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August 5, 2003

OFFICE OF ENVIRONMENTAL
QUALITY CONTROL

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 Waimalu Stream
Dredging, TMK: 9-8-07, 9-8-08, 9-8-09, 9-8-23, and 9-8-24,
Aiea, Oahu, Hawaii

The Department of Design and Construction has reviewed the comments received during the 30-day public comment period which began on September 23, 2002. The agency has determined that this project will not have a significant environmental effect and has issued a FONSI. Please publish this notice in the August 23, 2003 OEQC Environmental Notice.

We have enclosed a completed OEQC Publication Form, four copies of the draft EA, and the project summary on disk. Please call Keith Sugihara at 547-7506 if you have any questions.

Very truly yours,

A handwritten signature in cursive script, appearing to read "Eugene A. Steinberger".

for TIMOTHY E. STEINBERGER, P.E.
Director

KS:FK:pto

Encl.

FINAL ENVIRONMENTAL ASSESSMENT

AUG 23 2003

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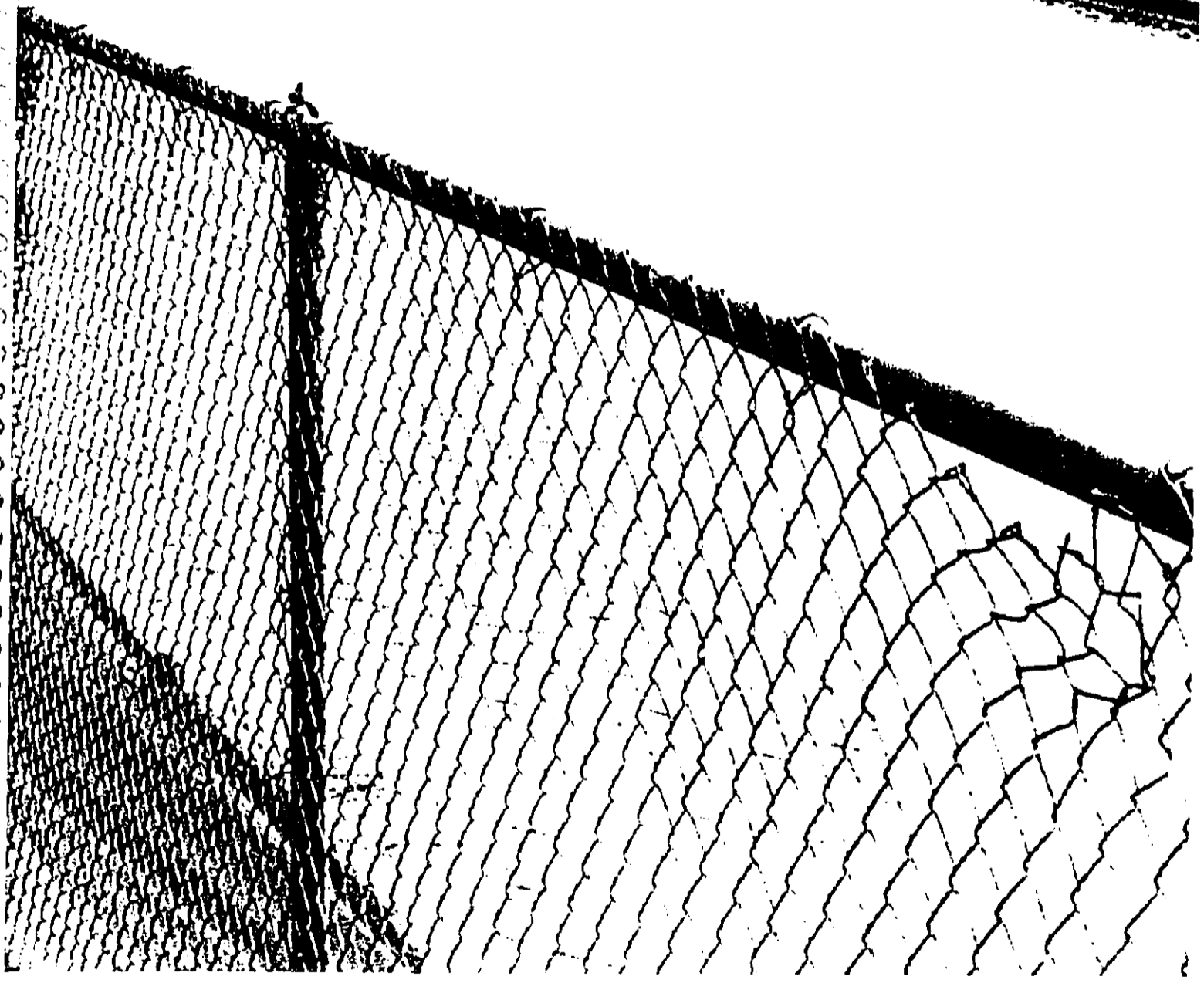
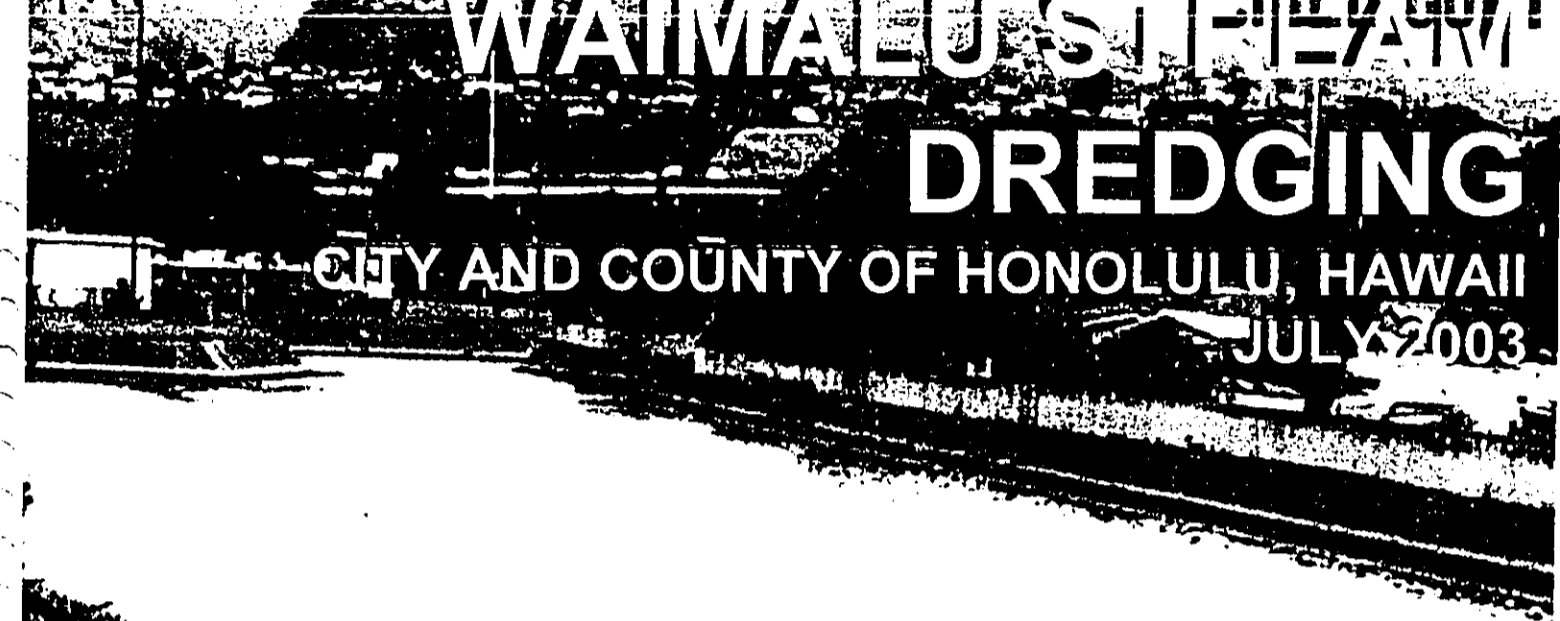
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WAIMALU STREAM

DREDGING

CITY AND COUNTY OF HONOLULU, HAWAII

JULY 2003



FINAL ENVIRONMENTAL ASSESSMENT

WAIMALU STREAM DREDGING

CITY & COUNTY OF HONOLULU, HAWAII

July 2003

Prepared for:

City and County of Honolulu
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SUMMARY SHEET

Project: Waimalu Stream Dredging, CIP No. 00033, Aiea, Oahu, Hawaii. This project is the proposed maintenance dredging of 35,000 cubic yards from the Waimalu Stream Flood Control Project and disposal of the dredged material at the Federally approved ocean disposal site in Mamala Bay.

Short-term Effects: Short term effects will occur during dredging operations. Effects include noise, odors, disruption of flora on and near stream banks, suspended sediments, degrading water quality in Waimalu Stream, dislocation of aquatic life in water column, and destruction of benthic life in the flood control channel.

Long-term Effects: There are no significant long-term adverse impacts to geology, hydrology, flora and fauna, historic resources, hazardous materials, air quality, noise quality and socio-economic resources. The project area is highly urbanized and has been previously modified by filling, grading, paving and facilities development.

The Environmental Assessment concludes that the proposed action does not constitute a major federal action which significantly affects the quality of the human environment. Therefore, neither a Federal nor a State of Hawaii environmental impact statement is required. This assessment has resulted in a finding of no significant impact (FONSI).

Location	Aiea, O'ahu, Hawai'i , City and County of Honolulu
Tax Map Key	9-8-07, 9-8-08, 9-8-09, 9-8-23, and 9-8-24
Project Site	Approximately 20 Acres (water surface area)
State Land Use District & Zoning	Urban Land Use District; R-5 (Residential), P-2 (Park), B-2 (Community Business), I-2 (General Industrial)
Ownership	City and County of Honolulu
Approving Agency	Department of Design and Construction, City and County of Honolulu, 650 South King Street, Honolulu, Hawai'i 96813; Telephone 808-523-4564.
Proposing Agency	Department of Design and Construction, City and County of Honolulu Keith Sugihara, Project Manager), 650 South King Street, Honolulu, Hawai'i 96813; Telephone 808-547-7506.
Consultant	Engineers Surveyors Hawaii, Eric Hee, P.E., Project Manager; 900 Halekauwila St., Honolulu, HI 96814-4057, Telephone: (808) 591-8116; Fax: 593-8101; E-mail – engineers001@hawaii.rr.com.
Associated Consultant	Eugene P. Dashiell, AICP, Environmental Planning, 1314 South King St., Suite 952; Honolulu, Hawai'i 96814; Telephone: (808) 593-8330; E-mail, dashiell@lava.net; www.lava.net/environmental-planning.
Required Permits and Approvals	U.S. Army Corps of Engineers Permit to Dredge and Ocean Dispose; DOH – Water Quality Certification if USACE Issues the Dredging Permit Under the Federal Clean Water Act; DLNR-Commission on Water Resources Management - Stream Channel Alteration Permit; Permission from U.S. Navy to transit Pearl Harbor.

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CHAPTER 1 - PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

This Environmental Assessment (EA) is prepared in accordance with the National Environmental Policy Act (NEPA) and State of Hawaii Chapter 343 of Hawaii Revised Statutes. The EA considers the impacts of the Proposed Action on the environment and the community. The document states the purpose and need for the Proposed Action in Section 1.2. The Proposed Action and alternatives of the Proposed Action are described in Chapters 2 and 3. The affected environment in which the Proposed Action is situated is described in Chapter 4, while the environmental consequences of the alternatives of the Proposed Action are discussed in Chapter 5. Chapter 6 offers a summary of the environmental impacts related to the Proposed Action. Chapter 7 states the expected determination. Chapter 8 lists the agencies and persons consulted. Chapter 9 includes a list of references, a glossary of acronyms, and the EA preparers.

The Proposed Action, by the City and County of Honolulu, is dredging of Waimalu Stream (Figure 1-1) in the reach approximately between the stream mouth at Pearl Harbor upstream to Moanalua Road. The dredged material would be disposed of at the Federally approved ocean disposal site in Mamala Bay (Figure 1-2). The purpose of the Proposed Action is to protect the public health and safety by restoring the design channel capacity of this flood control project. This reach of Waimalu Stream was constructed as a flood control project with concrete lined banks during the period from 1962 to 1970. Maintenance dredging has been previously accomplished in 1988-1989. Figure 1-1 shows the general location of this project in the State of Hawaii.

1.2 PURPOSE AND NEED

The purpose of the Proposed Action is to protect the public health and safety by restoring the design channel peak discharge capacity of the Waimalu Stream flood control project. Periodic maintenance dredging is required in this project. Maintenance dredging has been carried out once previously (1988-1989) after completion of the flood control project in 1970.

Project design standards¹ for this Flood Control Channel are based on a peak discharge from a storm with a one percent chance of occurrence in any given year (100-year recurrence interval). The peak discharge for such a storm in the Waimalu watershed (5,250 acres) is 13,600 cfs (cubic feet per second). Under the present, existing silted conditions, the Waimalu Stream flood control channel has a peak discharge capacity of 9,840 cfs. After completion of the proposed dredging project, the channel's peak discharge capacity will be adequate to accommodate the design flow peak discharge of 13,600 cfs. The following table summarizes these peak flow values.

Project Condition	Peak Flow Capacity in cfs (cubic feet per second) – based on a 100-year recurrence interval
Design Channel	13,600
Existing, Silted Condition	9,840
Proposed Project Condition	13,600

¹City and County of Honolulu, Department of Planning and Permitting, *Rules Relating to Storm Drainage Standards*, January 2000.

CHAPTER 2 - DESCRIPTION OF THE PROPOSED ACTION

2.1 Project Location

The project site is on the island of Oahu in the Hawaiian Islands, central Pacific Ocean. The project is located at Waimalu, Aiea, Island of Oahu, State of Hawaii. TMK (Tax Map Key) 9-8-07, 9-8-08, 9-8-09, 9-8-23 and 9-8-24; and latitude N21 degrees, 25.15 minutes; longitude W157 degrees, 57.14 minutes.

2.2 Project Features

Approximately 35,000 cubic yards of accumulated sediment in the Waimalu Stream Flood Control Project Channel would be dredged and disposed of at the federally approved ocean disposal site in Mamala Bay. Previous maintenance dredging of sediment at this location occurred in 1988-1989 when approximately 55,000 cubic yards of material was dredged and disposed of at the Mamala Bay ocean disposal site.²

2.3 Project Schedule and Cost

A firm schedule for the Proposed Action as not yet been determined and is dependent on funding and agency approvals. Depending on methods of dredging, dewatering and disposal, the cost of the Proposed Action may range between approximately \$1.0 million and \$3.5 million.

2.4 Required Permits and Approvals

Following is a list of formal permits and approvals required at the time of preparation of the draft EA. Other agencies will be reviewing the draft EA with regard to their specific areas of responsibilities. Such agencies include the State of Hawaii Historic Preservation Division (with regard to historic preservation regulations) and the U. S. Fish and Wildlife Service (with regard to the Endangered Species Act).

Approvals: U. S. Navy. Approval from the Navy for civilian commercial ocean-going vessels to transit Pearl Harbor for access to Waimalu Stream is required. The City will work with a Navy point-of-contact for access to the Harbor.

State of Hawaii Department of Planning, Economic Development and Tourism, Office of Planning. A Coastal Zone Consistency Declaration is required if a Department of Army permit is to be issued.

Permits: U. S. Army Corps of Engineers. A permit to dredge and to dispose of material at the federally approved ocean disposal site is required. The Corps will make a determination as to the specific applicable authority which pertains to the proposed project.

State of Hawaii Department of Health. A Water Quality Certification including approval of monitoring and best management practices is required for dredging if a Department of Army permit is to be issued.

State of Hawaii Commission on Water Resource Management. A Stream Channel Alteration Permit is required for dredging.

²Note that over-dredging of this project to increase sediment storage capacity and thereby increase the time between periodic maintenance dredging was not considered in this proposed action because there would be considerable added cost to improve the structural integrity of the bank revetment due to the deeper conditions. Also the portion of the project between Moanalua Road extending approximately 200 feet seaward is lined with concrete.

Coordination has been carried out or is underway between the City and County of Honolulu and:

U.S. Army Corps of Engineers, Honolulu Engineer District

U.S. Environmental Protection Agency³

U.S. Fish and Wildlife Service⁴

U.S. National Marine Fisheries Service⁵

Pacific Division, Naval Facilities Engineering Command; Commander Navy Region Hawaii

State of Hawaii, Department of Health

State of Hawaii, Commission on Water Resource Management

State of Hawaii, Department of Land and Natural Resources, Historic Preservation Division⁶

City and County of Honolulu, Department of Design and Construction

Neighborhood Boards, Community Groups and Individuals

³To be carried out during the permit application process with the U.S. Army Corps of Engineers.

⁴To be carried out during the permit application process with the U.S. Army Corps of Engineers.

⁵To be carried out during the permit application process with the U.S. Army Corps of Engineers.

⁶To be carried out during the permit application process with the U.S. Army Corps of Engineers.

CHAPTER 3 - ALTERNATIVES CONSIDERED

OVERVIEW OF DREDGING, DEWATERING, AND DISPOSAL OF SEDIMENT

Following is a discussion of the basic elements of dredging, dewatering and disposal of sediment.

Dredging. Regarding methods of dredging there are basically two differing techniques which might be applied at Waimalu Stream. Actual selection of the explicit method of dredging may be decided by a contractor during the bidding process and based on the contract specifications. In any event, either method would require careful installation of BMPs (best management practices) to reduce the discharge to State and federal waters of sediment which will be stirred up and placed into suspension during the dredging process.

- The first method involves use of mechanized equipment such as a crane to remove sediment using a clam shell bucket or dragline – it is unlikely that this technique will be applied because of the difficulty of staging equipment within the project reach because clearances between the bottoms of bridges and the surface elevation of the waterway are inadequate to permit the transit of this type of equipment. Also, the urban, built-up area surrounds the project and there is very little land area for access by equipment to the flood control channel.
- The second method – and the technique used in the previous maintenance dredging project in 1988-1989 – is use of a hydraulic or “suction” dredge which “vacuums” the sediment from the channel. In either case, both techniques require the placement of the dredged material into barges for transport or for mechanized dewatering; or into a bermed “dewatering” basin on-shore near the location of dredging. This type of equipment can be mounted on small barges which can enter the dredging area from Pearl Harbor and transit beneath the bridges over Waimalu Stream.

Dewatering. Dewatering of the dredged material may or may not be required, depending upon the final selected method of disposal of dredged sediment. Sediment to be disposed on land typically must be dewatered so that the material can be transported by truck to the disposal location although, if nearby land sites are available the sediment can sometimes be deposited directly by the dredge operation to a combined dewatering-disposal site. Sediment to be disposed of at the ocean site in Mamala Bay would not be dewatered.

There are three basic methods of dewatering. If sediment is to be disposed on land, dewatering will be required. Typically the choice of a specific method is left to the contractor during the bidding process and based on the contract specifications and this is done under strict supervision and controls of construction managers who are required to maintain the permit specifications of the Department of the Army, the State Department of Health or other agencies. Implementation of any of the methods would require careful installation of BMPs (best management practices) to reduce the discharge to State and federal waters of sediment. BMPs are specified in the terms of permits issued by governing authorities. Contractors would be required to meet all requirements of the State of Hawaii Department of Health, the federal Clean Water Act, or other provisions which may be included in authorizing permits.

- The first method of dewatering is placement of the wet dredged sediment within a bermed area on land where the water gradually is discharged via filters back to Waimalu Stream.
- The second method is use of mechanized devices sometimes called “hydro-separators” which separate the water from the solid sediment and after filtering the water is discharged

back to Waimalu Stream. The solids can then be transported to a selected land disposal site usually by truck.

- The third method is through the use of barge mounted equipment where water is separated from the solids. In this case, the water usually discharged after filtration at sea, or near the project area, possibly in Pearl Harbor itself, or within the confines of Waimalu Stream but downstream of all bridges because the low elevation of bridges at this project site probably do not permit the transit of barges with equipment on deck.

Disposal. Disposal (Figure 3-1) may be on land or at the federally approved ocean disposal site in Mamala Bay (five miles offshore, 1,400 feet deep).⁷ ⁸ Land disposal sites have been recently reviewed for the Ala Wai Canal dredging project.⁹ The most promising candidate, the Reef Runway Soil Remediation Facility at Honolulu International Airport has recently been closed to non-airport use by the State Department of Transportation, Airports Division because the site has limited capacity which is required for airport operations, maintenance and future improvements. Within Pearl Harbor, the U.S. Navy is developing a land disposal site on Waipio Peninsula. This site is being developed under a 30 year plan and is intended to be used (because its capacity is limited from Pearl Harbor) for sediment which is contaminated beyond levels acceptable for ocean disposal. Third and fourth sites, Waimanalo Gulch and the Waipahu Ash Fill (both City County of Honolulu, are potentially available for dredge sediment disposal provided the sediments meet the State Department of Health requirements levels of contaminants permissible for deposition in land fills.

Reuse or Recycling. Reuse or recycling of dredged material has been shown to be technically feasible. Typical uses or products include use as landfill cover. Other uses such as for soil amendments or top soil may in some circumstances be possible if contaminant levels are suitably low, but the cost of preparing dredged material for such use is high – the material must be de-watered upon dredging, and then salts removed (because the material is in an estuarine environment it contains salt which is not acceptable for most landscaping purposes. The material is generally not suitable for fill material where loading may occur because of potential shrink-swell problems. Bricks or other building blocks have been manufactured from dredged material in laboratories, but the process is costly. In any of these situations, what first must occur is de-watering to an extent that the material can be transported to an production area or work-site and this is the same difficulty facing other methods of disposal or transport at this particular location – there is no acceptable site for de-watering adjacent to the project area.

The alternatives considered in this EA are discussed below. Per the discussion above, dredging or dewatering may be one of several techniques.

3.1 NO ACTION

The No-Action alternative maintains the existing condition of sedimentation within the Waimalu Stream Flood Control Project. This alternative continues the exposure of community members to the public health and safety hazards of a flood control channel with significantly reduced capacity

⁷U.S. Army Corps of Engineers, *Honolulu Engineer District, Draft Environmental Statement Harbor Maintenance Dredging in the State of Hawaii*, Honolulu, 1975.

⁸U.S. Army Corps of Engineers and U.S. Environmental Protecting Agency, *Special Joint Public Notice Site Management Plan for the Hawaii Ocean Dredged Material Disposal Site*, n.d.

⁹Belt Collins Hawaii, *Ala Wai Canal Dredging Draft Environmental Assessment*, May 1998.

for transporting storm waters from the land away from residences, schools, businesses, roads and highways.

- 3.2 ALTERNATIVE 1 – Dredging, Dewatering at Waipio Peninsula and Disposal at a Land Fill.** In Alternative 1, the Waimalu Stream sediments would be dredged, placed in barges, and hauled to the U. S. Navy's dredge spoil disposal site on land at Waipio Peninsula. Sediments would be stored at this location during the dewatering process. Sediments might then be hauled by truck to a suitable land fill at a later date. Approval for this alternative which is subject to the authority of the U.S. Navy has been denied (See Navy letter in Appendix B). The Navy has a 30 year plan for this facility which is intended as a deposition area for sediments removed from Pearl Harbor which are not eligible for disposal at the federally approved ocean disposal site in Mamala Bay because of elevated levels of contaminants. The U.S. Navy requires this facility for their own use, therefore this alternative is not feasible.
- 3.3 ALTERNATIVE 2 – Dredging, Dewatering at Blaisdell Park and Disposal at a Land Fill.** In Alternative 2, the Waimalu Stream sediments would be dredged and pumped to the existing wetland area adjacent to Blaisdell Park where the sediments would be dewatered.¹⁰ After dewatering the sediments would be hauled by truck to a landfill. This alternative would seem unlikely to be approved because it would commit this two-acre wetland to an approximate 10 to 15 year cycle of use for dredge material dewatering, although from the standpoint of the recurring need for maintenance dredging of the Waimalu Stream flood control channel, use of this area in perpetuity for dewatering would be a practical alternative and the area could be managed as a constructed wetland. If sediments were to be moved later to a permanent disposal site, such site would likely be the City's approved land fill (Waimanalo Gulch).
- 3.4 ALTERNATIVE 3 – Dredging, Dewatering on Barges or by Mechanized Equipment and Disposal at a Land Fill.** In Alternative 3, Waimalu Stream sediments would be dredged and placed on barges within the confines of the Waimalu Stream and adjacent Pearl Harbor area where dewatering would take place through use of mechanized equipment. This alternative is likely to be the most costly because of the higher costs of dewatering through use of mechanized-powered equipment. After dewatering, the sediments would be hauled by truck to a landfill. The permanent disposal site would likely be at an approved site such as Waimanalo Gulch or possibly the Waipahu Ash Fill Site .
- 3.5 ALTERNATIVE 4 - Dredging and Disposal at EPA Approved Ocean Site in Mamala Bay.** In Alternative 4, Waimalu Stream sediments would be dredged and placed on barges which would be towed to the Mamala Bay ocean disposal site for disposal.

