA), Sunset Beach, Oahu, Hawaii

Dear Mr. Hibbard:

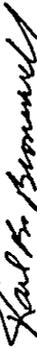
Thank you for your letter of October 24, 2000 commenting on the subject project.

We concur with your recommendations of on-site monitoring by a qualified archeologist during construction activities and the preparation and SHPD review of an archeological monitoring plan. We have included your recommendations in the FEA.

If you have any additional questions or comments regarding the proposed project, please call Mr. Karl Bromwell at 523-8874.

Very truly yours,

Earth Tech Inc.



Karl B. Bromwell, M.P.H.  
Project Manager

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