Alternative 4 is the recommended alternative for this proposed project because: a) this project was previously dredged for maintenance purposes with no significant impacts and there have been no significant changes in land use patterns or development since that time; b) the material proposed to be dredged is considered to be uncontaminated based on previous studies, c) the watershed land use patterns have been stable; and, d) the historic record of chemical or other releases of contaminants maintained by the State Department of Health which does not show any significant releases of contaminants in the project area.

¹⁰A stockpiling permit from the City and County of Honolulu may be required. Also, permits from the U.S. Army Corps of Engineers would be required, a Water Quality Certification and NPDES permits from the State Department of Health would be required, and the U.S. Fish and Wildlife Service would have to approve the action.

Table 3-1 (next page) compares the alternatives in terms of methods of dewatering, transport to disposal area and location of disposal. Table 3-2 (next page) summarizes the alternatives in terms of locations of disposal, relative financial cost, and location of water quality impacts.

Table 3-1: Comparison of Alternatives			
Alternative Note: All alternatives include the same dredging method.	Method of Dewatering	Method of Transport to Disposal Location	Location of Disposal of Sediment
No Action	NA (Not applicable)	NA	NA
Alternative 1 Dewatering at Waipio Peninsula, disposal there or at Waimanalo Gulch	On land, within confined area	Barge and Truck	Land
Alternative 2 Dewatering at Blaisdell Park Wetland, disposal at Waimanalo Gulch	On land, within confined area	Truck	Land
Alternative 3 Dewatering by mechanized equipment, disposal at Waimanalo Gulch	On barges, in Waimalu Stream and Pearl Harbor	Barge and truck	Land
Alternative 4 (Recommended) Ocean Disposal	None	Barge	Ocean

Table 3-2: Summary of Alternatives			
Alternative Note: All alternatives include the same dredging method.	Location(s) of Disposal and Treatment	Relative Financial Cost (1 = lowest; 4 = highest)	Location of Water Quality Impact
No Action	NA (Not applicable)	NA	NA
Alternative 1 Dewatering at Waipio Peninsula, disposal there or at Waimanalo Gulch	Waipio Peninsula, Waimanalo Gulch	3	Dewatering discharge to Pearl Harbor
Alternative 2 Dewatering at Blaisdell Park Wetland, disposal at Waimanalo Gulch	Blaisdell Wetland, Waimanalo Gulch	2	Dewatering discharge to Waimalu Stream and Pearl Harbor
Alternative 3 Dewatering by mechanized equipment, disposal at Waimanalo Gulch	Waimanalo Gulch	4	Dewatering discharge to Pearl Harbor
Alternative 4 (Recommended) Ocean Disposal	Mamala Bay	1	Mamala Bay, 5 miles offshore

CHAPTER 4 - AFFECTED ENVIRONMENT

This Chapter presents a description of the environment which may be impacted by the Proposed Action. The descriptions are representative of the existing (baseline) environment and are based on historical knowledge, technical studies, previous environmental studies, and site visits.

4.1 Climate

The climate of Hawaii is moderate and can be characterized into two seasons: i) summer, from May 1 to October 31; and ii) winter, from November 1 to April 30. The summer months are normally warm and dry with persistent trade winds (northeasterly winds), while the winter months are wetter and cooler interspersed with Trade winds and Kona winds (southerly winds).

The average annual temperature at Honolulu International Airport (similar in characteristic to the Waimalu Area) varies between 72°F (coolest month) and 81°F (warmest month). The average annual precipitation is 23 inches. The trade winds, or northeasterly winds, typically have a range from 4 to 12 miles per hour, and rarely exceeds 24 miles per hour, though peak gusts have been recorded to 51 miles per hour.¹¹

Annual rainfall within the watershed can range from 30 inches at the Waimalu Stream mouth to 150 inches at the highest elevations near the crest of the Koolau mountains.

4.2 Geology and Groundwater Sources

Geology of the watershed overall reflects the volcanic nature of the Island of Oahu. The Conservation District (76 percent of the total watershed area) is comprised of steep slopes and a highly dissected terrain with highly erodible soils. Typically, in Hawaii, these upland, erodible areas incur the highest rainfall and the most severe soil erosion. The Conservation District is likely to contribute the majority of eroded soil to the accumulated sediments in the Waimalu Stream Flood Control project reach. Because of the absence of urban land uses in the Conservation District, sediment originating in this area from soil erosion will tend to reflect natural background levels which would typically be less than sources reflecting only stormwater runoff from an urban environment.

There are ground water sources and potable water wells which derive their source from the Waimalu aquifer which approximately underlies the Waimalu watershed. This aquifer has a sustainable yield of 45.0 MGD (million gallons per day) and in 1988 a total of 52.6 MGD were withdrawn, resulting in a net deficit of 7.6 MGD.¹²

4.3 Topography

The project area is relatively flat. The actual project area is a flat water surface with a slight downstream sloping bottom.

4.4 Flora

Most of the project site is aquatic. Flora at the site consists of mangrove and grasses along some areas of the stream banks.

¹¹Climate data source, State of Hawaii *Data Book 1995*.

¹²State of Hawaii, Department of Land and Natural Resources, Commission on Water Resource Management, *Oahu Water Management Plan*, Honolulu, March 1990.

4.5 Fauna

Most of the project site is aquatic. During field inspections, water birds were not observed within the project site flood control channel. Aquatic species include tilapia, mullet, papio, mosquito fish, several crab and shellfish varieties.¹³

4.6 Endangered Species

The project area has been extensively disturbed in the past, the flora and fauna of the areas generally consists of non-native species, though there is some beach *naupaka* (a native specie not threatened or endangered). However, the U.S. Fish and Wildlife Service has previously stated that, "Endangered Hawaiian stilt (*Himantopus mexicanus knudseni*) and several species of migratory shorebirds utilize the mud flats near the mouth of Waimalu Stream as loafing and feeding areas."¹⁴

4.7 Historical and Archaeological Resources; Traditional and Cultural Practices; Public Access

Waimalu Stream Flood Control project was constructed with concrete lining of stream banks and the stream bottom was dredged to a depth of approximately -8.0 feet below sea level. There are no known archaeological or historic sites within the area to be dredged. There are archaeological and historic sites in the vicinity. These sites include pre-historic fishponds and historic sites related to Pearl Harbor. Recently, human skeletal remains were found at Blaisdell Park, adjacent to the proposed project site. The remains were identified by State Department of Land and Natural Resources, Historic Preservation Division staff to be more than 50 years old, and possibly 19th century.¹⁵

There are no known traditional or cultural practices at this time for the present project.¹⁶ However, historically, and pre-historically, prior to construction of the present flood control project, native Hawaiians, and other groups used Pearl Harbor and tributary streams such as Waimalu for fishing, gathering, bathing, irrigation and recreation.¹⁷

Public access is available to the stream banks downstream of Kamehameha Highway although the banks are overgrown with mangrove, impeding physical access. Upstream of Kamehameha Highway, access to the flood control channel is restricted by fence due to potential hazards associated with steep channel banks and deep water. Small boats can navigate Waimalu Stream from Pearl Harbor up to Moanalua Road at which point the channel bottom is exposed except during storm flows. However, such boats would need to be launched from some point in Pearl Harbor (however the U.S. Navy forbids civilian access by boat to Pearl Harbor) in order to navigate up the mouth of Waimalu Stream. No closures to public access along the bike path crossing Waimalu Stream are anticipated.

¹³City and County of Honolulu, *Environmental Assessment, Waimalu Stream Dredging Project*, 1986.

¹⁴U. S. Fish and Wildlife Service, Letter to City and County of Honolulu, April 14, 1986.

¹⁵Honolulu Star Bulletin, *Bones at Blaisdell Park part of ancient burial*, February 2, 2000.

¹⁶Project is entirely within much modified stream channel bounded by chainlink fences with sloping concrete banks and no public access for safety purposes.

¹⁷Handy, *Native Planters in Old Hawaii*, Bishop Museum Press, 1972, page 470; and Sterling and Summers, *Sites of Oahu*, Bishop Museum, 1978, pages 46-56.

4.8.1 Watershed

The Waimalu Stream watershed (Figure 4-1) is comprised of approximately 5,250 acres, of which 76 percent (4,000 acres) is not developed and is classified as a Conservation District and 24 percent (1,250) acres is developed and is classified as an Urban District.¹⁸

Photographs of the watershed, land use and stream locations to be dredged are placed following Figure 4-12 (note that all figures are placed following Chapter 9).

4.8.2 Land Use and Ownership

The project site is located in the State of Hawaii, Land Use District Classification of Urban (Figure 4-2). The project is within the confines of the Waimalu Stream Flood Control Project, which is owned by, and was constructed by the City and County of Honolulu (Figure 4-3). Land use within the Urban District is described in the following table.

Land Use	Zoning	Acres (percent)
Residential	R-5 Residential (5,000 sq. ft. minimum lot), A-1 Low-Density Apt., A-2 Medium Density Apt.	1,027 (82%)
Park	P-2 General	89 (7%)
Industrial	I-2 Intensive	78 (6%)
Community Business	B-2 Community Business	56 (4%)
Total Acres		1,250 (100%)

Source: Adapted from City and County of Honolulu zoning maps and data in the City's geographic information system files.

Photographs of typical land uses are located following Figure 4-12. Residential land uses include extensive single family homes with minimum lot sizes of 5,000 square feet (R-5), townhouses (A-1), a variety of parks, some light industrial areas which include automobile sales lots, car repair shops and similar types of businesses (I-2). The service business are classed as Community Business (B-2) and include drive-in restaurants, offices and shops. There are no naval facilities in this project area.

4.8.3 Wetlands

A small wetland (approximately two acres) is adjacent to the west bank of Waimalu Stream at its mouth (Figure 4-4). This wetland, which borders Pearl Harbor is part of Blaisdell Park. The dominant vegetation is pickleweed (*batis maritima*), with some mangrove along the edges of the wetland.

4.8.4 Population

Population in Waimalu has declined slightly since the 1990 census (about 2.0 percent) based on the 2000 U.S. Census results. In 1990, Waimalu had a population of 29,967 and in 2000 the population had decreased to 29,371. During the same 10 year period, the population of the State of Hawaii increased by 9.3 percent, from 1,108,279 to 1,211,537. The implications of this change

¹⁸Estimates of urban land use areas based on available zoning maps from City and County of Honolulu Geographic Information System.

in Waimalu is that this is a stable, not a developing or physically growing community with additional housing units, and that the population is aging with younger people moving out of the area into their own dwellings elsewhere.

4.9 Flood Hazard, Tsunami and Flood Classifications

The Waimalu Stream Channel and surrounding areas are shown as Zone D in the City and County of Honolulu's geographic information system Internet web site (Figure 4-5). The source of the Zone D designation is the Federal Emergency Management Office, Flood Insurance Rate Maps. The Zone D classification is assigned to areas where the flood hazards are "...undetermined, but possible..." (FIRM). At these locations within Pearl Harbor, there is not a tsunami hazard.

4.10 Hazardous and Toxic Wastes

There are no known Hazardous or Toxic Wastes disposal sites in the area. State of Hawaii Department of Health records¹⁹ do not list any toxic or contaminated releases in the Waimalu area since 1990 with two exceptions as follows:

10/10/99 – "Grease in main line, no drain involved" at 98-108 Pahemo Place.

The above case apparently referred to grease in the main sewer line with no involvement of storm drains and it is unlikely that Waimalu Stream was affected by this incident.

12/23/99 – "Sheen on water, gasoline smell" at Blaisdell Park.

The above case may have affected Waimalu Stream, but the records do not clearly state such. Because Blaisdell Park also borders Pearl Harbor, the problem could have occurred in those waters, or the problem could have occurred even on the grounds of the park's parking lot. In any event, this appears to have been a minor incident.

The State of Hawaii Department of Health also does not list any reports of problems with leaking USTs (underground storage tanks) at the project location or vicinity.²⁰

4.11 Air Quality

In general, outdoor air quality at the project site meets federal and state standards because of consistent tradewinds and the absence of significant industrial sources of air contamination.

4.12 Noise

Roadway noise from Kamehameha Highway and Moanalua Road is currently generated by the vehicular traffic, and peaks during rush-hour peaks.

4.13.1 Water Quality

The State of Hawaii designates Waimalu Stream as Class 2. The water quality of Waimalu Stream is described in the following Table 4-2. Water quality for dissolved oxygen may not always meet the State standard of 80 percent saturation.

¹⁹State of Hawaii, Department of Health, HEER (Hazard Evaluation and Emergency Response Office), database 1990 to present.

²⁰State of Hawaii, Department of Health, Hazardous and Solid Waste web site for leaking underground storage tanks.

Parameter	Upstream (Pedestrian Bridge)	Midstream (Bend)	Downstream (Bikeway)	U.S. EPA STORET STA- TION 8000175 ²¹
pH (Units)	6.15	7.00	7.60	7.5 to 8.3
Temperature (C°)	27.5	27	26	24.1 to 29.3
Salinity (ppt)	32.78	33.76	34.18	1.1 to 27.2
Dissolved Oxygen (mg/l)	0.6	3.8	3.8	1.4 to 14
Total Kjeldahl Nitrogen (mg/l)	0.5	1.6	1.7	No equivalent data
Total Phosphorus (mg/l)	0.06	0.11	0.26	No equivalent data
Sources:	City and County of Honolulu ²² EPA STORET (1972)			

On an Island-wide basis, all urban streams on Oahu, including streams discharging to Pearl Harbor, have been posted by the State Department of Health against the consumption of fish, shellfish or crabs because of potential contamination by pollutants in storm water runoff. Such postings are also to warn of the risk of leptospirosis.

4.13.2 Sediment

The quality of sediment to be dredged has been previously described in an environmental assessment.²³ These sediments also passed bio-assay testing and the complete report of that testing is included as Appendix A of this present Environmental Assessment. Because there have been no major changes in land uses within the watershed of this project since the previous sediment testing, major changes in sediment quality are considered to be unlikely, therefore the present sediments are considered suitable for disposal at the South Oahu Dredged Material Ocean Disposal Site (SODMODS) because the proposed dredged material is not likely to exceed the bioassay and bioaccumulation results referenced for January 1988.

The quantity of sediment proposed to be dredged (Figures 4-7 through 4-12) is 35,000 cubic yards which has accumulated since the time of the previous maintenance dredging project which was completed in 1988, about 13 years ago. At that time, 55,000 cubic yards of material which had accumulated since completion of construction of the project in 1972, were dredged. The approximate annual rate of sedimentation is estimated to be 3,100 cubic yards per year.²⁴ Contribution to the total sediment yield in this watershed has been estimated to be 96 percent

²¹U. S. Environmental Protection Agency, STORET LDC - Detailed Data Report Station 80000175 Pearl Harbor in Waimalu Stream, various sampling dates, March 2 to July 13, 1972.

²²City and County of Honolulu, Environmental Assessment for Waimalu Stream Maintenance Dredging Project, September 23, 1986. Date of sampling September 29, 1981.

²³City and County of Honolulu, Environmental Assessment for Waimalu Stream Maintenance Dredging Project, September 23, 1986. Date of sampling September 29, 1981.

²⁴Estimated rate of sedimentation is calculated as follows: 2001 - 1972 = 29 years; 55,000 + 35,000 = 90,000 cubic yards; 90,000/29 = 3,100 cubic yards per year.

(Conservation District, 76 percent of the land area) and 4 percent (Urban District, 24 percent of the land area).²⁵

Sediment particle size is described in the following table. The sediment sizes tends towards finer material (very fine sand and silt) which reflects the sediment origin, the uplands in the watershed.

Table 4-3: Sediment Particle Size, Waimalu Stream (Figure 4-6)		
Particle Diameter (mm) (Hydrometer Analysis)	Percent Passing Sampling Site #1	Percent Passing Sampling Site #2
0.055 (very fine sand)	38	
0.031 (silt)		20
0.030 (silt)	28	
0.016 (silt)		14
0.015 (silt)	16	
0.010 (silt)	9	11
0.007 (silt)		4
0.003 (clay)	4	
Grading Analysis (Sieves)		
1 - inch (gravel)		100
½ - inch (gravel)	100	
#4 (5 mm) (gravel)	97	75
#200 (0.075mm) (very fine sand & silt)	40	21
Source: City and County of Honolulu ²⁶		

²⁵Freeman, William, report prepared for State Department of Health, Environmental Planning Office, *Revised Total Maximum Daily Load Estimates for Six Water Quality Limited Segments, Island of Oahu, Hawaii*, November 1993.

²⁶City and County of Honolulu, *Environmental Assessment for Waimalu Stream Maintenance Dredging*, September 23, 1986. Date of testing, June 16, 1986.

Parameter (mg/dry kg) ²⁷	Sampling Site #1	Sampling Site #2
Oil & Grease	2600*	470
Chlordane	0.07	0.04
Lindane	ND	ND
DDD	ND	ND
DDE	ND	ND
DDT	ND	ND
Dieldrin	ND	ND
Heptachlor	ND	ND
Heptachlor Epoxide	ND	ND
Mercury	0.05	0.08
Copper	270	120
Lead	61	37
Zinc	320	87
Nickel	370	170
Chromium	420	180
Cadmium	0.38	0.06
*Sulfur interference		
ND (<i>Not Detected</i> , as stated in the referenced report)		
Note: Limits of detection are not stated in the reference document.		
Source: City and County of Honolulu ²⁸		

4.14 Coastal Zone Management.

The entire Island of Oahu is within the Coastal Zone Management area and the Waimalu Stream Dredging project area is required to meet the provisions of the federal Coastal Zone Management Act, the Hawaii State Coastal Zone Act, and related laws and rules of the City and County of Honolulu. These requirements are being met as follows. The application for a U.S. Army Corps of Engineers Permit to dredge and dispose at the federally approved ocean disposal site is accompanied by a Declaration of Consistency with the Coastal Zone Management Act. The State of Hawaii Department of Business, Economic Development and Tourism, Office of Planning reviews this "Consistency Declaration" for compliance with the State of Hawaii's Coastal Zone Management Act. Application for such a permit may be required, depending on decisions yet to be

²⁷Mg/kg (milligrams per kilogram) equivalent to ppm (parts per million).

²⁸City and County of Honolulu, *Environmental Assessment for Waimalu Stream Maintenance Dredging*, September 23, 1986. Date of testing, June 16, 1986.

made by the Corps of Engineers regarding the type of permit which will be required for the proposed project. In conformance with applicable rules of the City and County of Honolulu, "Routine maintenance of existing streams, channels and drainageways..."²⁹ is excluded from the requirement of a Special Management Area Permit. The boundary of the Special Management Area extends from the shoreline at Pearl Harbor to Kamehameha Highway and most of the proposed dredging actually would occur outside of the SMA area, upstream of Kamehameha Highway. This is considered to be a routine action which has previously been accomplished in 1987-1988. The nature of the proposed work is considered to be consistent with the coastal zone management plan and policies of the State of Hawaii. However, should such a permit be required, an appropriate application would be made.

4.15 Traffic

Waimalu Stream itself does not generate or affect traffic, but major roads (Kamehameha Highway, Moanalua Road, H-1) cross the stream at different bridge locations.

4.16 Solid Waste

There are no solid waste facilities in the project area or watershed.

4.17 Sanitary Sewer

There are sanitary sewer lines serving the developed areas within the watershed, and sewer lines cross Waimalu stream at several locations.

4.18 Stream Water

Waimalu Stream is classified as a perennial stream by the State of Hawaii Commission for Water Resource Management.³⁰ The stream is gaged (Gage # 223000) with more than 50 years of record. Stream flow at the gaging station exceeded 1.3 cubic feet per second (approximately 0.8 million gallons per day) 50 percent of the time (median annual stream flow).

4.19.1 Pearl Harbor Sediment

Sediments in Pearl Harbor have been characterized by the State of Hawaii Department of Health as follows:

Pearl Harbor sediment's study. The Navy is conducting a study of the sediments in the Pearl Harbor basin to determine what effect the Navy's operation at Pearl Harbor has had on the harbor itself. The site encompasses the entrance channel to the estuary, West Loch, Middle Loch, East Loch and Southeast Loch. Naval operations conducted adjacent to the site have included fuel storage, handling, transfer and recycling facilities as well as operation, maintenance and support facilities and military landfills. Past waste handling and disposal methods, although acceptable at the time, may have caused unexpected long-term problems at some locations through the release of toxic and hazardous substances into the soil and ground water at sites surrounding the estuary as well as the estuary itself. The Navy has developed a sampling and analysis plan for the remedial investigation (RI) of the harbor sediments. The sampling of the sediment and the fish in the harbor was completed in November 1996. Analytical results of sediment and fish and crab tissue have been received. The evaluation of the analytical results of fish and crab tissue showed PCB and pesticide contamination. As a result, the

²⁹City and County of Honolulu, *Revised Ordinances of Honolulu*, Chapter 25, Article 1, Section 25-1.3, Paragraph (2)(C).

³⁰State of Hawaii, Commission on Water Resource Management, *Hawaii Stream Assessment*, December 1990, Honolulu.

Department of Health issued a fish advisory against eating fish caught in Pearl Harbor.^{31 32}

The area to be dredged of the Waimalu Stream Flood Control Project functions as a sedimentation basin which serves as a best management practice in reducing the discharge of land-origin sediment to Pearl Harbor. The benefit to Pearl harbor in lessened sediment inflow is approximately 3,100 cubic yards annually. The impact of the proposed maintenance dredging will be to restore the present channel capacity to its original design. However, over time, based on historic sedimentation at this facility, that channel capacity will be reduced. The only occurrence of increased flow to Pearl Harbor would be when a severe rainstorm causes high flows, approaching the one percent chance of occurrence (so-called 100 year storm) in which case there would be direct flow-discharge via the channel mouth to Pearl Harbor. It is also likely that a storm of this intensity would re-suspend sediment trapped in the basin and discharge some or much of that material to Pearl Harbor. If the project is not undertaken, and a severe storm (1 percent chance of occurrence) occurs, then the residential and commercial areas surrounding the project which are intended to be protected from flooding under such circumstances would be flooded and Pearl Harbor would receive the overland flow product of such an event.

Because there have been no major changes in land uses within the watershed of this project since the previous sediment testing, major changes in sediment quality are considered to be unlikely, therefore the present sediments are considered suitable for disposal at the South Oahu Dredged Material Ocean Disposal Site (SODMODS) because the proposed dredged material is not likely to exceed the bioassay and bioaccumulation results referenced for January 1988.

4.19.2 Comparison of Metals in Hawaii's Soil and Sediments

The following table compares levels of metals in typical Hawaii soils and sediments at several locations.³³ The data show that natural levels of metals in Hawaii soils are typically high and of similar magnitude as the levels of metals found in sediments. High levels of lead may tend to reflect the effects of the use of leaded gas in the past. Studies from other urban watershed areas with high volumes of vehicle traffic such as Palo Alto, California show high levels of cadmium, lead and zinc may be related to releases of contaminants from vehicles, brake pads/linings, and tires. Vehicle contaminants are likely to be a component of the source of some metals in Waimalu Stream because there are no industrial process discharges in that watershed.

Because there have been no major changes in land uses within the watershed of this project since the previous sediment testing, major changes in sediment quality are considered to be unlikely, therefore the present sediments are considered suitable for disposal at the South Oahu Dredged

³¹State of Hawaii, Department of Health, Hazard Evaluation and Emergency Response Office, 1999 Annual Report.

³²

The Navy has sediment data and test results for Pearl harbor, and the nearest station to the downstream limit of the proposed project is approximately 600 feet. In discussions with Navy staff, there was concurrence that this nearest station and others for that matter could not be said to represent discharges from Waimalu Stream for two reasons. The first being that the station is in Pearl Harbor itself and appears to reflect conditions there when compared to other stations there. The second reason is the 600 foot distance from the downstream limit of the proposed project which is an extension of the mouth of Waimalu Stream below Kamehameha Highway and in which it appears that sedimentation also occurs, however this area is not intended to be dredged because it is not part of the subject flood control project.

³³U.S. Army Engineer District, Honolulu, *Draft Environmental Statement Harbor Maintenance Dredging in the State of Hawaii*, Honolulu, June 1975.

Material Ocean Disposal Site (SODMODS) because the proposed dredged material is not likely to exceed the bioassay and bioaccumulation results referenced for January 1988.

Table 4-5: Metals in Hawaii's Soil and Sediments (ppm)					
Metal	Hawaii Soils (mean)	Waimalu Str. (mean) ³⁴	Pearl Harbor	Hawaii Harbors (mean)	Ala Wai Canal (range) ³⁵
Mercury	0.68	0.07	1.1	0.26	ND to 0.9
Cadmium	1.02	0.22	1.2	3.67	0.17 to 0.89
Lead	19.7	49	115	82.0	59.5 to 289
Zinc	94.0	204	75	103.5	61.8 to 239

Notes: ND (*None detected*, as reported by referenced document.)

Sources:

Ala Wai Canal – Belt Collins Hawaii, December 1997

Hawaii, Pearl Harbor, Hawaii Harbors – U.S. Army Corps of Engineers, quoted in City and County, *EA for Waimalu Stream Maintenance Dredging*, 1986.

Waimalu Stream – City and County, see footnote.

³⁴City and County of Honolulu, *Environmental Assessment for Waimalu Stream Maintenance Dredging*, September 23, 1986. Date of testing, June 16, 1986.

³⁵Belt Collins Hawaii, *Ala Wai Canal Dredging Conceptual Design and Environmental Assessment Dredge Sediment Characterization Tier II Field Trip Report # 2 and Tier II Laboratory and Data Report #2*, December 29, 1997.

CHAPTER 5 - ENVIRONMENTAL CONSEQUENCES

5.1 Climate

None of the alternatives are anticipated to have any significant impacts on climate, regional or local.

5.2 Geology and Groundwater Sources

None of the alternatives are anticipated to have any significant impacts on geology or groundwater sources, regional or local.

5.3 Topography

None of the alternatives are anticipated to have any significant impacts on topography, regional or local. Bathymetry of the flood control channel will be restored to design capacity.

5.4 Flora

None of the alternatives are anticipated to have any significant impacts on flora, regional or local.

5.5 Fauna

None of the alternatives are anticipated to have any significant impacts on fauna, regional or local.

5.6 Endangered Species

None of the alternatives are anticipated to have any significant impacts on endangered species, regional or local.

5.7 Historical and Archaeological Resources

None of the alternatives are anticipated to have any significant impacts on historical or archaeological resources, regional or local.

5.8.1 Watershed

None of the alternatives are anticipated to have any significant impacts on the watershed.

5.8.2 Land Use and Ownership

None of the alternatives are anticipated to have any significant impacts on land use or ownership, regional or local, except in-so-far as to maintain the existing condition through provision of flood channel peak flow capacity which the existing built-up developed areas depend upon for health and safety.

5.8.3 Wetlands

Alternative 2 (Dredging, Dewatering at Blaisdell Park and Disposal at a Land Fill) would adversely impact the 2-acre Blaisdell wetland.

5.8.4 Population

No action would adversely affect population. All alternatives benefit the population by providing for health and safety with regard to lessened flood hazards.

5.9 Flood Hazard, Tsunami and Flood Classifications

None of the alternatives are anticipated to have any significant impacts on flood hazards, tsunami or flood classifications, regional or local. However, no action would result in deferral of dredging to maintain channel capacity which could lead to an increased risk of flooding over surrounding lands and a concomitant change in flood zone designations by the Federal Emergency Management Office as depicted on the FIRM map for the area.

5.10 Hazardous and Toxic Wastes

None of the alternatives are anticipated to have any significant impacts on hazardous or toxic wastes, regional or local.

5.11 Air Quality

None of the alternatives are anticipated to have any significant impacts on air quality, regional or local.

Short term ambient air quality, may be slightly degraded due to implementation of the proposed plan. Such conditions would be due to emissions from the construction equipment and vehicles which may slightly and temporarily impact air quality in the area.

Mitigation. The short-term construction impacts on air quality will be mitigated by compliance with the State of Hawaii, Department of Health rules and regulation on construction activities.

5.12 Noise

Construction activities will cause short-term noise impacts in the area. However, these impacts are not expected to be significant. A noise permit could be required by the Department of Health if the proposed equipment to be used in the dredging operation would be operated outside of normal working hours (7:00 AM to 5:30 PM, weekdays) or at night.

5.13.1 Water Quality

Water quality in the vicinity of the dredging operations will be temporarily degraded during dredging operations which will be segregated from existing water bodies and stream flow through the use of best management practices approved by the State of Hawaii Department of Health.

During construction, Alternatives 1, 2 and 3 will temporarily impact water quality in Waimalu Stream and/or Pearl Harbor. Such impacts would be mitigated through implementation of best management practices during construction such as use of silt fences, settling ponds or "hydro-separators", silt fences and similar techniques.

5.13.2 Sediment

All alternatives will have minor impacts on the benthos at the dredging site within the project boundaries of Waimalu Stream. Because of the marginal quality conditions in this area, the effects will be short-term and the area will gradually become filled with sediment over time and return to a condition similar to that at present.

5.14 Coastal Zone Management

These alternatives are not expected to affect Coastal Zone Management Area programs, activities, plans or policies. A Coastal Zone Consistency Declaration will be filed with the State of Hawaii as part of the application for the U.S. Army Corps of Engineers permit to dredge and dispose of the sediment.

5.15 Traffic

Alternatives 1, 2, and 3 require use of trucks on public roadways to transport dewatered sediment to the landfill site and there would be adverse but temporary impacts on traffic during those periods.

5.16 Solid Waste

Alternatives 1, 2, and 3 require disposal at a landfill of the dewatered sediment there would be a permanent impact in terms of a lessened ultimate capacity of the land fill to accommodate other wastes.

5.17 Sanitary Sewer

There would be no impacts on the sanitary sewer system from any of the alternatives.

5.18 Stream Water

Water quality in the vicinity of the dredging operations will be temporarily degraded during dredging operations which will be segregated from existing water bodies and stream flow through the use of best management practices approved by the State of Hawaii Department of Health.

Alternatives 2 and 3 will temporarily, during construction, adversely impact water quality in Waimalu Stream. Such impacts would be mitigated through implementation of best management practices during construction such as use of silt fences, settling ponds or "hydro-separators", silt fences and similar techniques.

5.19.1 Pearl Harbor Sediment

There would be little or no impact on sediment in Pearl Harbor because dredging, dewatering and disposal operations will occur in conjunction with best management practices under authority of the State of Hawaii Department of Health and the U.S Army Corps of Engineers, to reduce the effects of construction operations. There are benefits to Pearl Harbor under all alternatives because the proposed maintenance dredging will retain the capability of the City and County of Honolulu's Waimalu Stream Flood Control project to capture sediment and prevent its discharge to Pearl Harbor.

Over time, based on historic sedimentation rates at this flood control facility, the channel capacity is gradually reduced due to annual estimated sedimentation rates of 3,100 cubic yards. Each year this facility captures 3,100 cubic yards of sediment which in the absence of this facility would be transported to Pearl Harbor via Waimalu Stream flow.

5.19.2 Metals in Hawaii's Soil and Sediments

Alternatives 1, 2 and 3 dispose of the dredged material which includes metals at a landfill. Alternative 4 disposes of dredge material offshore at the approved ocean disposal site. The impacts are considered to be marginal.

CHAPTER 6 - MITIGATION

Mitigation for implementation of alternatives

Prior to construction, if necessary depending on method or location of dewatering to be applied, resources will be protected by requiring the contractor to develop and implement an erosion control plan compatible with the State of Hawaii, Department of Health, "Best Management Practices". This plan will include dust control measures.

Cultural resource protection will require that the contractor notify the contracting office, construction manager, and the State of Hawaii, Historic Preservation Office in the event that archaeological artifacts are encountered.

This Environmental Assessment concludes that an Environmental Impact Statement (EIS), as defined by the Council on Environmental Quality (CEQ) Regulations, 40 CFR 1500, and the National Environmental Protection Act (Public Law 91-190) is not required.

It is recommended that a Finding of No Significant Impact (FONSI) be prepared and a notice of availability of the EA and FONSI be published in the State of Hawaii, Department of Health, Office of Environmental Quality "Environmental Notice" publication.

CHAPTER 7 - EXPECTED DETERMINATION

- 7.1 Finding of No Significant Impact (FONSI).** The proposed improvements will not have a significant effect on the environment and therefore preparation of an environmental impact statement is not required. This document constitutes a Notice of Negative Declaration/Finding of No Significant Impact for the proposed project. This determination was based on review and analysis of the "Significance Criteria" in Section 11-200-12 of the Hawai'i Administrative Rules, as documented below and after a review of the guidelines for preparation of environmental impact assessments by the U.S. Council on Environmental Quality.
- 7.2 Findings and reasons supporting the determination including justifying evidence.**
- 7.2.1** *No irrevocable commitment to loss or destruction of any natural or cultural resource would result.* There are no sites within the project boundaries, nor would any sites outside the project boundaries be affected.
- 7.2.2** *The proposed project would not curtail the range of beneficial uses of the environment.* The proposed project will in fact enhance the beneficial use of the environment of Pearl Harbor by its continued operational effectiveness in preventing the movement of eroded soil from the Waimalu watershed into Pearl Harbor.
- 7.2.3** *The proposed project would not conflict with the state's long-term environmental policies or goals and guidelines.* The state's environmental policies and guidelines as set forth in Chapter 344, Hawai'i Revised Statutes, "State Environmental Policy", encompass two broad policies: conservation of natural resources, and enhancement of the quality of life. The proposed project will both conserve and enhance the natural resources of Pearl Harbor, and enhance the health and safety of adjacent residents, workers, commuters and customers by providing for continued flood protection.
- 7.2.4** *The proposed project will improve the economic and social welfare of the community and the state.* The proposed improvements add to the benefits available to residents and visitors by maintaining the flood carrying capacity of the Waimalu Stream channel and thereby allowing unimpeded traffic, business, and residential life.
- 7.2.5** *The proposed project would not substantially affect public health.* The proposed improvements will benefit public health because of improvement to the channel capacity and continued prevention of flood hazards.
- 7.2.6** *No substantial secondary impacts, such as population changes or effects on public facilities, are expected.* The project will not alter the present use of the area and will not cause population changes nor will there be any effects on existing public facilities. The area has actually had a slight population decrease in the last 10 years implying that the project is not inducing population growth.
- 7.2.7** *No substantial degradation of environmental quality is expected due to the proposed project.* Construction activities would have potential short-term impacts on ambient environmental quality, although these impacts are expected to be minor. In the long

term, the completed project will improve the environmental quality of the surrounding community due to maintenance of the flood protection benefits.

- 7.2.8 *No cumulative effect on the environment or commitment to larger actions will be involved.* The proposed improvements affect only the existing project and are part of the required maintenance of the facility.
- 7.2.9 *No rare, threatened or endangered species or their habitats are affected.* No impacts are anticipated on any candidate, proposed or listed endangered species or their habitats. There are no known threatened/endangered species or their habitats within the project limits. There are known areas where Hawaiian stilts may frequent, and these will not be affected by the proposed project as recommended.
- 7.2.10 *The proposed project will not detrimentally affect air or water quality or ambient noise levels.* Construction activities may cause short-term impacts to air, noise and water quality which will be mitigated to the extent practicable.
- 7.2.11 *The proposed project will not detrimentally affect environmentally sensitive areas such as flood plains, tsunami zones, beaches, erosion-prone areas, geologically hazardous lands, estuaries, fresh waters or coastal waters.* The proposed project is maintenance of an existing flood control channel and no structural changes are proposed.
- 7.2.12 *The proposed project will improve scenic vistas and view planes identified in county or state plans or studies.* The proposed improvements have no impact on scenic vistas because the water surface elevation will remain the same as the existing condition after the project is completed.
- 7.2.13 *There will be no requirement for substantial energy consumption.* Construction of the project will not require substantial energy consumption.

CHAPTER 8 - AGENCIES AND PERSONS CONSULTED OR TO BE CONSULTED & PERMITS REQUIRED

The following agencies or groups have been consulted with regard to the draft environmental assessment or will be consulted during the application for permit process for the proposed project. The following permits or approvals are or may be required.

Agency or Person to be Consulted	Permit or Approval Required
Department of the Army, Corps of Engineers, Honolulu Engineer District	Permit required to dredge and ocean dispose of dredged material.
Department of the Navy, Pacific Division, Naval Facilities Engineering Command; Commander Navy Region Hawaii.	Permission/approval required to transport dredged material via barge or ocean-going vessel through Pearl Harbor, and /or to dewater or dispose of dredged material at Waipio Peninsula.
Department of Interior, Fish and Wildlife Service	Coordination required per the federal Endangered Species Act
Department of Commerce, National Marine Fisheries Service	Coordination required per the federal Coastal Zone Management Act
U.S. Environmental Protection Agency	Coordination required per the federal Clean Water Act
State of Hawaii Department of Health	Water Quality Certification will be required if the Corps intends to issue a permit to dredge per the federal Clean Water Act.
State of Hawaii Commission on Water Resource Management	Stream Channel Alteration Permit required to dredge.
State of Hawaii, Department of Land and Natural Resources, Historic Preservation Division	Coordination required with the State Historic Preservation Officer per the federal Historic Preservation Act.
City and County of Honolulu, Department of Design and Construction	Approval of the EA required.
Neighborhood Boards	Coordination required and will be done through circulation of the EA for public comment.
Community Groups	Coordination required and will be done through circulation of the EA for public comment.
Individuals	Coordination required and will be done through circulation of the EA for public comment.

Coordination with the Department of the Navy has resulted in their rejection of Alternative 1, which would dispose of the dredge material at Waipio Peninsula (See Appendix B for a copy of this letter). The Navy is also concerned about security issues related to navigation of dredge material via barge or scow through Pearl Harbor from Waimalu Stream to the Mamala Bay EPA - approved deep ocean disposal site, however their letter of October 23, 2003 indicates a willingness to coordinate the project. After processing of this environmental assessment and during applications for actual permits to dredge and dispose of the accumulated sediment, further communications will be entered into with the Navy to obtain permission to transit Pearl Harbor to the disposal site in Mamala Bay.

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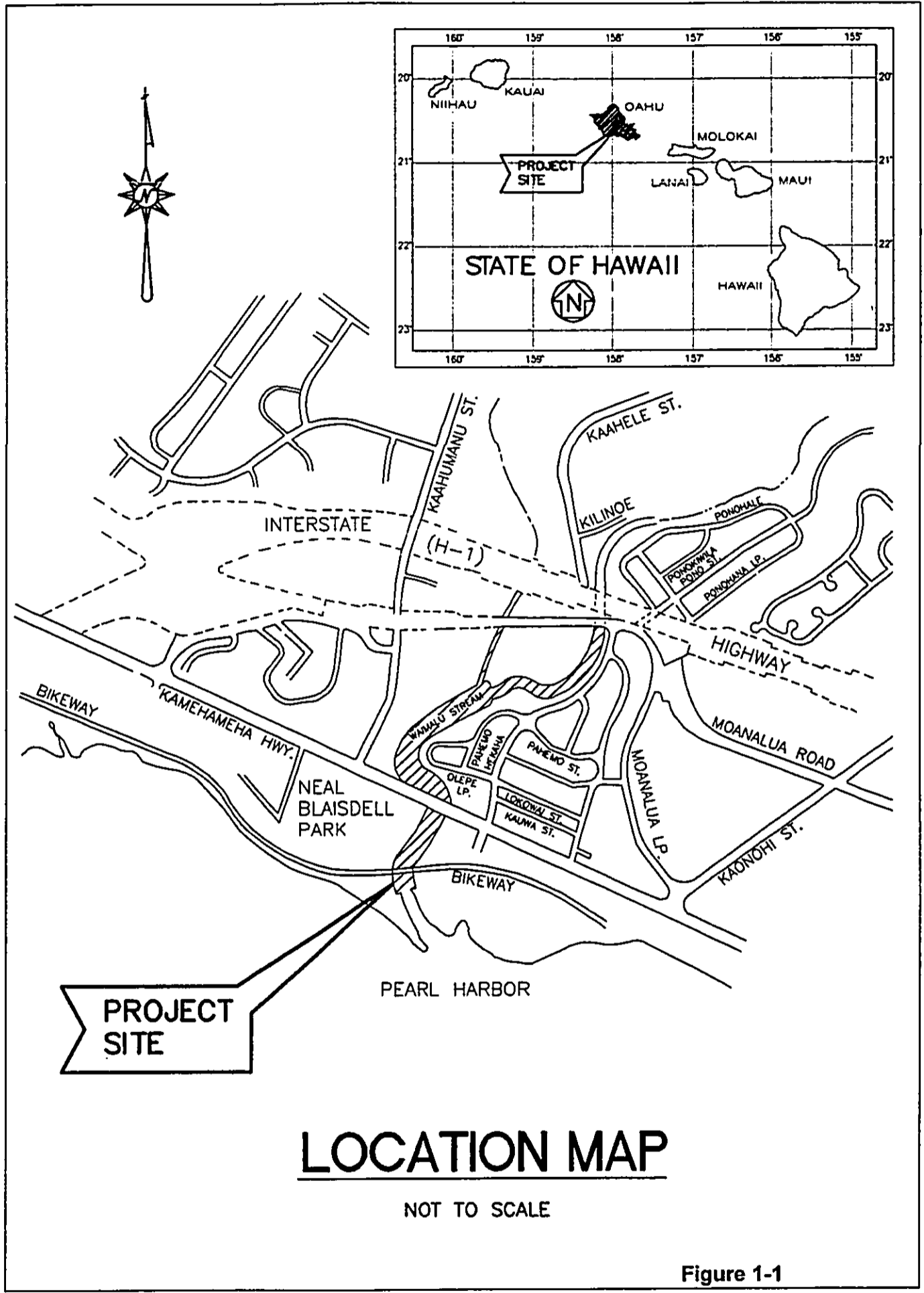
GLOSSARY OF ACRONYMS

CEQ	Council on Environmental Quality
COE, USACE	U.S. Army Corps of Engineers
CFR	Code of Federal Regulations
CFS	Cubic Feet per Second
CZM	Coastal Zone Management
DLNR	Department of Land and Natural Resources, State of Hawaii
DOD	Department of Defense, U. S.
DOH	Department of Health, State of Hawaii
EA	Environmental Assessment
EIS	Environmental Impact Statement
HEER	Hazard Evaluation and Emergency Response, DOH, State of Hawaii
SHPO	State Historic Preservation Officer, DLNR, Historic Preservation Division
SMA	Special Management Area
USFWS	U.S. Fish and Wildlife Service, Department of the Interior
NMFS	National Marine Fisheries Service, U.S. Department of Commerce

ENVIRONMENTAL ASSESSMENT PREPARERS

CONSULTANT

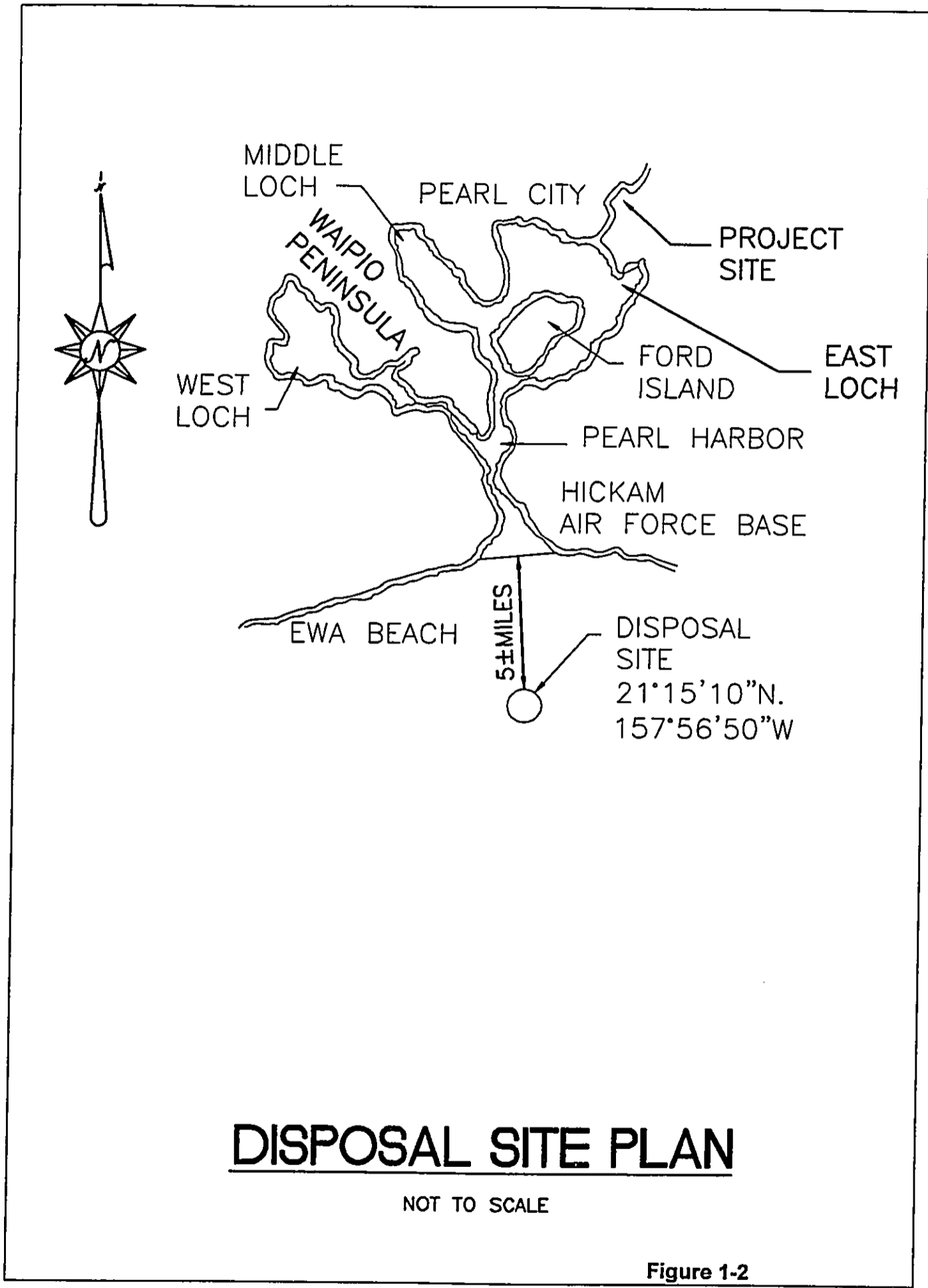
Name:	Eugene P. Dashiell, Member, American Institute of Certified Planners
Company:	Environmental Planning Services
Area of Expertise:	Environmental Planning and Analysis
Years of Experience:	25 years



LOCATION MAP

NOT TO SCALE

Figure 1-1



Dredging and Alternate Disposal Sites

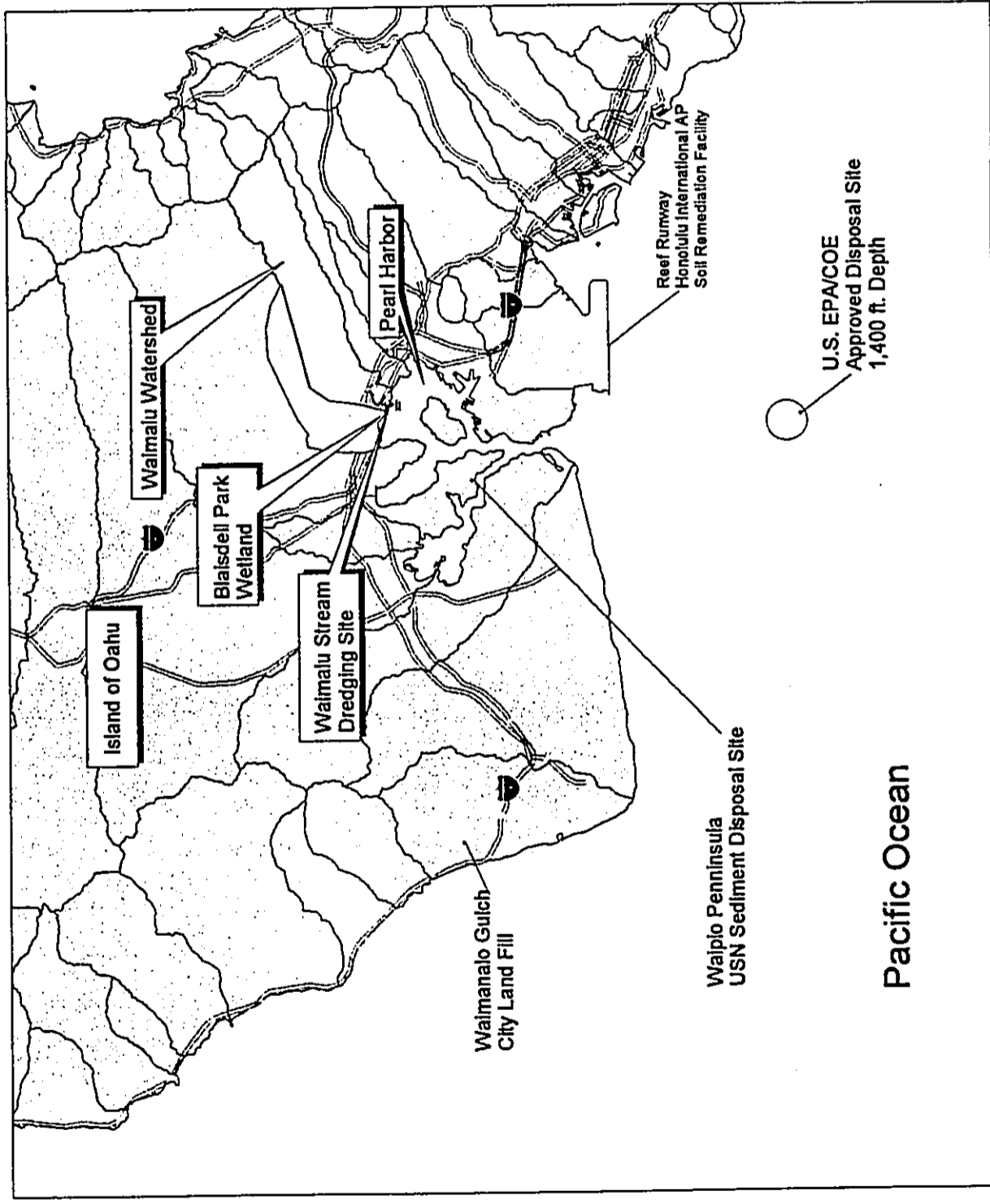


Figure 3-1

Waimalu Stream Watershed - Land Use & Zoning 2001

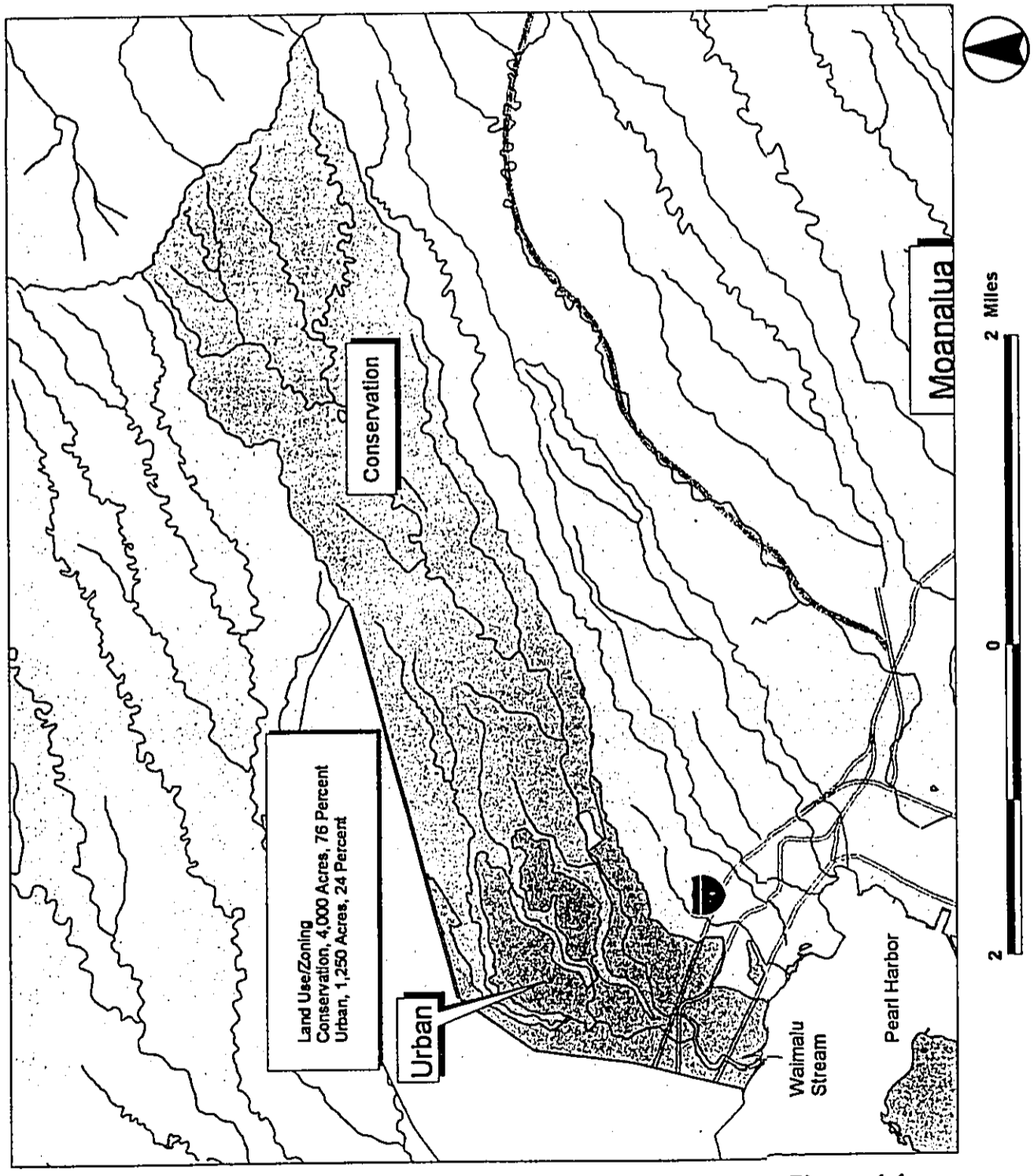


Figure 4-1

Waimalu Stream Watershed - Urban Land Use

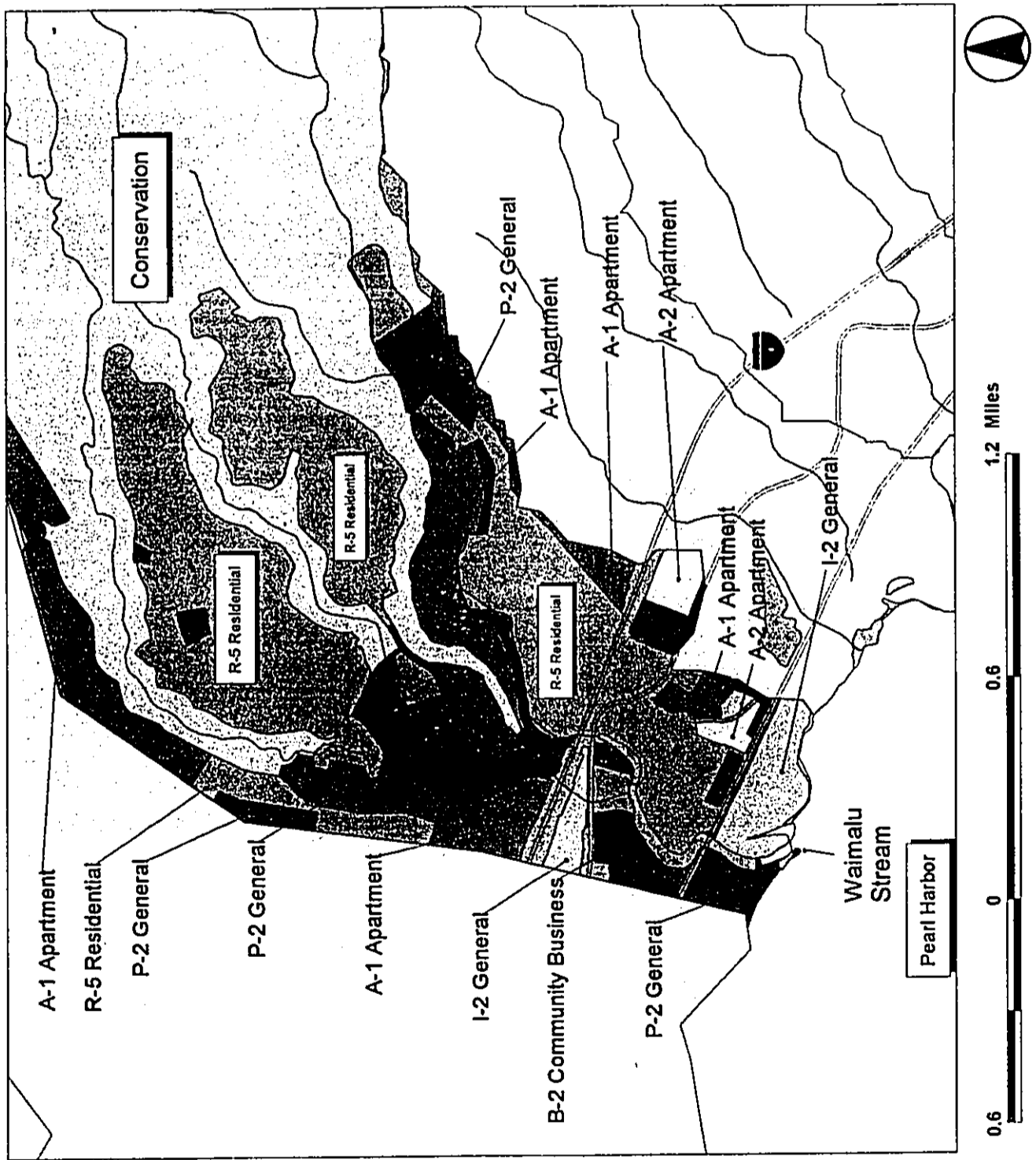


Figure 4-2

Waimalu Stream -- Ownership

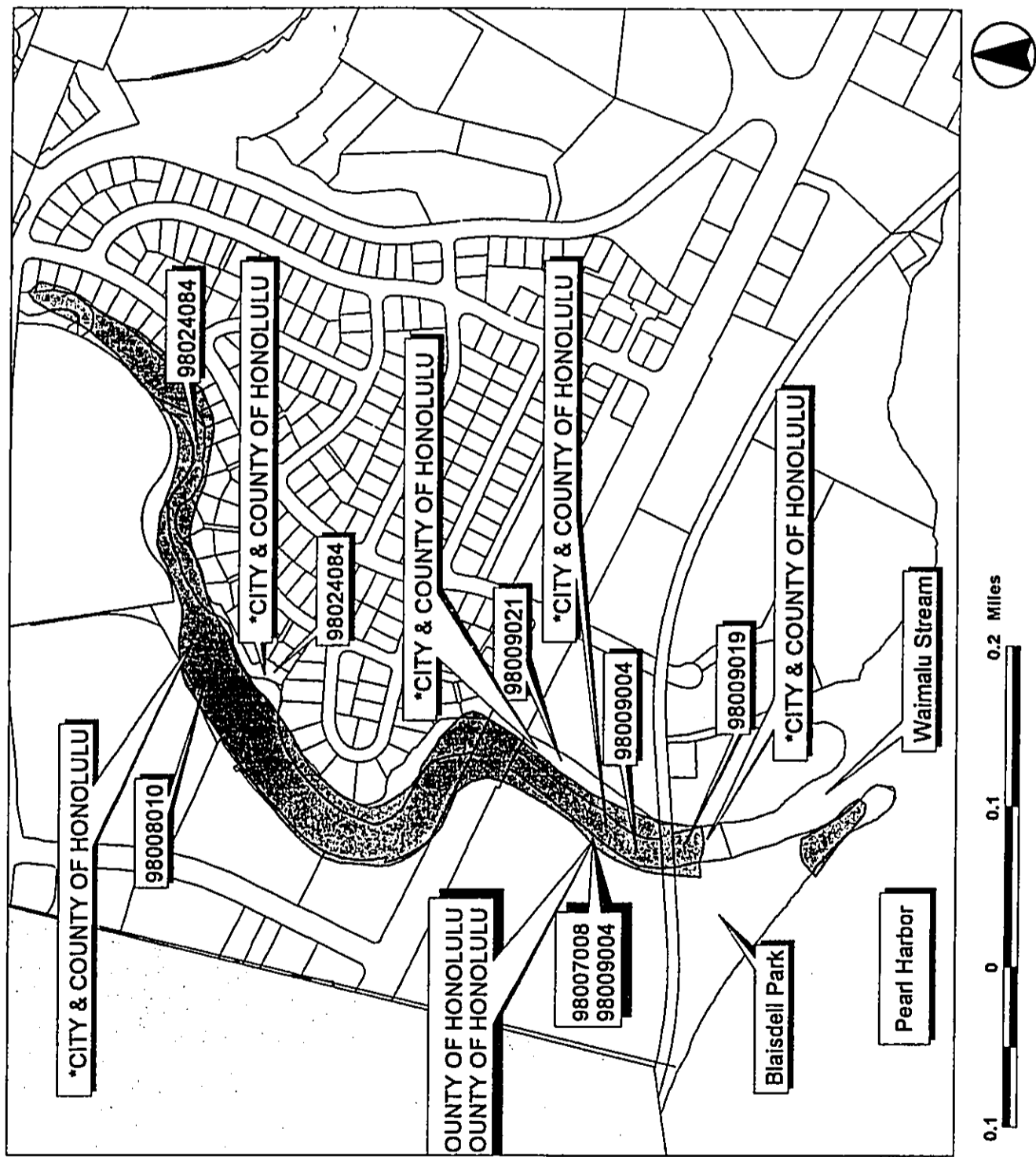


Figure 4-3

Waimalu Stream Mouth

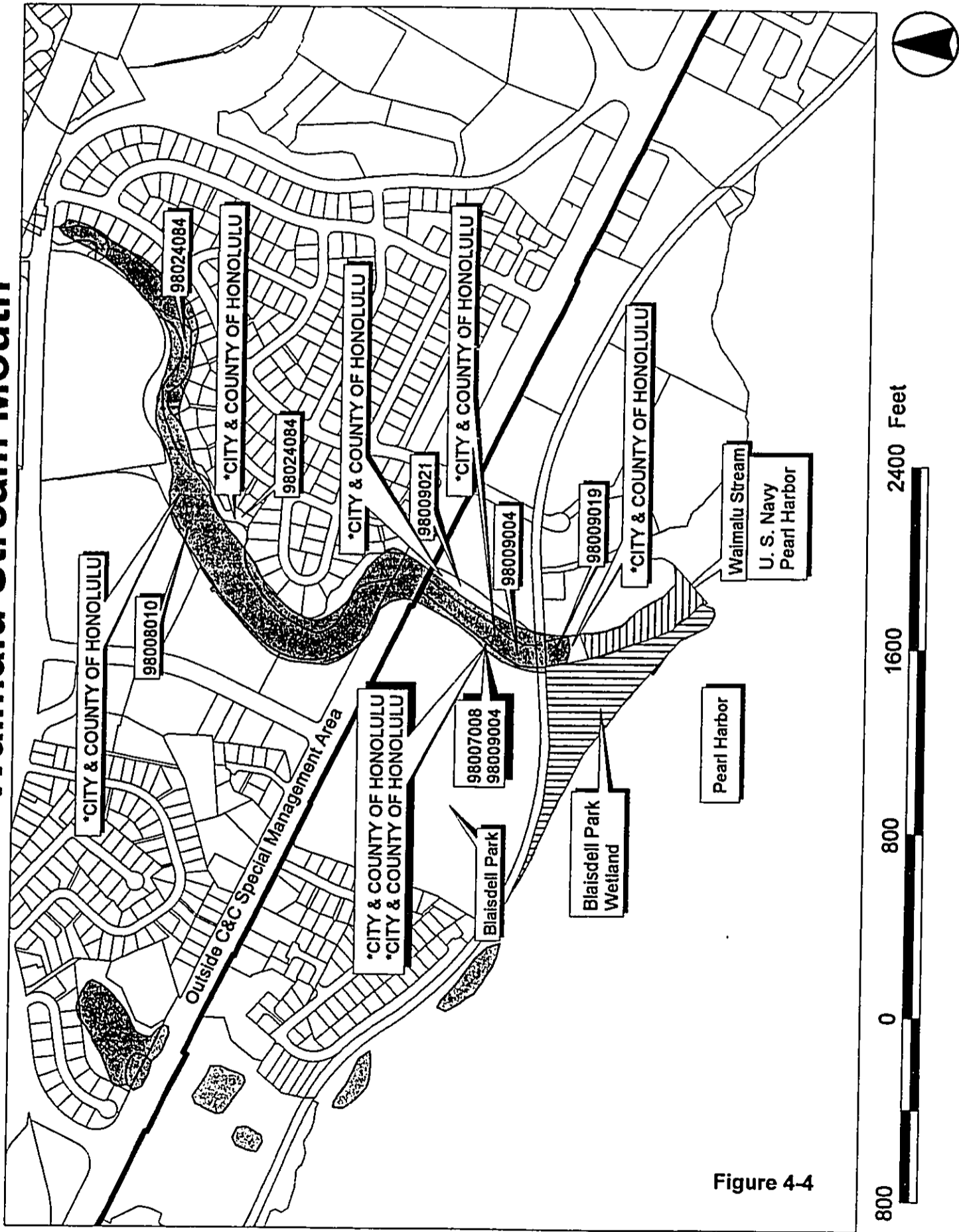


Figure 4-4

Waimalu Stream Flood Zone -- (Entire Area is Zone D)

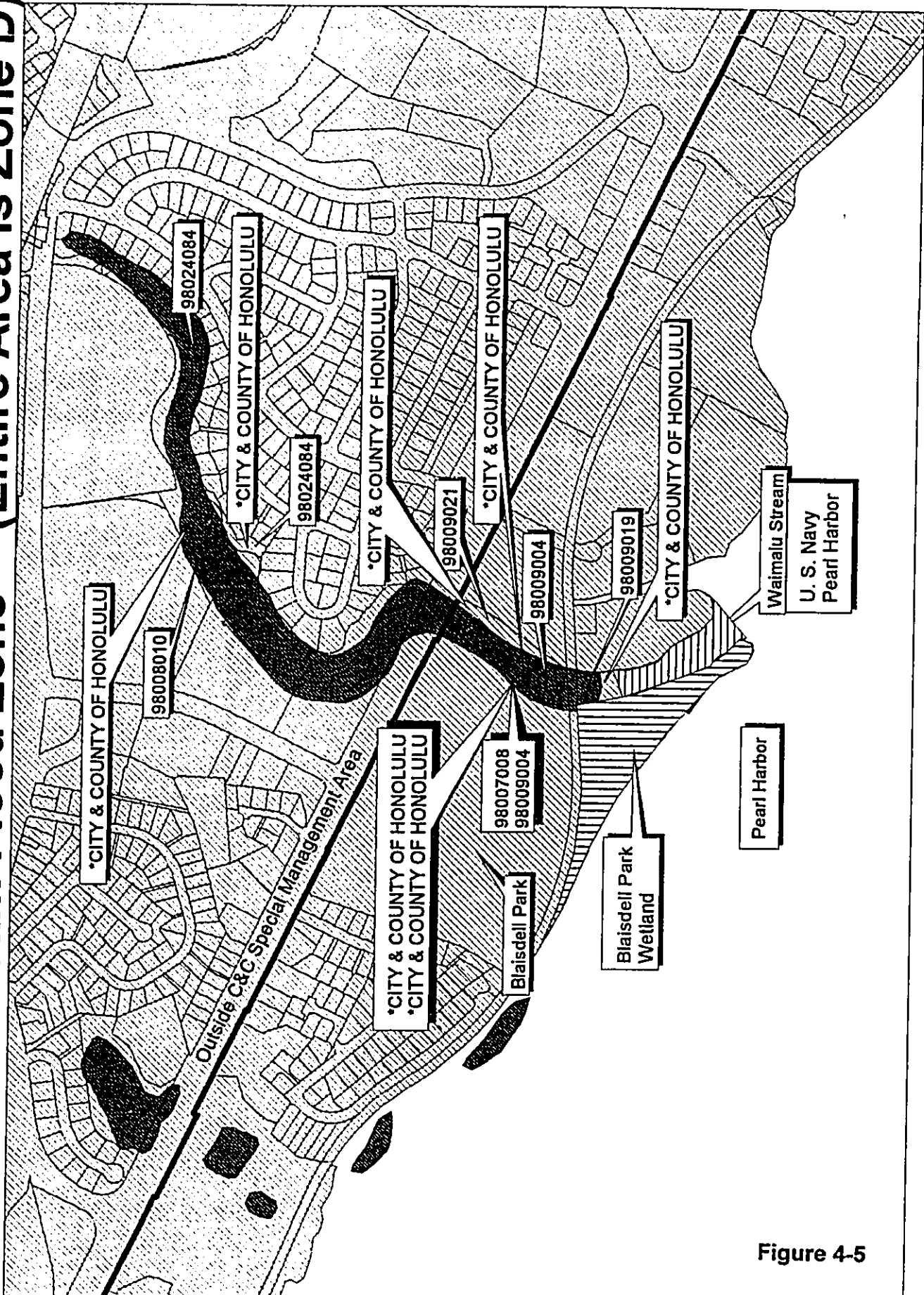


Figure 4-5

Waimalu Stream -- Sampling Sites & Wetland

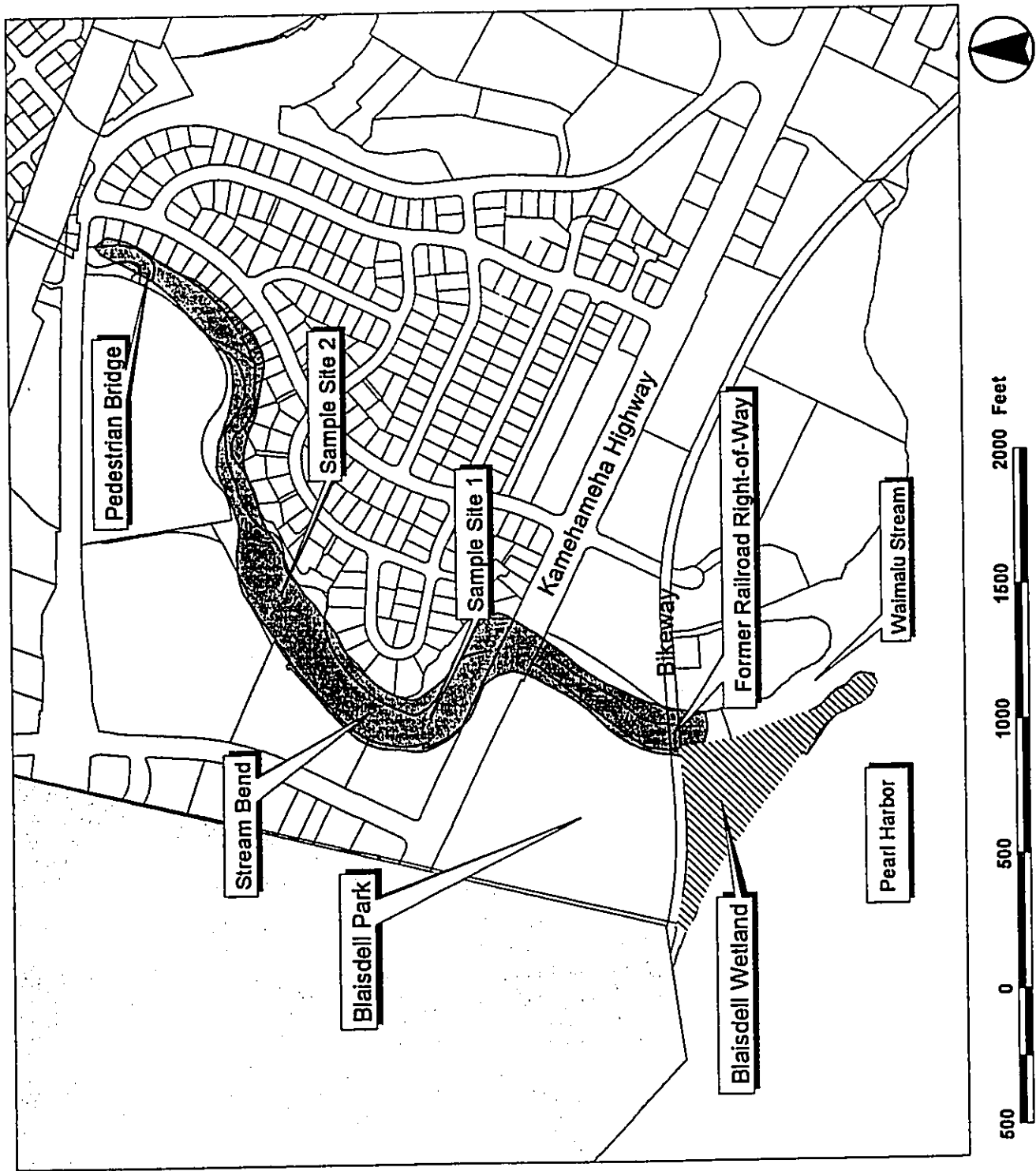
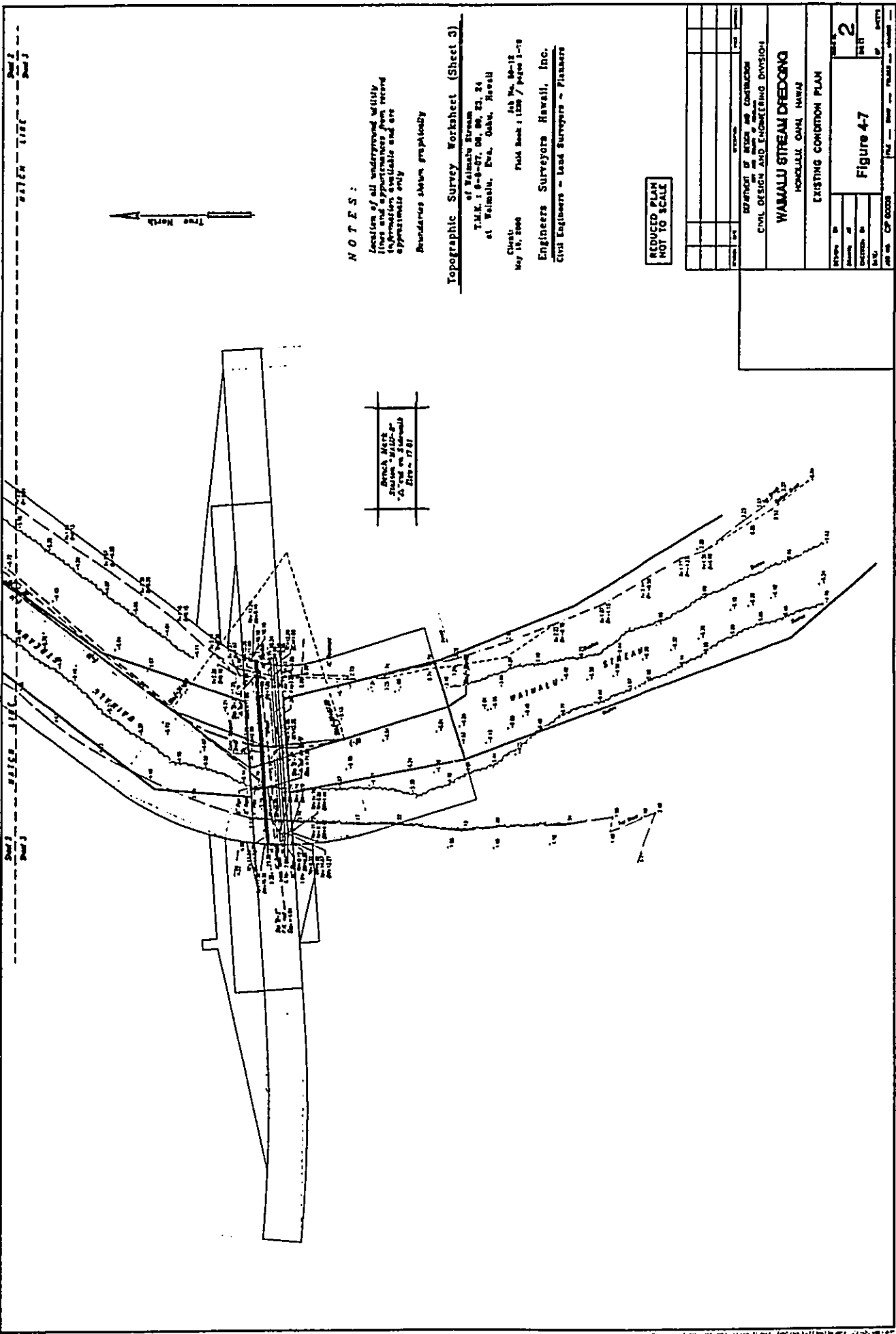


Figure 4-6



NOTES:

Location of all underground utility lines and appurtenances from recent surveys to be shown on this plan. Approximate only.
Boundaries shown graphically.

Topographic Survey Worksheet (Sheet 3)

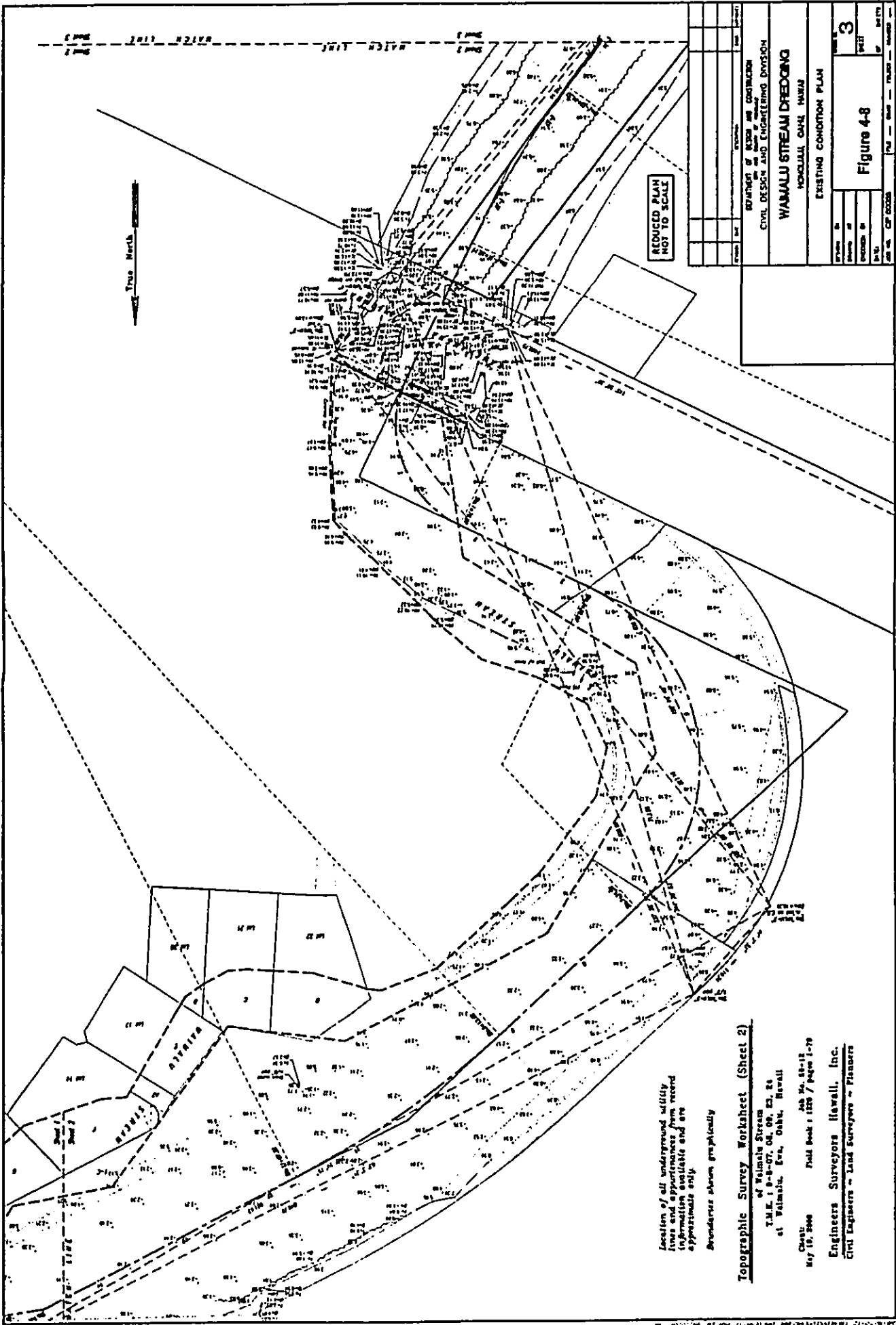
of Waimalu Stream
T.M.K. 1-8-4-01, 02, 03, 04
at Waimalu, Ewa, Oahu, Hawaii

Client: Job No. W-11
May 15, 1960 Field Book: 1526 / pages 1-19
Engineers: Surveyors Rawell, Inc.
Civil Engineers - Lead Surveyors - Planners

REDUCED PLAN
NOT TO SCALE

PROJECT NO.	CP 00000
DATE	May 15, 1960
SCALE	AS SHOWN
WAIMALU STREAM DREDGING HONOLULU, OAHU, HAWAII EXISTING CONDITION PLAN	
DESIGNED BY	Figure 4-7
DRAWN BY	2
CHECKED BY	
APPROVED BY	
DATE	

PART 2 of 7 SHEETS

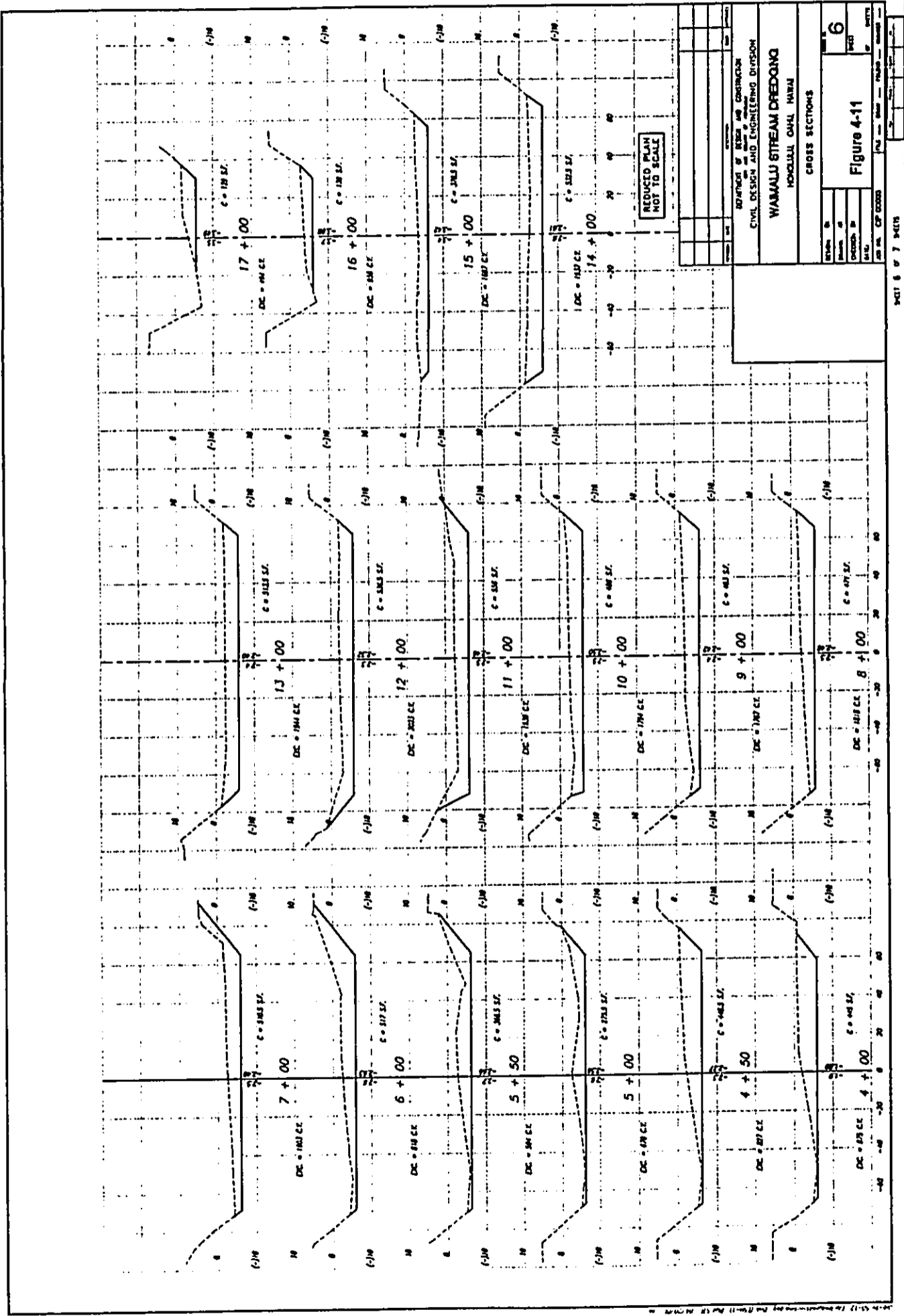
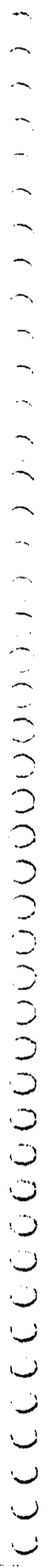


Location of all underground utility lines and appurtenances from record information available and are approximate only and are not shown graphically

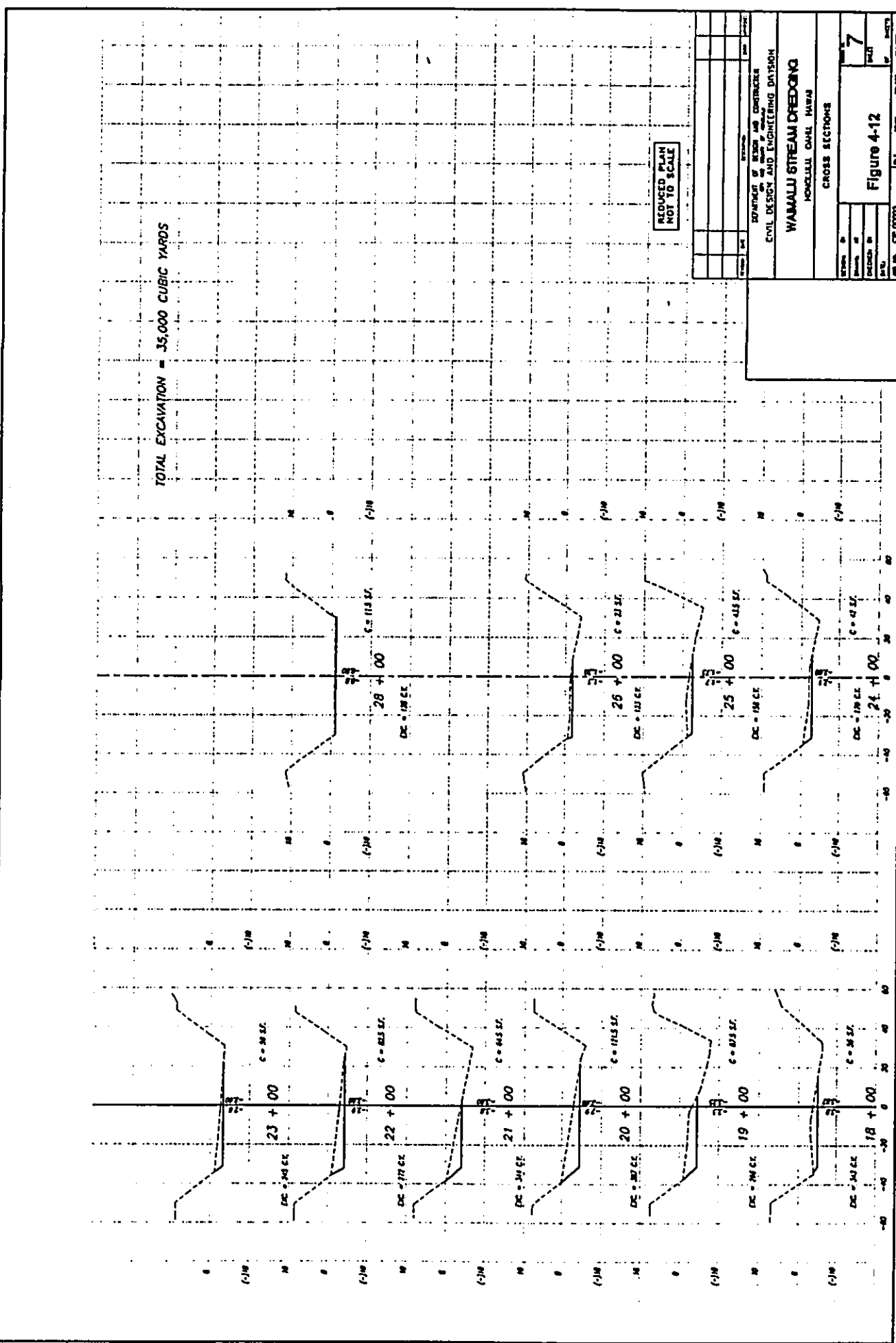
Topographic Survey Worksheet (Sheet 2)
 of Waimale Stream
 T.M.L. 10-07, 08, 09, 10, 11
 at Waimale, Ewa, Oahu, Hawaii
 Sheet No. 22-12
 Job No. 100-100 / page 1-10
Engineers Surveyors Hawaii, Inc.
 Civil Engineers - Land Surveyors - Planners

REVISED PLAN NOT TO SCALE	
DEPARTMENT OF PUBLIC WORKS AND CONSTRUCTION CIVIL DESIGN AND ENGINEERING DIVISION	
WAIMALE STREAM DREDGING	
HONOLULU CANAL, HAWAII	
EXISTING CONDITION PLAN	
DATE	BY
10/10/00	CP 00008
SHEET 3 OF 7 SHEETS	

Figure 4-8



CCCCCCCCCCCCCCCCCCCCCCCCCCCCCC



DATE: 7-7-64

Land Use and Zoning, typical examples.



Photo 1. Typical conservation (open areas and R-5 residential (in valley and on ridge).



Photo 2. Typical urban apartment (background) and community business (foreground on left).

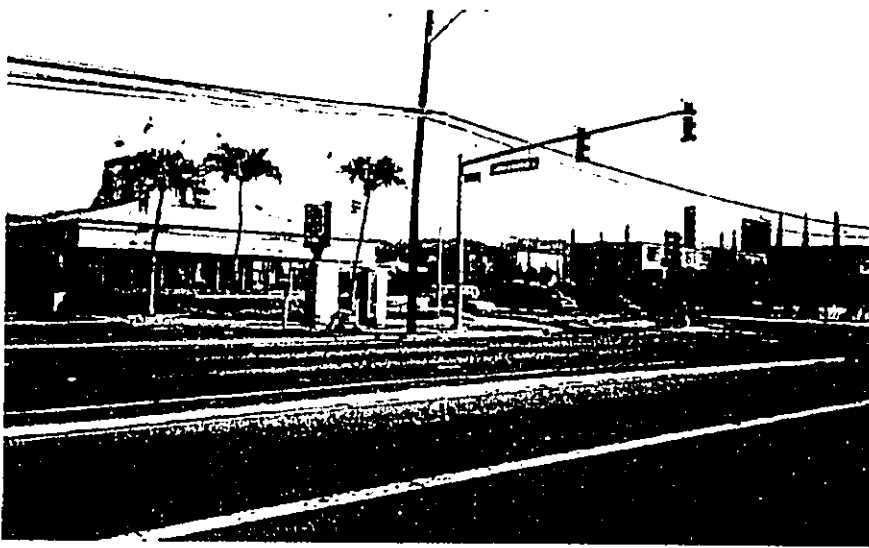


Photo 3. Typical community business on left and apartment on right.



Photo 4. Typical park.



Photo 5. Wetland, mouth of Waimalu Stream, west bank, next to Blaisedell Park.



Photo 6. Mouth of Waimalu Stream looking south to Pearl Harbor. Mangroves on left and right banks. Wetland is on right bank, behind mangroves.



Photo 7. Mouth of Waimalu Stream looking south to Pearl Harbor from Kamehameha Highway bridge. Bridge in foreground is a City and County Bikeway. This reach of the stream will be dredged.



Photo 8. Looking north up Waimalu Stream towards Kamehameha Highway from bikeway bridge.

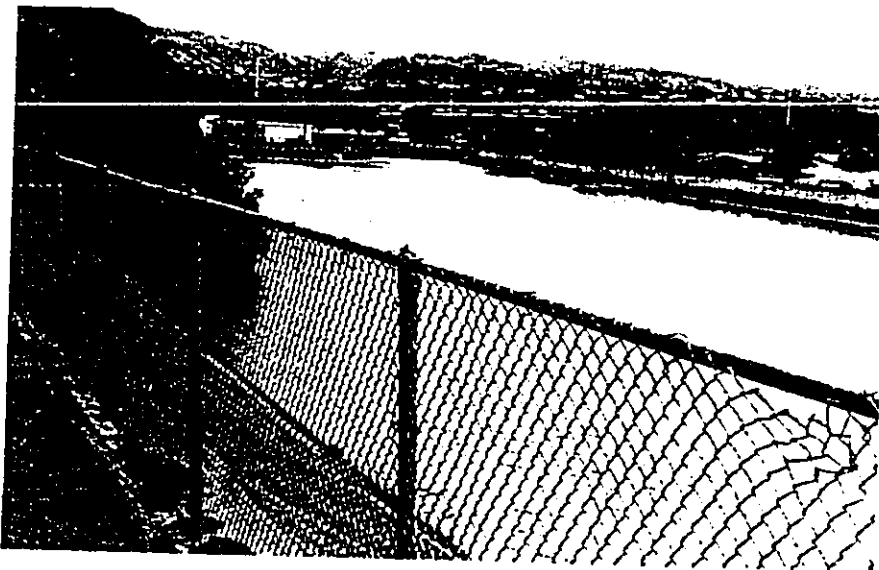


Photo 9. Looking north towards Moanalua Road and upper extent of project boundary. This area will be dredged.



Photo 10. Center of project. Residential area (R-5) across channel. This area will be dredged.



Photo 11. Looking downstream, above Kamehame Highway. Apartments on right, single family residential dwellings on left.

CC
DREDGE MATERIAL TESTING FOR MAINTENANCE
OF WAHAJU STREAM, WAHAIJU, OAHU, HAWAII
(BIOMASSAY AND BIOACCUMULATION TESTING)

Prepared for:

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January 1988

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INTRODUCTION

Section 103 of Public Law 92-532, the Marine Protection, Research, and Sanctuaries Act of 1972, mandates that all ocean dredge spoils disposal operations be preceded by appropriate bioassay testing to limit adverse effects on the marine environment. The bioassay tests to be conducted are rather rigidly delineated in the implementation manual entitled, "Ecological Evaluation of Proposed Discharge of Dredged Material into Ocean Waters (EPA/COE, 1977)." The results of bioassay tests conducted on sediments collected from the lower reach of Waimalu Stream are summarized in this report. The procedures followed those specified in the implementation manual cited above unless noted otherwise. The report also contains some discussion on the merits of the test species utilized in these tests. Additional comments are included on problems encountered relative to the bioassay testing program as it implemented in the State of Hawaii.

MATERIALS AND METHODS

Analyses conducted on the reference and test sediments include solids content, size distribution, calcium carbonate content, and percent organics. Solids determinations were made by drying small aliquots of sediment at 100°C as described in Standard Methods (1981). The size distribution analyses were carried out by a combination of wet and dry sieving. In the laboratory, the samples were washed with tap water through a 0.063 mm mesh screen to separate the sand and silt-clay fractions. Wash water containing the silt-clay fraction was collected in beakers. After the fine particles had settled overnight the clear supernatant was discarded and the fines were transferred to aluminum drying pans. The coarse fractions of the sediments (>0.063 mm) were dried separately. The coarse material as well as the fines were dried at 100°C. After drying, the coarse sand fraction of the sample was placed in the uppermost sieve of a graded series (representing 1.0 phi intervals) and shaken with a Tyler Model RX-24 mechanical shaker for 15 minutes (Folk, 1974). The sediment fraction retained in each sieve was then weighed to the nearest 0.1 gm on an Ohaus triple beam balance. The weight of sediments passing through the finest mesh screen (0.063 mm), i.e. the fraction retained on the pan, was added to the weight of fines initially washed from the sample

and dried separately. No further size-fraction analysis was conducted on the silt/clay fraction (<0.063 mm) of the sediments.

Volatile solids were determined as described in Standard Methods (1981) as detailed for volatile and fixed matter in semi-solid samples, except that the ashing was carried out at 500°C to prevent loss of calcium carbonate (Hirota and Szyper, 1975). The weight loss on ignition is an estimate of the percent organic matter in the sediments.

Calcium carbonate was determined using the volumetric procedure as outlined in Gross (1971). The sediment sample was dried and ground with a mortar and pestle. A 0.5 gm aliquot of the ground sediment was reacted with 3.0 ml of 1+1 hydrochloric acid in a closed system such that the evolution of carbon dioxide gas displaced an indicator solution. The volume of indicator solution displaced was proportional to the amount of calcium carbonate in the sample. The system was standardized with pure calcium carbonate.

The test sediments were collected in Waimalu Stream at the three sample stations shown in Figure 1. Station 1 was in the center of the upper third of the proposed stream dredge site, Station 2 was in the center of the middle third of the proposed stream dredge site and Station 3 was in the center of the lower third of the proposed stream dredge site. Sediments were collected using a post hole digger and stored in 20 liter plastic

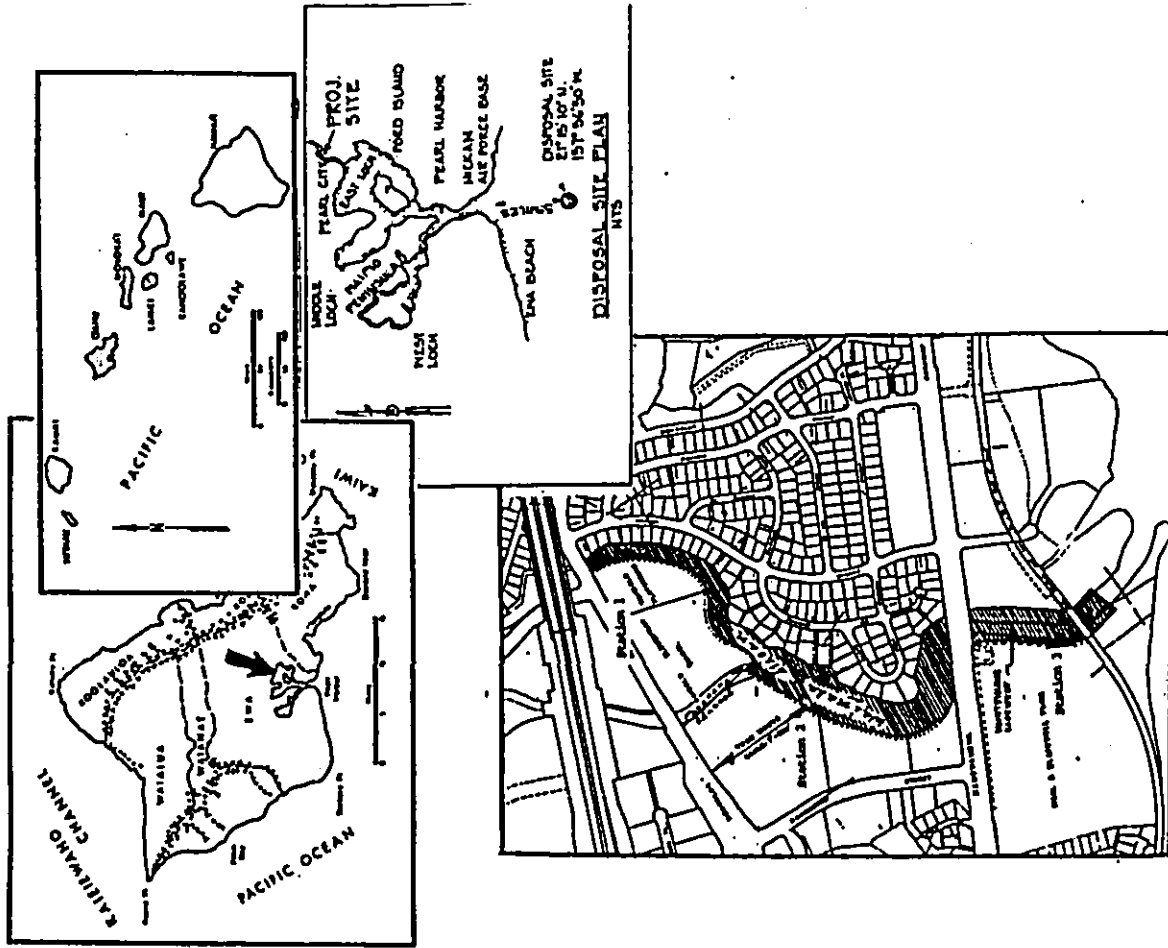


Figure 1. General location of Waimalu Stream sediment sampling stations.

pails with tight fitting covers. The test sediment was collected on multiple occasions between October and December 1987. The test sediment was transported to the laboratory at ambient temperature and stored at 4°C Celsius until utilized in the bioassay. All test sediments were utilized within two weeks of collection. The coral sand reference sediment was taken from Kailua Beach, Oahu.

All the bioassays were conducted using static culture conditions following the guidelines in the implementation manual. The sediments were mixed with four parts of Kailua Beach seawater in 30 gallon plastic pails and aerated for 30 minutes with occasional stirring to keep the heavier solids in suspension. After aeration, the suspension was allowed to settle for at least one hour after which the supernatant was siphoned off for use in the bioassays. The supernatant was used without further treatment as test water in the suspended phase bioassays. The test water used in the liquid phase was filtered through Millipore cellulose nitrate 0.45 micron filters. A Millipore 293 mm filter holder was used for these filtration steps.

All bioassay experiments were performed in a laboratory with room temperature controlled by an air conditioning system (25°C ± 2°C.) Aeration was supplied by a Dayton Speedaire, 1.1 CFM air compressor.

Liquid Phase Bioassays

Three species were utilized in the liquid phase bioassays: the brine shrimp, *Artemia salina* (obtained from Hawaii Fish Hatchery), the mullet, *Mugil cephalus* (obtained from Oceanic Institute), and the shrimp, *Penaeus vannamei* (obtained from Amorient Aquafarms, Kahuku). The *Artemia* bioassays (10 animals/dish) were carried out in 300 ml finger bowls with glass covers to reduce evaporation. The control water consisted of 100 percent seawater from off Kailua Beach. The 10 and 50 percent dilutions of the test water were made using the Kailua Beach water as the diluent. Five drops (approximately .25 ml) of a thick (4,000,000 cells/milliliter) culture of the alga, *Isochrysis* sp., was added to each dish every day of the test. No other food was provided and the only oxygenation effected was by photosynthetic activity of the algae and atmospheric exchange across the water surface.

The mullet (10 fish/tank) were placed in 10 gallon aquaria measuring 25 x 30 x 50 cm and filled with 20 liters of test water. Control tanks utilizing Kailua Beach seawater and treatment tanks with 10, 50, and 100 percent concentrations of test water were run in triplicate. The fish were fed a small amount of TetraMin fish food daily. The dissolved oxygen would have fallen below 4.0 mg/l without aeration, consequently all tanks were aerated. The tanks were monitored for temperature, salinity,

dissolved oxygen, and pH daily. Observations and fish mortalities were recorded at 4, 8, 12, 24, 48, 72, and 96 hours after the start of the experiment.

The PENAEUS liquid phase bioassay was conducted simultaneously with the mullet bioassay by placing 10 shrimp in each of the same 10-gallon tanks with the mullet. The shrimp were fed commercial shrimp pellets. Observations were made, shrimp mortality assessed, and fresh food added on a daily basis. The three stations and a control were run in triplicate.

Suspended Phase

The suspended phase was carried out as described above for the liquid phase, except that the test liquid was not filtered. The same three species as used for the liquid phase tests were used in the suspended phase tests: the brine shrimp (ARTEMIA SALINA), the mullet (MULLUS CEPHALUS), and the shrimp (PENAEUS VANNAMEI). The suspended phase bioassays were started one day after the liquid phase bioassays were completed.

Solid Phase

The solid phase bioassays were carried out twice in 10 gallon aquaria using the bivalves, TAPES JAPONICA (obtained from Ted Kuiper in Eureka, California), MERCENARIA MERCENARIA (obtained from Aquaculture Research Corporation in Dennis,

Massachusetts), the glass shrimp, PALAEON SP. (collected from mud flats off Kahalu'u, Kane'oh'e Bay), and the Penaid shrimp, PENAEUS VANNAMEI (obtained from Amoriant Aquafarms in Kahuku, Oahu). The results of the first solid phase bioassays were inconclusive, requiring that a second testing be undertaken. The results for both solid phase bioassays are presented in the results section of this report.

In the first solid phase bioassays, 60 individuals of the bivalve, TAPES JAPONICA were placed in each of seven replicate tanks for each station and a control. The shrimp, PENAEUS VANNAMEI, were placed at a density of 20 animals/tank in 5 of the replicate tanks which contained the bivalve. The glass shrimp, PALAEON SP., were placed at a density of 20 shrimp/tank in the 2 replicate tanks with bivalves that did not contain the PENAEUS VANNAMEI. The remaining PALAEON SP. were placed in 10 gallon aquaria that had been divided into 3 chambers at a density of 20 animals per chamber. Thus, the shrimp, PALAEON SP. and PENAEUS VANNAMEI, were replicated 5 times for each station and control, and the bivalve TAPES JAPONICA was replicated 7 times for each station and control.

Control and experimental tanks were established with 4.5 liters of reference sediment and covered by approximately 10 liters of Kailua Beach seawater. The animals were added to the control and experimental tanks/chambers 2 days before the testing

was to start. Aeration commenced as soon as the shrimp were added. The system was monitored for the first 2 days during which time dead organisms were replaced. On the third day 2.5 liters of test sediment were added to the appropriate test aquaria. The aquaria were monitored daily for the next 10 days for temperature, salinity, and dissolved oxygen. Observations were recorded, but the highly turbid water made accurate daily counts impossible. After the daily monitoring was completed, commercial shrimp pellets were added to the tanks. No attempt was made to remove uneaten food.

In the second solid phase bioassays, the shrimp *Penaeus vannamei*, were placed (20 animals/tank) in 5 replicate tanks for each station and control. The test was conducted as above, except that only the one species of shrimp were placed in the tanks. It was not possible to keep records of mortalities because of the turbid nature of the water.

The clam, *Mercanaria mercenaria*, were placed (20 animals/tank) in 5 replicated tanks for each station and control. The test was conducted as described above. By the fourth day a fungal growth had appeared on the sediment surface in some of the test tanks. The growth was removed during monitoring, but it reappeared in some tanks. The fungus did not grow in the control tanks, but it did grow in several tanks from each station. The clams could not be counted during the test period as

they remained hidden under the sediment. Four liters of an algal culture (*Isochrysis* sp. at 4 million cells/milliliter) was added to each tank on the first day.

Bioaccumulation

Tissue from the clam, *Tapes japonica*, was used for the bioaccumulation test. The *Tapes* were approximately 1/4" to less than 1/2" in size, hence 60 animals were placed in each of 7 replicate tanks to insure that enough tissue would be available for the chemical analyses. The first solid phase bioassays were harvested by siphoning the mud through a 1.0 mm sieve. After counting and cleaning, the clams from all 7 replicates for each station and control were combined in individual station and control tanks with clean seawater for three days. Replicates had to be combined to provide sufficient tissue for the analyses. The clams were shucked and the tissue placed in a glass vial with a teflon-lined lid and frozen. Approximately half of the tissue for each series was placed in another glass vial with a teflon-lined lid, packed with blue ice and shipped to Brewer Analytical laboratory for mercury, cadmium and lead analyses. The remaining sample was analyzed for oil and grease at AECOS laboratory.

RESULTS

Sediment

As was anticipated the results of the grain size analyses (Table 1) showed more than 20 percent of the Waimalu Stream sediment at all stations was smaller than 1.00 mm in size. In fact, the results show that approximately 1/4 of Stations 1 and 2 and almost 1/2 of Station 3 test sediments were composed of material smaller than 0.063 mm. Generally sediments with a grain size distribution of at least 80 percent (by weight) larger than 1.00 mm in size are excluded from further testing. Since this was not the case for Waimalu Stream sediments, bioassay and bioaccumulation tests were required.

Table 1. Grain Size Analysis
(% by dry weight)

Station	>4.00	4.00	2.00	1.00	0.500	0.250	.125	<0.063
1	17.9	6.9	13.2	16.7	11.4	5.9	2.8	25.2
2	23.2	8.2	8.9	10.5	11.5	8.1	4.9	24.6
3	15.9	3.5	4.1	4.5	7.0	10.6	7.5	46.7
Control	<0.1	0.2	0.1	0.2	15.5	71.8	11.8	0.4

The results of the organic, and calcium carbonate tests are shown in Table 2. The results are similar among the three sta-

tions. The data indicate that the test sediments were high in organic content and low in calcium carbonate compared to the reference sediment. This is not unusual for stream sediment. These results, as anticipated, indicate that the stream sediment at all stations is primarily terrigenous in nature.

Table 2. Volatile Solids and Calcium Carbonate

Station	Volatile Solids & Organic	Calcium Carbonate & CaCO ₃
1	11.1	<1
2	10.8	1.9
3	12.1	<1
Control	1.7	91.3

Testing for selected metals, total cyanide, total phenols, total pesticides, total PCBs and total petroleum hydrocarbons are shown in Tables 3 through 8. These tests were done at the request of the City and County of Honolulu, Department of Public Works. All analytes except for a few in the total petroleum hydrocarbon analysis were not detected and are reported as "less than" the detection limit.

Table 3. Selected Metals (units in ug/g)

Analysis	Station 1	Station 2	Station 3	Control
Lead	19.33	20.00	10.32	3.69
Chromium	23.72	24.34	20.19	2.05
Copper	15.21	16.93	15.71	0.54
Zinc	35.21	27.82	15.06	<0.005
Nickel	22.15	20.21	16.79	1.33
Cadmium	0.249	0.269	0.263	0.393
Arsenic	0.005	0.010	0.012	0.002
Mercury	0.014	0.057	0.022	<0.001

Table 4. Results for Total Cyanide (units in ug/g)

Analysis	Station 1	Station 2	Station 3	Control
Cyanide	<0.1	<0.1	<0.1	<0.1

Table 5. Total Phenols (all units in ug/g)

Analysis	Station 1	Station 2	Station 3	Control
2-Chloro-phenol	<0.3	<0.3	<0.3	<0.3
2-Nitro-phenol	<0.3	<0.3	<0.3	<0.3
2,4-Dimethyl phenol	<0.3	<0.3	<0.3	<0.3
2,4,6-Trichloro phenol	<0.3	<0.3	<0.3	<0.3
4-chloro-3-methylphenol	<0.3	<0.3	<0.3	<0.3
2,4-Dinitro phenol	<10	<10	<10	<10
2-Methyl-4,6 dinitrophenol	<2	<2	<2	<2
Pentachloro phenol	<0.5	<0.5	<0.5	<0.5
4-Nitrophenol	<0.5	<0.5	<0.5	<0.5
Cresols	<0.3	<0.3	<0.3	<0.3

Table 6. Total Petroleum Hydrocarbons (units in ug/gram).

Analysis	Station 1	Station 2	Station 3	Control
Napthalene	<0.04	<0.04	<0.04	<0.04
Acenaphthylene	<0.04	<0.04	0.11	<0.04
Acenaphthene	<0.04	<0.04	<0.04	<0.04
Fluorene	<0.04	0.06	<0.04	<0.04
Phenanthrene	<0.04	<0.04	<0.04	<0.04
Anthracene	<0.04	<0.04	<0.04	<0.04
Fluoranthene	<0.04	<0.04	0.06	<0.04
Pyrene	<0.04	<0.04	0.07	<0.04
Benz (a)	<0.04	<0.04	<0.04	<0.04
Anthracene	<0.04	0.05	0.30	0.07
Chrysene	<0.04	<0.04	<0.04	<0.04
Benzo (b) fluoranthene	<0.04	<0.04	0.09	0.07
Benzo (k) fluoranthene	<0.04	<0.04	<0.04	<0.04
Benzo (e) Pyrene	<0.04	<0.04	<0.04	0.06
Benzo (a) Pyrene	<0.04	<0.04	<0.04	<0.04
Indeno (123-cd) Pyrene	<0.04	<0.04	0.20	0.15
Dibenz (a,h) anthracene	<0.04	<0.04	<0.04	<0.04
Benzo (ghi) perylene	<0.04	<0.04	0.05	<0.04

Table 7. Total PCBs (units in ug/gram)

Analysis	Station 1	Station 2	Station 3	Control
Aroclor 1016	<0.3	<0.3	<0.3	<0.3
Aroclor 1221	<0.3	<0.3	<0.3	<0.3
Aroclor 1232	<0.3	<0.3	<0.3	<0.3
Aroclor 1242	<0.3	<0.3	<0.3	<0.3
Aroclor 1248	<0.3	<0.3	<0.3	<0.3
Aroclor 1254	<0.3	<0.3	<0.3	<0.3
Aroclor 1260	<0.3	<0.3	<0.3	<0.3

Table 8. Total Pesticides (units in ug/gram)

Analysis	Station 1	Station 2	Station 3	Control
Aldrin	<0.005	<0.005	<0.005	<0.005
alpha-BHC	<0.005	<0.005	<0.005	<0.005
beta-BHC	<0.005	<0.005	<0.005	<0.005
delta-BHC	<0.005	<0.005	<0.005	<0.005
Lindane	<0.005	<0.005	<0.005	<0.005
Chlordane	<0.1	<0.1	<0.1	<0.1
4,4'-DDD	<0.01	<0.01	<0.01	<0.01
4,4'-DDE	<0.01	<0.01	<0.01	<0.01
4,4'-DDT	<0.01	<0.01	<0.01	<0.01
Dieldrin	<0.005	<0.005	<0.005	<0.005
Endosulfan I	<0.01	<0.01	<0.01	<0.01
Endosulfan II	<0.01	<0.01	<0.01	<0.01
Endosulfan sulfate	<0.05	<0.05	<0.05	<0.05
Endrin	<0.005	<0.005	<0.005	<0.005
Endrin	<0.005	<0.005	<0.005	<0.005
Aldehyde	<0.05	<0.05	<0.05	<0.05
Heptachlor	<0.005	<0.005	<0.005	<0.005
Heptachlor Epoxide	<0.005	<0.005	<0.005	<0.005
Toxaphene	<0.5	<0.5	<0.5	<0.5
Methoxychlor	<0.05	<0.05	<0.05	<0.05

Liquid and Suspended Phase Bioassay Test Results

The survival data for the liquid and suspended phase bioassays are detailed in Tables 9 - 14. The *Panaeus yannamai* and the *Mugil cephalus* were difficult to count (note the data tables) because they moved quickly around the aquariums. Also, despite the covers on the tanks, the *Panaeus yannamai* managed to jump out of the tanks onto the floor and into other tanks during the first 24 hour period and during harvesting. None of the bioassays using the *Akemia salina*, *Mugil cephalus* or *Panaeus yannamai* showed significant differences between the controls and the 100 percent test medium. Dissolved oxygen concentrations were generally 5.7 - 6.8 mg/l while most pH measurements ranged from 7.6 to 8.4. The concentrations of dissolved oxygen went down as low as 3.6 on three different occasions in three different tanks. This did not adversely effect the survival of the fish or shrimp.

TABLE 9. RESULTS OF A BIOASSAY OF THE LIQUID PHASE OF WAIMALU STREACH DREDGE MATERIAL USING THE SHRIMP *PANAEUS YANNAI*

		Station 1.									
Concentration	Replicate	0hr	4hr	8hr	24hr	48hr	72hr	96hr			
Control Water	1	10	10	10	10	10	10	10			
	2	10	10	10	10	10	10	10			
	3	10	10	10	11	11	11	11			
		--	--	--	--	--	--	--			
		30	30	30	31	31	31	31			
100 percent test medium	1	10	10	10	10	10	10	10			
	2	10	10	10	10	10	10	10			
	3	10	10	10	10	10	10	10			
		--	--	--	--	--	--	--			
		30	30	30	30	30	30	30			
50 percent test medium	1	10	10	10	10	10	10	10			
	2	10	10	10	10	10	10	10			
	3	10	10	10	10	10	10	10			
		--	--	--	--	--	--	--			
		30	30	30	30	30	30	30			
10 percent test medium	1	10	10	10	10	10	10	10			
	2	10	10	10	10	10	10	10			
	3	10	10	10	10	10	10	10			
		--	--	--	--	--	--	--			
		30	30	30	30	30	30	30			

TABLE 9. (continued) RESULTS OF A BIOASSAY OF THE LIQUID PHASE OF WAIMALU STREAM DREDGE MATERIAL USING THE SHRIMP *PENAEUS VANNAMEI*

Station 3.

Concentration	Replicate	0hr	4hr	8hr	24hr	48hr	72hr	96hr
Control Water	1	10	10	10	10	10	10	10
	2	10	10	10	10	10	10	10
	3	10	10	10	11	11	11	11
100 percent test medium	1	30	30	30	31	31	31	31
	2	10	10	10	10	10	10	10
	3	10	10	10	10	10	10	10
50 percent test medium	1	10	10	10	10	10	10	10
	2	10	10	10	10	10	10	10
	3	10	10	10	10	10	10	10
10 percent test medium	1	10	10	10	10	10	10	10
	2	10	10	10	10	10	10	10
	3	10	10	10	10	10	10	10

TABLE 9. (continued) RESULTS OF A BIOASSAY OF THE LIQUID PHASE OF WAIMALU STREAM DREDGE MATERIAL USING THE SHRIMP *PENAEUS VANNAMEI*

Station 2.

Concentration	Replicate	0hr	4hr	8hr	24hr	48hr	72hr	96hr
Control Water	1	10	10	10	10	10	10	10
	2	10	10	10	10	10	10	10
	3	10	10	10	11	11	11	11
100 percent test medium	1	30	30	30	31	31	31	31
	2	10	10	10	10	10	10	10
	3	10	10	10	10	10	10	10
50 percent test medium	1	10	10	10	10	10	10	10
	2	10	10	10	10	10	10	10
	3	10	10	10	10	10	10	10
10 percent test medium	1	10	10	10	10	10	10	10
	2	10	10	10	10	10	10	10
	3	10	10	10	10	10	10	10

TABLE 10. RESULTS OF A BIOASSAY OF THE LIQUID PHASE OF WAIMALU
STREAM DREDGE MATERIAL USING THE FISH MUGIL CEPHALAIS

Station 1.									
Concentration	Replicate	0hr	4hr	8hr	24hr	48hr	72hr	96hr	
Control Water	1	10	10	10	10	10	10	10	
	2	10	10	10	10	10	10	10	
	3	10	10	10	10	10	10	10	
		30	30	30	30	30	30	30	
100 percent test medium	1	10	10	10	10	10	10	10	
	2	10	10	10	10	10	10	10	
	3	10	10	10	10	10	10	10	
		30	30	30	30	30	30	30	
50 percent test medium	1	10	10	10	10	10	10	10	
	2	10	10	10	10	10	10	10	
	3	10	10	10	10	10	10	10	
		30	30	30	30	30	30	30	
10 percent test medium	1	10	10	10	9	9	9	9	
	2	10	10	10	10	10	10	10	
	3	10	10	10	10	10	10	10	
		30	30	30	29	29	29	29	

TABLE 10. (continued) RESULTS OF A BIOASSAY OF THE LIQUID PHASE
OF WAIMALU STREAM DREDGE MATERIAL USING THE FISH
MUGIL CEPHALAIS

Station 2.									
Concentration	Replicate	0hr	4hr	8hr	24hr	48hr	72hr	96hr	
Control Water	1	10	10	10	10	10	10	10	
	2	10	10	10	10	10	10	10	
	3	10	10	10	10	10	10	10	
		30	30	30	30	30	30	30	
100 percent test medium	1	10	10	10	10	10	10	10	
	2	10	10	10	10	10	10	10	
	3	10	10	10	10	10	10	10	
		30	30	30	30	30	30	30	
50 percent test medium	1	10	10	10	10	10	10	10	
	2	10	10	10	10	10	10	10	
	3	10	10	10	10	10	10	10	
		30	30	30	30	30	30	30	
10 percent test medium	1	10	10	10	10	10	10	10	
	2	10	10	10	10	10	10	10	
	3	10	10	10	10	10	10	10	
		30	30	30	30	30	29	28	

TABLE 10. (continued) RESULTS OF A BIOASSAY OF THE LIQUID PHASE OF WAIMALU STREAM DREDGE MATERIAL USING THE FISH MUGIL CEPHALUS

Station 3.

Concentration	Replicate	0hr	4hr	8hr	24hr	48hr	72hr	96hr
Control Water	1	10	10	10	10	10	10	10
	2	10	10	10	10	10	10	10
	3	10	10	10	10	10	10	10
		--	--	--	--	--	--	--
		30	30	30	30	30	30	30
100 percent test medium	1	10	10	10	10	10	10	10
	2	10	10	10	10	10	10	10
	3	10	10	10	10	10	10	10
		--	--	--	--	--	--	--
		30	30	30	30	30	30	30
50 percent test medium	1	10	10	10	10	10	10	10
	2	10	10	10	10	10	10	10
	3	10	10	10	10	10	10	10
		--	--	--	--	--	--	--
		30	30	30	30	30	30	30
10 percent test medium	1	10	10	10	10	9	10	10
	2	10	10	10	10	10	10	10
	3	10	10	10	10	10	9	9
		--	--	--	--	--	--	--
		30	30	30	30	29	29	29

TABLE 11. RESULTS OF A BIOASSAY OF THE LIQUID PHASE OF WAIMALU STREAM DREDGE MATERIAL USING THE BRINE SHRIMP ARTEMIA SALINA

Station 1.

Concentration	Replicate	0hr	4hr	8hr	24hr	48hr	72hr	96hr
Control Water	1	10	10	10	10	10	10	10
	2	10	10	10	9	9	9	8
	3	10	9	9	9	9	9	8
	4	10	10	10	11	11	11	11
	5	10	10	10	10	10	8	8
	6	10	10	10	10	10	9	9
		--	--	--	--	--	--	--
		60	59	59	59	59	56	54
100 percent test medium	1	10	10	10	10	10	10	9
	2	10	10	10	10	10	10	10
	3	10	10	10	10	10	10	10
		--	--	--	--	--	--	--
		30	30	30	30	30	30	28
50 percent test medium	1	10	10	10	10	10	8	8
	2	10	10	10	10	8	7	7
	3	10	10	10	10	10	10	10
		--	--	--	--	--	--	--
		30	30	30	30	28	25	25
10 percent test medium	1	10	10	10	10	10	10	10
	2	10	10	10	10	10	8	9
	3	10	10	10	10	10	9	9
		--	--	--	--	--	--	--
		30	30	30	30	29	27	28

TABLE 11. (continued) RESULTS OF A BIOASSAY OF THE LIQUID PHASE OF WAIMALU STREAM DREDGE MATERIAL USING THE BRINE SHRIMP *ARTEHIA SALINA*

		Station 2.									
Concentration	Replicate	0hr	4hr	8hr	24hr	48hr	72hr	96hr			
Control Water	1	10	10	10	10	10	10	10	10	10	10
	2	10	10	10	9	9	9	9	8	8	8
	3	10	9	9	9	9	9	9	8	8	8
	4	10	10	10	11	11	11	11	11	11	11
	5	10	10	10	10	10	8	8	8	8	8
	6	10	10	10	10	10	9	9	9	9	9
		60	59	59	59	59	56	54			
100 percent test medium	1	10	10	10	10	10	8	7			
	2	10	10	10	10	10	10	10	10	10	10
	3	10	10	10	10	10	10	10	8	8	8
		30	30	30	30	30	28	25			
50 percent test medium	1	10	10	10	9	9	9	9			
	2	10	10	10	10	10	10	10	9	9	9
	3	10	10	10	10	9	9	9	9	9	9
		30	30	30	29	28	28	27			
10 percent test medium	1	10	10	10	10	10	9	9			
	2	10	10	10	10	10	10	10	9	9	9
	3	10	10	10	9	9	9	9	8	8	8
		30	30	30	29	29	28	26			

TABLE 11. (continued) RESULTS OF A BIOASSAY OF THE LIQUID PHASE OF WAIMALU STREAM DREDGE MATERIAL USING THE BRINE SHRIMP *ARTEHIA SALINA*

		Station 3.									
Concentration	Replicate	0hr	4hr	8hr	24hr	48hr	72hr	96hr			
Control Water	1	10	10	10	10	10	10	10	10	10	
	2	10	10	10	9	9	9	9	8	8	
	3	10	9	9	9	9	9	9	8	8	
	4	10	10	10	11	11	11	11	11	11	
	5	10	10	10	10	10	8	8	8	8	
	6	10	10	10	10	10	9	9	9	9	
		60	59	59	59	59	56	54			
100 percent test medium	1	10	10	10	9	9	10	10			
	2	10	9	9	9	9	9	9	8	8	
	3	10	10	10	10	10	9	9	9	9	
		30	29	29	28	27	28	27			
50 percent test medium	1	10	10	10	10	9	9	9			
	2	10	10	10	10	10	10	11	10	10	
	3	10	10	10	10	10	10	9	10	10	
		30	30	30	30	30	29	29	29	29	
10 percent test medium	1	10	10	10	10	10	10	10	9	9	
	2	10	10	10	10	10	10	10	9	10	
	3	10	10	10	10	10	10	9	9	9	
		30	30	30	30	29	28	28	28	28	

TABLE 12. RESULTS OF A BIOASSAY OF THE SUSPENDED PHASE OF WAIMALU
 STREAM DREDGE MATERIAL USING THE MARINE SHRIMP,
 PENAEUS VANNAMEI

Station 1.

Concentration	Replicate	0hr	4hr	8hr	24hr	48hr	72hr	96hr
Control Water	1	10	10	10	10	10	10	11
	2	10	10	10	10	10	10	10
	3	10	10	10	10	10	10	11
		30	30	30	30	30	30	32
100 percent test medium	1	10	10	10	10	7	8	10
	2	10	10	10	8	9	10	10
	3	10	10	10	10	9	7	9
		30	30	30	30	28	25	29
50 percent test medium	1	10	10	11	11	11	11	11
	2	10	10	10	9	10	9	10
	3	10	10	10	10	9	10	10
		30	30	30	30	30	30	31
10 percent test medium	1	10	10	10	10	10	10	10
	2	10	10	10	10	11	9	10
	3	10	10	10	9	9	10	8
		30	30	30	29	30	29	28

TABLE 12. (continued) RESULTS OF A BIOASSAY OF THE SUSPENDED
 PHASE OF WAIMALU STREAM DREDGE MATERIAL USING THE SHRIMP
 PENAEUS VANNAMEI

Station 2.

Concentration	Replicate	0hr	4hr	8hr	24hr	48hr	72hr	96hr
Control Water	1	10	10	10	10	10	10	11
	2	10	10	10	10	10	10	10
	3	10	10	10	10	10	10	11
		30	30	30	30	30	30	32
100 percent test medium	1	10	10	10	7	7	7	8
	2	10	10	10	8	9	10	10
	3	10	10	10	9	8	9	9
		30	30	30	24	24	26	27
50 percent test medium	1	10	10	10	9	10	10	10
	2	10	10	10	11	11	11	11
	3	10	10	10	10	10	10	10
		30	30	30	31	31	31	31
10 percent test medium	1	10	10	10	10	10	10	10
	2	10	10	10	10	10	10	10
	3	10	10	10	8	8	8	8
		30	30	30	28	28	28	28

TABLE 12. (continued) RESULTS OF A BIOASSAY OF THE SUSPENDED PHASE OF WAIHALU STREAM DREDGE MATERIAL USING THE SHRIMP *PENAEUS VANNAMEI*

Station 3.									
Concentration	Replicate	0hr	4hr	8hr	24hr	48hr	72hr	96hr	
Control Water	1	10	10	10	10	10	10	11	
	2	10	10	10	10	10	10	10	
	3	10	10	10	10	10	10	11	
		--	--	--	--	--	--	--	
		30	30	30	30	30	30	32	
100 percent test medium	1	10	10	10	8	9	8	10	
	2	10	10	10	10	9	7	9	
	3	10	10	10	8	8	8	10	
		--	--	--	--	--	--	--	
		30	30	30	28	26	25	29	
50 percent test medium	1	10	10	10	10	10	9	10	
	2	10	10	10	10	9	10	10	
	3	10	10	10	9	9	10	10	
		--	--	--	--	--	--	--	
		30	30	30	29	28	29	30	
10 percent test medium	1	10	10	10	9	9	9	10	
	2	10	10	10	9	10	10	10	
	3	10	10	10	10	10	10	10	
		--	--	--	--	--	--	--	
		30	30	30	28	29	29	30	

TABLE 13. RESULTS OF A BIOASSAY OF THE SUSPENDED PHASE OF WAIHALU STREAM DREDGE MATERIAL USING THE FISH *MUGIL CEPHALIS*

Station 1.									
Concentration	Replicate	0hr	4hr	8hr	24hr	48hr	72hr	96hr	
Control Water	1	10	10	10	10	10	10	9	
	2	10	10	10	10	10	10	10	
	3	10	10	10	10	10	10	10	
		--	--	--	--	--	--	--	
		30	30	30	30	30	30	29	
100 percent test medium	1	10	10	10	10	10	10	10	
	2	10	10	10	10	10	10	9	
	3	10	10	10	10	10	10	10	
		--	--	--	--	--	--	--	
		30	30	30	30	30	28	29	
50 percent test medium	1	10	10	10	10	10	10	10	
	2	10	10	10	10	10	10	10	
	3	10	10	10	10	10	10	10	
		--	--	--	--	--	--	--	
		30	30	30	30	30	30	30	
10 percent test medium	1	10	10	10	10	10	10	10	
	2	10	10	10	10	10	10	10	
	3	10	10	10	10	10	10	10	
		--	--	--	--	--	--	--	
		30	30	30	30	30	30	30	

TABLE 13. (continued) RESULTS OF A BIOASSAY OF THE SUSPENDED PHASE OF WAIMALU STREAM DREDGE MATERIAL USING THE FISH MUGIL CEPHALIS

Station 2.

Concentration	Replicate	0hr	4hr	8hr	24hr	48hr	72hr	96hr
Control Water	1	10	10	10	10	10	10	9
	2	10	10	10	10	10	10	10
	3	10	10	10	10	10	10	10
100 percent test medium	1	30	30	30	30	30	30	29
	2	10	10	10	10	10	10	10
	3	10	10	10	8	10	9	9
50 percent test medium	1	10	10	10	10	10	10	10
	2	10	10	10	10	10	10	9
	3	10	10	10	10	10	10	10
10 percent test medium	1	30	30	30	28	30	29	29
	2	10	10	10	10	10	10	10
	3	10	10	10	10	10	9	9
10 percent test medium	1	30	30	30	30	30	29	29
	2	10	10	10	10	10	9	9
	3	10	10	10	9	10	10	10
		30	30	30	29	29	29	28

TABLE 13. (continued) RESULTS OF A BIOASSAY OF THE SUSPENDED PHASE OF WAIMALU STREAM DREDGE MATERIAL USING THE FISH MUGIL CEPHALIS

Station 3.

Concentration	Replicate	0hr	4hr	8hr	24hr	48hr	72hr	96hr
Control Water	1	10	10	10	10	10	10	9
	2	10	10	10	10	10	10	10
	3	10	10	10	10	10	10	10
100 percent test medium	1	30	30	30	30	30	30	29
	2	10	10	10	10	10	10	10
	3	10	10	10	9	10	10	9
50 percent test medium	1	30	30	30	29	30	29	29
	2	10	10	10	10	10	10	10
	3	10	10	10	10	10	10	10
10 percent test medium	1	30	30	30	30	30	30	30
	2	10	10	10	10	10	10	10
	3	10	10	10	10	10	10	10
10 percent test medium	1	30	30	30	30	30	30	30
	2	10	10	10	10	10	9	8
	3	10	10	10	10	10	9	8
		30	30	30	30	28	27	25

TABLE 14. RESULTS OF A BIOASSAY OF THE SUSPENDED PHASE OF
WAIMALU STREAM DREDGE MATERIAL USING THE BRINE SHRIMP
ARTEMIA SALINA

Station 1.

Concentration	Replicate	0hr	4hr	8hr	24hr	48hr	72hr	96hr
Control Water	1	10	10	10	10	10	10	10
	2	10	10	10	10	10	10	10
	3	10	10	10	10	10	10	10
	4	10	10	10	10	10	10	10
	5	10	10	10	10	10	10	10
	6	10	10	10	10	10	9	9
		--	--	--	--	--	--	--
		60	60	60	60	60	59	59
100 percent test medium	1	10	10	10	10	9	9	9
	2	10	10	10	9	9	9	9
	3	10	10	10	10	10	10	10
		--	--	--	--	--	--	--
		30	30	30	29	28	28	28
50 percent test medium	1	10	10	10	10	10	10	10
	2	10	10	10	10	10	10	10
	3	10	10	10	10	10	10	10
		--	--	--	--	--	--	--
		30	30	30	30	30	30	30
10 percent test medium	1	10	10	10	10	10	10	10
	2	10	10	10	10	9	9	9
	3	10	10	10	10	10	9	9
		--	--	--	--	--	--	--
		30	30	30	30	29	28	28

TABLE 14. (continued) RESULTS OF A BIOASSAY OF THE SUSPENDED
PHASE OF WAIMALU STREAM DREDGE MATERIAL USING THE BRINE SHRIMP
ARTEMIA SALINA

Station 2.

Concentration	Replicate	0hr	4hr	8hr	24hr	48hr	72hr	96hr
Control Water	1	10	10	10	10	10	10	10
	2	10	10	10	10	10	10	10
	3	10	10	10	10	10	10	10
	4	10	10	10	10	10	10	10
	5	10	10	10	10	10	10	10
	6	10	10	10	10	10	9	9
		--	--	--	--	--	--	--
		60	60	60	60	60	59	59
100 percent test medium	1	10	10	10	10	10	10	9
	2	10	10	10	10	10	10	10
	3	10	10	10	10	10	9	10
		--	--	--	--	--	--	--
		30	30	30	30	30	29	29
50 percent test medium	1	10	10	10	10	10	10	10
	2	10	10	10	10	10	10	10
	3	10	10	10	10	10	10	10
		--	--	--	--	--	--	--
		30	30	30	30	30	30	30
10 percent test medium	1	10	10	10	10	10	9	10
	2	10	10	10	10	10	10	10
	3	10	10	10	10	10	10	9
		--	--	--	--	--	--	--
		30	30	30	30	29	29	29

TABLE 14. (continued) RESULTS OF A BIOASSAY OF THE SUSPENDED PHASE OF WAINALU STREAM DREDGE MATERIAL USING THE BRINE SHRIMP ARTEMIA SALINA

		Station 3.									
Concentration	Replicate	0hr	4hr	8hr	24hr	48hr	72hr	96hr			
Control Water											
	1	10	10	10	10	10	10	10	10	10	10
	2	10	10	10	10	10	10	10	10	10	10
	3	10	10	10	10	10	10	10	10	10	10
	4	10	10	10	10	10	10	10	10	10	10
	5	10	10	10	10	10	10	10	10	10	10
	6	10	10	10	10	10	10	10	10	10	10
		--	--	--	--	--	--	9	9	--	--
		60	60	60	60	60	60	59	59	--	--
100 percent test medium											
	1	10	10	10	10	10	10	10	10	10	10
	2	10	10	10	10	10	10	10	10	10	10
	3	10	10	10	10	10	10	10	10	10	10
		--	--	--	--	--	--	--	--	--	--
		30	30	30	30	30	30	30	30	30	30
50 percent test medium											
	1	10	10	10	10	10	10	10	10	10	10
	2	10	10	10	10	10	10	10	10	10	9
	3	10	10	10	10	10	10	10	10	10	10
		--	--	--	--	--	--	--	--	--	--
		30	30	30	30	30	30	30	30	30	29
10 percent test medium											
	1	10	10	10	10	10	10	10	10	10	10
	2	10	10	10	10	10	10	10	10	10	10
	3	10	10	10	10	10	10	10	10	10	9
		--	--	--	--	--	--	--	--	--	--
		30	30	30	30	30	30	30	30	30	29

Solid Phase Bioassay Test Results

The survival data for the three species used in the first set of solid phase bioassays are shown in Table 15. No statistical analysis was done on the first set of solid phase bioassays. The results were deemed inconclusive, since it was observed that predation, cannibalism, and involuntary suicide (Panagus yannagai jumping out of the tanks onto the floor or into other tanks) was occurring.

The survival data for the two species used in the second set of bioassays are shown in Table 16. The variance for the Panagus yannagai data was homogeneous. The Student-Neuman-Keuls multiple range test indicates that the mean survival in dredged material from Stations 2 and 3 is significantly lower ($p < 0.05$) than the mean survival in the control. Mean survival in dredged material from Station 1 is not significantly different from that in the control. Note that the difference between means (survival) in Station 3 and the control exceeds the least significant range (LSR) by only a small percent; and, therefore, the effects of dredged material from station 3 relative to the control are tenuous. (The calculations and tables used in this statistical analysis can be found in Table 17).

No analysis on the Mercenaria mercenaria is required as the survival in all treatments were equal to or greater than the control. A third species of animal to be used in this second set

of solid phase bioassays could not be obtained and therefore the Army Corps of Engineers waived the requirement to repeat this test. Dissolved oxygen in the solid phase tests generally ranged between 5.0 and 6.7 mg/l. The dissolved oxygen dropped below 4 several different times in different tanks during the test due to clogging of air hoses, but this fact did not have an adverse effect on survival of the test animals.

TABLE 15. RESULTS OF A BIOASSAY OF THE SOLID PHASE OF WAIMALU STREAM DREDGED MATERIAL USING THE CLAM TAPES *NARONICA*

Replicate	Control	Station 1	Station 2	Station 3
1	57	32	41	57
2	45	55	48	52
3	56	54	11	36
4	20	52	48	41
5	48	43	41	58
6	52	58	52	29
7	58	68	54	50
‡ Survival	80	84	70	80

PENAEUS VANNAMEI

Replicate	Control	Station 1	Station 2	Station 3
1	16	15	8	16
2	20	18	17	16
3	17	8	18	16
4	22	14	15	17
5	21	16	12	20
‡ Survival	96	71	70	85

TABLE 15. (continued) RESULTS OF A BIOASSAY OF THE SOLID PHASE OF WAIMALU STREAM DREDGED MATERIAL USING THE SHRIMP *PALAEONH* SP.

Replicate	Control	Station 1	Station 2	Station 3
1	4	*	*	*
2	*	*	1	5
3	16	12	16	7
4	18	9	6	16
5	20	14	11	11
‡ Survival	73	58	42	49

* Shrimp from these tanks were not counted.

TABLE 16. RESULTS OF A BIOASSAY OF THE SOLID PHASE OF WAIMALU STREAM DREDGED MATERIAL USING THE SHRIMP *PENAEUS VANNAMEI*

Replicate	Control	Station 1	Station 2	Station 3
1	20	20	16	18
2	19	20	17	16
3	20	20	15	20
4	-20	20	19	19
5	.20	22*	18	18
‡ Survival	99	100	85	91

TABLE 16. (continued) RESULTS OF A BIOASSAY OF THE SOLID PHASE OF WAIMALU STREAM DREDGED MATERIAL USING THE SHRIMP *MERCINERIA MERCINERIA*

Replicate	Control	Station 1	Station 2	Station 3
1	18	14**	19	17
2	20	20	16	20
3	16	20	19	19
4	18	19	20	17
5	19	17	19	18
† Survival	91	94**	93	91

* Two extra shrimp were placed in tank at beginning of bioassay.
 ** Two clams (or empty clam shells) were not found. It is assumed that the tank only had 18 clams since the beginning of the bioassay. If that is not true and the clams were placed in the tank at the beginning of the bioassay, the percent survival would have been 90%.

TABLE 17. RESULTS AND CALCULATIONS FOR STATISTICAL ANALYSIS OF *PENAEUS VANNAMEI* USED IN THE SOLID PHASE BIOASSAY OF WAIMALU STREAM DREDGED MATERIAL

Replicate (n=5)	Control	Station 1	Station 2	Station 3
1	20	20	16	18
2	19	20	17	16
3	20	20	15	20
4	20	20	19	20
5	20	22	18	18
$\Sigma X =$	99	102	85	91 + $\Sigma(X) = 377$
$\bar{X} = \frac{\Sigma X}{n} =$	19.8	20.4	17	18.2
$\Sigma X^2 =$	1,961	2,084	1,455	1,655 + $\Sigma(X^2) = 7,111$
CORRECTED $SS = \frac{\Sigma X^2 - (\Sigma X)^2}{n} =$	0.8	3.2	10.0	8.8 + $\Sigma CORR SS =$
$(\Sigma X)^2 =$	9,801	10,404	7,225	8,281
$\frac{(\Sigma X)^2}{n} =$	1,960.2	2,080.8	1,445	1,656.2 + $\frac{(\Sigma X)^2}{n} = 711.1$
$(\Sigma X)^2 =$	(377) ² = 7106.45			

$$S^2 = \frac{\text{CORRECTED SS}}{n-1} = 0.2$$

$$C = \frac{S^2 \max}{IS} = 2.5 = 0.4386$$

$$C < \text{Crit. } \rightarrow \text{ homogeneity of variances verified}$$

Cochran's Test where $k = 4$ and $v = 4$ → Critical $C_{(4,4)} = 0.6287$

ANOVA Table

Source	df	SS	MS	F
Treatments	3	35.75	11.92	8.39*
Error	16	22.80	1.42	
Total	19	58.55		

$$*F_{0.05}(3,16) = 3.24$$

$F > F_{\text{crit.}} \rightarrow \text{ Treatments are significantly different at } \alpha = 0.05$

$$SX = \sqrt{\frac{MS_{\text{error}}}{n}} = \sqrt{\frac{1.42}{5}} = 0.53$$

TABLE 17. (continued) RESULTS AND CALCULATIONS FOR STATISTICAL ANALYSIS OF PENAEUS VANNAMEI USED IN THE SOLID PHASE BIOASSAY OF WALHALU STREAM DREDGED MATERIAL

LSR for k groups = $Q_{\alpha}(k, v, j) \times s\bar{x}$

From Rohlf & Sokal (1969) Table U : where $\alpha = 0.05$; $v = 16$; $k = 2, 3, 4$

Q	k		
	2	3	4
LSR	2.998	1.649	4.016
	1.59	1.93	2.14

Treatment Means:

\bar{X}_2	\bar{X}_3	\bar{X}_C	\bar{X}_1
17.0	18.2	19.8	20.4

Mean Comparison:

k	LSR	Difference Between Means
3	1.93	$\bar{X}_2 - \bar{X}_3 = 19.8 - 17.0 = 2.8^*$
2	1.59	$\bar{X}_1 - \bar{X}_C = 20.4 - 19.8 = 0.6$ ns
2	1.59	$\bar{X}_1 - \bar{X}_3 = 19.8 - 18.2 = 1.6^*$

*p < 0.05

Bioaccumulation

The results of the bioaccumulation analyses for selected metals and oil and grease are shown in Table 18. The quantity of tissue available in each Tapes japonica (i.e., about 0.10 gm) and the total amount necessary for all analysis (about 20 gm) required that the tissue from all the animals from each sediment test be combined. Thus, replicate analyses could not be performed. No further bioaccumulation analyses were done since results of the sediment analyses were none detected for total pesticides, PCBs, cyanide, phenols and most of the petroleum hydrocarbons.

TABLE 18. RESULTS OF BIOACCUMULATION ANALYSES ON THE CLAM TAPES JAPONICA

Station	SELECTED METALS AND OIL & GREASE (ug/g)			
	Control	1	2	3
Lead	0.27	0.34	0.30	0.40
Cadmium	0.113	0.115	0.173	0.113
Mercury	0.021	0.031	0.015	0.022
Oil & Grease	3,570	4,330	2,550	2,790

DISCUSSION

The survival rates in the liquid and suspended phase bioassays were 90% or better for Mugil cephalis and Panaeus vancouveri, and 80% or better for Artemia salina. The results provide no evidence of toxicity in the sediment collected at any of the three stations tested in Waimalu Stream. However, in order to successfully complete the liquid and suspended phase bioassays using Artemia as the test organism, it was necessary to depart from the protocol for zooplankton bioassays outlined in the implementation manual. Past experience (AECOS 1981) showed direct correlation between test water concentrations and survival rates (i.e., the controls suffered the heaviest mortality rates). The Artemia in the controls were apparently dying of starvation. Consequently, 0.25 milliliters of an Isochrysis algal culture was placed in all brine shrimp bowls daily.

The results of the Mercenaria mercenaria bioassay showed no evidence for toxicity. In fact, there was a higher survival rate in the test sediment than in the controls. The highest Mercenaria survival rate was 94% at Station 2. The Panaeus bioassay, on the other hand, showed evidence of possible toxicity at Station 2 with a survival rate of 85%. Survival rates for stations 1, 3 and the control were over 90%. Observations of surviving shrimp at the end of the test period showed no evidence of stress at any of the stations. The levels of lead, chromium and copper at station 2 were slightly higher, but fairly similar to Station 1. The levels of zinc and nickel were lower than at

Station 1. The cadmium level was higher than at Station 1 and 3 but lower than the control. The cadmium levels in the clam tissue used for bioaccumulation was highest for Station 2 sediment. The level of arsenic was lower than station 3 sediment. The level of mercury in the sediment at Station 2 was 0.057 ppm, or approximately 2.5 times higher than Station 3 sediment and 4 times greater than Station 1 sediment. However, the mercury levels in the clam tissue used for bioaccumulation testing was lowest at Station 2 at 0.015 ppm, the next lowest was at the control station at 0.021 ppm. Total pesticides, PCBs, phenols, and cyanide were not detected in the sediment samples. Most of the petroleum hydrocarbons were not detected. Station 3 sediment and the control station had more petroleum hydrocarbons than Station 2. It is not apparent from the results of the testing that the sediment from Station 2 is toxic.

Bioaccumulation

The bioaccumulation testing was intended to demonstrate the potential for bioconcentration of toxins in the marine organisms when the dredged spoils are released. Unfortunately, the experimental approach used here and used previously by Kimmerer and Brock (1980), is not likely to provide such information. The emphasis in the EPA-mandated approach to bioaccumulation is on metals and chlorinated organics. Most if not all the metals in the test sediment would be in an insoluble form, which would have little interaction with biological systems.

Since the total pesticides, PCBs, cyanide, and phenols were not detected, none of these analyses were done on the bioaccumulation tissue. The clam tissue was analyzed for oil and grease. Although the bioassay plan did not call for total petroleum hydrocarbon analysis, the Army Corps of Engineers suggested that the clam tissue be tested. However, since most of the total petroleum hydrocarbons in the sediment were not detected and 5 laboratories that perform this analysis did not want to test for it in clam tissue the test was omitted. Finally, it should be noted that the environmental parameters in the test aquaria do not even remotely simulate those of the deep ocean environment in which the dredged spoils are being deposited.

Notes on Bioassay Species Utilized

Panaeus vannamei. This shrimp is fairly easy to obtain as it is the most popular aquaculture species in Hawaii at the present time. The shrimp used in these bioassay tests were obtained from Amorient Aquafarms in Kahuku, O'ahu. When using this shrimp, tight-fitting lids should be used on the aquaria. The shrimp become very active (some leaving the aquaria) by disturbances, such as turning the lights on after dark.

Palaemon pacificus. The Palaemon used in these bioassay tests were captured on mud flats at Kahalu'u, O'ahu. Approximately 1,000 shrimp can be readily captured by submerging an 8 foot length of 12 inch pipe. The shrimp seek refuge in the pipe and can be removed in mass by closing one end with a net and lifting the other end out of the water, thereby dumping the lot into the net. The shrimp captured in this manner are always in good condition. The Palaemon readily tolerate the conditions of the static water bioassays. The liabilities of the shrimp are 1) they are highly cannibalistic, and 2) they are extremely active when agitated making sorting, counting, and transferring difficult. Palaemon are not suitable for solid phase bioassays but have been used successfully in liquid and suspended phase bioassays.

Artemia salina. Artemia are potentially the easiest species to handle of all those tested here. Past experience (AECOS 1981) shows that the poor condition of animals received from

pet stores and lack of food were the major problems with this species. Artemia adults obtained from local pet supply shops are almost universally stressed by crowding, poor water quality, or abrupt changes in salinity. Artemia airfreighted in from San Francisco are temperature shocked by being packed on ice and thus are also unsuitable as bioassay specimens. The Artemia used here were acquired from the Hawaii Fish Hatchery in Waianae after having been acclimated to seawater salinity. In addition, the modified bioassay protocol described above, or some other procedure that supplies extra food, is necessary in order to achieve sufficient survival.

Mullus cephalis. The mullet are fairly hardy fish and adapted well to the static water bioassays. The major problem with this fish is finding a supplier. Oceanic Institute provided just enough for the liquid and suspended phase bioassays. They will have no more available until the latter part of this year.

Tapes samidesicata (syn. T. japonica). This infaunal bivalve is an excellent choice for the solid phase bioassay if you can find it in a large size and quantity. The Tapes used in this bioassay was obtained from Ted Kuiper in Eureka, California. The clams from this source are small and not a good choice for bioaccumulation unless a source of larger clams are found.

Mercenaria mercenaria. This clam is available from Aquaculture Research Corporation in Dennis, Massachusetts. This clam is available in larger sizes than the Tapes and would be a better animal to use for bioaccumulation.

Validity of Bioassay Program in Hawaii

A number of serious problems exist with the bioassay program as it is now being applied in Hawaii. The major problems with the program are detailed below.

1. The EPA was slow to act on the submitted plan and species list submitted by AECOS. In fact, the bioassay commenced before EPA approval.

2. A total of 4,200 individual test organisms were used in the bioassay testing reported herein. One field monitoring study on populations of the deep water shrimp (Metorocarpus ensifer), showed that the effect of dredged spoils disposal in deep ocean environments in Hawaii was biostimulatory rather than one of toxicity (Tetra Tech, 1977). After disposal a significant increase in biomass of Metorocarpus occurred at the disposal site, accompanied by significant reductions in biomass both inshore and offshore of the disposal site. The population structure also changed at the disposal site reflecting increases in the percentages of juveniles and gravid females. These population changes occurred as a result of both migration into the disposal area and increased reproductive activity (Tetra Tech, 1977). It

3. The liquid and suspended phases of the bioassay testing have little or no significance to deep ocean disposal. The material is diluted and dissipated so rapidly from the water column that long term effects are either non-existent or so small as to be unmeasurable (Tetra Tech, 1977).
4. The species choices available for use in bioassays are quite limited in Hawaii. Aquatic environments in temperate climates (such as the mainland U.S.) are generally characterized by fewer species present in greater densities than are tropical or sub-tropical ecosystems. Coral reef ecosystems such as are found in Hawaii are characterized by a larger variety of species present in fewer numbers of each. This high species diversity is a basic structural component of coral reef ecosystems. Consequently, procuring anything but aquacultural species is a substantial undertaking. Even aquaculture species are limited in terms of the diversity of species. Attempts to obtain Panacrus monodon were frustrated by the fact that only one aquaculture facility on Oahu is trying to raise them and their harvesting schedule was erratic.
5. The use of a marine fish species in the Hawaii bioassay program is unrealistic unless Oceanic Institute or commercial aquaculture farms are growing them.
6. Because dredged spoils are deposited into extremely deep water in Hawaii, many of the requirements specified in the government implementation manual are difficult if not impos-

sible to follow, or do not simulate actual dump site conditions. Among these requirements are use of dilution water from the dump site, use of reference sediment from the dump site, and use of specific light (i.e., 14 hr L - 10 hr D) and temperature (i.e., $25 \pm 2^\circ\text{C}$) regimes that do not even remotely simulate the deep ocean disposal site at 500 m depth where there is very little light and the temperature is less than 10°C .

SUMMARY AND CONCLUSIONS

1. Liquid and suspended phase bioassay tests utilizing the brine shrimp (Artemia salina), the mullet (Mugil cephalis) and the shrimp (Penaeus vannamei) as the test organisms showed no toxicity for the sediments from Waimalu Stream.
2. The solid phase testing utilizing a bivalve (Mercenaria mercenaria) and the shrimp Penaeus vannamei showed no toxicity for the sediments from Waimalu Stream Stations 1 and 3. It is possible, but improbable that Station 2 is toxic to shrimp.
3. The present program, mandated by the EPA, which utilized 4,200 test organisms to test the toxicity of sediments from three stations located on Waimalu Stream appears to be excessive in scope.
4. The bioaccumulation program mandated by the EPA to assess the potential for bioconcentration appears to be inappropriate for use where anoxic sediment conditions exist.
5. Previous field monitoring at a deep ocean dredge disposal site in Hawaii suggests that such disposal operations do not result in measurable toxicity but rather a biostimulation of the deep water shrimp (Heterocarpus ensifer).

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APPENDIX I

MISCELLANEOUS DATA FROM THE BIOCASSAYS OF THE
SUSPENDED PHASE FOR WAIMALO STREAM
(Requested by Client)

Analysis (all units in mg/l unless otherwise noted)	Control	Station 1	Station 2	Station 3
Nitrate/ Nitrite	0.005	0.016	0.012	0.006
Total Kjeldahl Nitrogen	0.199	3.86	3.90	4.27
Ortho- phosphate	0.017	0.047	0.037	0.032
Total Phosphorus	0.010	0.203	0.103	0.117
Nonfilterable Residue	7.6	58	38	48
Turbidity (NTU)	7.4	47	30	56.2
Salinity (ppt)	34	34	34	34



DEPARTMENT OF THE NAVY
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NAVY REGIONAL HEADQUARTERS
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NAVY REGIONAL HEADQUARTERS
5090
SEE N465/0031
23 OCT 2002

Mr. Rae Loui
Director
Department of Design & Construction
City & County of Honolulu
615 South King Street
Honolulu HI 96843

Dear Mr. Loui:

This responds to your recent request for review comments on the Draft Environmental Assessment, Waialua Stream Dredging, City and County of Honolulu prepared September 2002. We have prepared comments, which are provided in enclosure (1).

Thank you for the opportunity to comment. Please continue to include the Navy on future communications. Should you have any questions or require additional information, please contact Ms. Lisa Chan of my office at (808) 471-1171 extension 223.

Sincerely,

AFW

L. J. MOHREBERGER
Lieutenant, CEC, U. S. Navy
Director
Regional Environmental Department
By direction of
Commander, Navy Region Hawaii

Copy to: Mr. Eugene Dashiell, PIC

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By Eugene Dashiell from Lisa Chan
Per 503-8330 from 41-1171 ext. 223
FORM NO. 1010 1-78

ENVIRONMENTAL COMPLIANCE OFFICE Commander Navy Region Hawaii, Code N465	
Review Comments	DATE: 10/2/02
PROJECT TITLE Draft Environmental Assessment Waialua Stream Dredging	REVIEWED BY: N465/PN/RLAN
ACTIVITY City and County of Honolulu, Hawaii	DATE September 2002
	PAGE: 1 OF 2

Page 2-2 and Page 2-1	1	Change "Commander, Pearl Harbor" to "Commander Navy Region Hawaii" - Please change throughout document if there is additional references other than the two noted.
Section 2-4, Page 2-1	2	The City will need to work with a Navy POC for access to the Harbor.
Chapter 3, Page 3-1	3	Dewatering: The choices of dewatering and implementation of BMPs methods are being left to the contractor. Suggest stronger language be used to prevent adverse impacts to the wetland and sediments of Pearl Harbor.
Table 3-2	4	The information for Alt 1 and Alt 2 in the column for "Locations of disposal and treatment appears to be incorrect. Alt. 1 should be Waipio Peninsula and Alt. 2 should be Blahohli Wetland.
Page 3-2, 2 nd Paragraph	5	Disposal: Recommend adding "from Pearl Harbor" after phrase "(because its capacity is limited) for sediment from Pearl Harbor..." which is contaminated beyond levels acceptable for ocean disposal."
Table 4-4	6	Detection limits should be noted. Also, the list of chemicals should be coordinated with the results of sediment samples collected by the Navy at the mouth of Waialua Stream.
Table 4-4	7	The results that show "ND" are not correct. The results should be shown at less than the detection level.

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

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TIMOTHY E. STEINBERGER, P.E.
ACTING DIRECTOR
GEORGE T. ZALUBANSKI, P.E.
ASSISTANT DIRECTOR

February 26, 2003

CDD-A 03-0028

L.L.M. T. Wolfersberger, Director
CEC, U.S. Navy
Regional Environmental Department
517 Russell Avenue, Suite 110
Pearl Harbor, Hawaii 96860-4884

Dear Lieutenant Wolfersberger:

Subject: Your Letter of October 23, 2002, Regarding the Draft Environmental Assessment for the City's Proposed Waimalu Stream Dredging Project (5090 Ser N465/0031)

Thank you for your letter regarding the Draft Environmental Assessment (EA) for the City's proposed Waimalu Stream Dredging Project.

We have the following response to your concerns:

1. The final EA will include suggested changes to "Commander Navy Region Hawaii".
2. It is our understanding that Lisa Chan is the point of contact at present. Please advise if a different person should be the POC.
3. Language has been added to the final EA to state that the contractor will be required to meet requirements of the State Department of Health regarding water quality in the area.
4. The final EA incorporates the corrected designations for "locations of disposal".
5. The final EA incorporates the suggested addition "... from Pearl Harbor ...".
6. The final EA incorporates the suggested sediment data.
7. The final EA includes the suggested clarification as to detection levels.

L.L.M. T. Wolfersberger
Page 2
February 26, 2003

8. The list of parameters was selected based on contaminants of concern at the times of sediment sampling.
9. The final EA will include a revised paragraph to clarify the statement regarding the functioning of the flood control project as a sedimentation basin.
10. We have requested that the Navy provide us their sediment and metals concentration data for the mouth of Waimalu Stream, and we will incorporate the data into the final EA.
11. The final EA will include a revised paragraph to clarify the statement regarding the functioning of the flood control project as a sedimentation basin.

If you have questions, please contact Tim Trang at 547-7771.

Very truly yours,

TIMOTHY E. STEINBERGER, P.E.
Acting Director

TT:FK:pto

cc: Eugene P. Dashiell, AICP, Environmental Planning Services

Mr. Loui
October 23, 2002
page 2



**UNIVERSITY OF HAWAII
ENVIRONMENTAL CENTER**

A UNIT OF THE WATER RESOURCES RESEARCH CENTER

October 23, 2002
EA: 0295

Ree Loui
City and County of Honolulu
Department of Design and Construction
630 South King Street, 11th Floor
Honolulu, HI 96813

Dear Mr. Loui:

**Draft Environmental Assessment
Waimala Stream Dredging
EWA, Oahu**

The City and County of Honolulu proposes maintenance dredging of 35,000 cubic yards from the Waimala Stream Flood Control Project and disposal of the dredged material at the federally approved ocean disposal site in Mammala Bay. The draft Environmental Assessment anticipates a finding of no significant impact (FONSI).

Short-term effects anticipated during dredging operations include noise, odors, disruption of flora on and near stream banks, suspended sediments, degraded water quality in Waimala Stream, dislocation of aquatic life in the water column, and destruction of benthic life in the flood control channel. The document argues that there are no significant long-term adverse impacts to geology, hydrology, flora and fauna, historic resources, hazardous materials, air quality, noise quality and socio-economic resources. The project area is highly urbanized and has been previously modified by filling, grading, paving and facilities development.

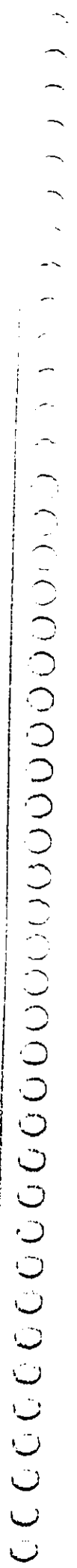
This review was conducted with the assistance of Jacqueline N. Miller, and Dave Sims, Environmental Center.

General Comments

Our reviewers found this document well written and comprehensive. It appears to provide objective and concise information sufficient to make a decision on potential impacts from this dredging operation. Further, the draft EA provides adequate supporting information and substantiation of the conclusion that impacts are not likely to be significant and that an EIS will

not be necessary. However we do have some suggestions for possible consideration in the planning and contracting for this project:

- (1) The design capacity of the channel is 13,600 cfs for the hundred-year flow, and the present capacity is some 9,840 cfs. The current dredging will restore the capacity to the 13,600 cfs. His consideration been given to "over dredge" this channel in order to permit a few years of sediment buildup before the flood capacity is reduced due to siltation? Of course, if the structure of the stream banks cannot withstand additional sediment removal, then the suggestion is moot. On the other hand, if some additional sediment could be removed now, it would likely prolong the time for the next maintenance dredging and would provide a longer period of optimum flood capacity.
- (2) It is our understanding that mainland dredging contracts range from \$3.75/cu yd. for very large jobs (very high volume, i.e. millions of cubic yards projects) to about \$10.00-\$15.00 per cu yd for smaller or more "challenging" jobs. We note that the estimates of cost on this project range from \$28.50/cu yd to \$100.00/cu yd. These numbers are very large and appear to be excessive. Even if we use the high value of \$15.00/cubic yard, the 35,000-yard project would cost only \$525,000. Not...\$1.0-3.5 million!
- (3) Although it is customary to leave the mode of dredging to the contractor (page 3-1, paragraph 2), we note that suction dredging tends to create less turbidity at the dredging site. Also when the material is pumped through a pipeline directly to a barge, there is less need to deal with heights of bridges and barge access. The down side of suction dredging is that in addition to the dredged material being vacuumed, considerable water also is entrained. Subsequently the waiting barge can fill with turbid water, increasing the cost of disposal (water plus sediment) or causing additional water quality problems at the barge site if the excess water is allowed to overflow the barge. This problem has been resolved by having a return pipeline from the barge to the dredging site and pumping the excess water back to the dredging site. Silt curtains control sediment transport at the dredging site.
- (4) According to the draft EA, the source of 96% of the sediment is believed to be from the conservation district (Section 4.13.2). It should be noted that the city could save future costs of dredging if they would initiate better land management practices (erosion control) in that conservation district.



05-03000 F. 04

Mr. Loui
October 23, 2002
page 3

Correction

A minor typo is on page 4-5, section 4.13.2. The quantity of the material to be dredged should be listed as 35,000 cubic yards (not yards).

Thank you for the opportunity to comment on this Draft EA.

Sincerely,

John T. Harrison, Ph.D.
Environmental Coordinator

cc: OEQC
Eugene Dashiell, Environmental Planning Services
Jacquella Miller
James Moncur
Dave Sims

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JEREMY HARRIS
MAYOR

TIMOTHY E. STEINBERGER, P.E.
ACTING DIRECTOR
GEORGET T. MALLOWS, P.E.
ASSISTANT DIRECTOR

February 26, 2003

CDD-A 03-0029

John T. Harrison, Ph.D.
Environmental Coordinator
Environmental Center
University of Hawaii
Krauss Annex 18
2500 Dole Street
Honolulu, Hawaii 96822

Dear Dr. Harrison:

Subject: Your Letter of October 23, 2002, Regarding the Draft Environmental Assessment for the City's Proposed Waimalu Stream Dredging Project

Thank you for your letter regarding the Draft Environmental Assessment (EA) for the City's proposed Waimalu Stream Dredging project.

We have the following response to your concerns:

1. Our initial review of the project design is that it may not support "overdredging", but we will consider this possible project component in the final EA.
2. The cost of dredging the Ala Wai Canal (not including the small quantity of "contaminated" sediment at the Kapahulu end of the canal) is approximately \$42 per cubic yard, including mobilization and demobilization. We anticipate higher costs for the Waimalu Stream project because a lesser volume of material may possibly incur disproportionately larger mobilization and demobilization costs. Also, there are likely to be added costs of security for the operations.
3. Use of silt curtains surrounding the dredging site is considered to be an effective best management practice regardless of the type of dredging machine. Dredging operations at the Ala Wai Canal using a backhoe have been able to meet the requirements of the Department of Health's Water Quality Certification.

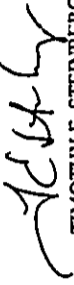
John T. Harrison, Ph.D.
Page 2
February 26, 2003

4. Erosion reduction in the Conservation District is an objective of watershed management and polluted storm water runoff control. The State of Hawaii is participating in the Koolau Watershed Partnership in an effort to improve management within the Conservation District.

5. The final EA corrects the typographic error.

If you have any questions, please contact Tim Trang at 547-7771.

Very truly yours,


TIMOTHY E. STEINBERGER, P.E.
Acting Director

TT:FK:pto

cc: Eugene P. Dashiell, AICP, Environmental Planning Services

BERNARD J. CAFFARO
GOVERNOR



STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
228 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96813
TELEPHONE: (808) 586-4185
FACSIMILE: (808) 586-4186

GENEVIEVE SALMONSON
DIRECTOR

JEREMY HARRIS
MAYOR

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU
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TIMOTHY E. STEINBERGER, P.E.
ACTING DIRECTOR
GEORGE T. TAMAROMO, P.E.
ASSISTANT DIRECTOR

October 23, 2002

Mr. Jan Dacnay
Department of Design and Construction
City and County of Honolulu
650 South King Street, 11th Floor
Honolulu, Hawaii 96813

Mr. Eric Hee, P.E.
Engineer Surveyors Hawaii'i
900 Halekauwila Street
Honolulu, Hawaii 96814-4057

Mr. Eugene P. Dashiell, A.I.C.P.
Environmental Planning Services
1314 South King Street, Suite 951
Honolulu, Hawaii 96814

Dear Messrs. Dacnay, Hee and Dashiell:

Thank you for your submittal of the draft environmental assessment (DEA) for the dredging of a portion of Waimalu Stream situated near Tax Map Keys 9-3-07, 9-3-08, 9-3-09, 9-3-23, and 9-3-24 in the judicial district of 'Ewa. We have reviewed the document and submit the following comments for your consideration and response.

1. **CLOSURE OF BIKE PATH AND STREAM ACCESS DURING DREDGING OPERATIONS:**
Please disclose if access to the bike path and stream will be closed during the project and what measures will be undertaken to inform the public of any such closure.
2. **WATERFOWL NESTING AREAS:** Page 4-2 notes that a 1986 letter of the U.S. Fish and Wildlife Service mentions that the Hawaiian stilt and several species of migratory shorebirds use the mud flats near the Waimalu Stream mouth as loafing and feeding areas. Where if any, are nesting areas in the region for these species?

Thank you for the opportunity to comment. If there are any questions, please call Leslie Segundo, Environmental Health Specialist, at (808) 586-4185.

Sincerely,

GENEVIEVE SALMONSON
Director

Enclosures

February 26, 2003

CDD-A 03-0030

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: Your Letter of October 23, 2002, Regarding the Draft Environmental Assessment for the City's Proposed Waimalu Stream Dredging Project

Thank you for your letter regarding the Draft Environmental Assessment (EA) for the City's proposed Waimalu Stream Dredging project.

We have the following response to your concerns:

1. The final EA will note that we do not anticipate closure of the bike path.
2. There are no waterfowl nesting areas within the project boundaries or nearby which might be impacted by the proposed project. There are known waterfowl nesting areas two miles to the west within the Pearl Harbor National Wildlife Refuge.

If you have any questions, please contact Tim Trang at 547-7771.

Very truly yours,

TIMOTHY E. STEINBERGER, P.E.
Acting Director

TT:FK:pio

cc: Eugene P. Dashiell, AICP, Environmental Planning Services

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PROPERTY OF HONGKONG
RENTAL COMPANY



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
885 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5087

NOV -1 P3:11

OCT 29 2002

HWY-PS 28401

NOV 4 2002

Ms. Rae M. Loui, Director
Department of Design and Construction,
City and County of Honolulu
650 South King Street, 2nd Floor
Honolulu, Hawaii 96813

Dear Ms. Loui:

Subject: Draft Environmental Assessment, Waimalu Stream Dredging, Aiea.
TAMK-9-8-07; 9-8-08; 9-8-09; 9-8-23 9-8-24

The proposed maintenance dredging is not expected to impact our State highway facilities.
We have the following comments:

1. The contractor shall coordinate and acquire any permits needed for movement of heavy equipment on our State roads and for work within the State's highway right-of-way.
2. The contractor shall physically verify abutments and take precautions to avoid damaging our bridges, their abutments and piers, and drainage structures during the dredging operation, especially if barges are used in conveyance equipment, materials, and foundations being undermined.
3. Dredging shall be monitored to ensure that the original dredge line within our bridge structure limits is not exceeded which could result in our abutments, substructures, and foundations being undermined.
4. Dredging operations, including permit plans and specifications, should also be coordinated with our Highways Bridge Design section (Paul Santo, 692-7611).

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P.2

Mr. Rae M. Loui
Page 2

HWY-PS 28401

If there are any questions regarding our actions, please contact Ronald Tsuzuki, Head Planning Engineer, Highways Division, at 587-1333. Please reference file review number: 02-254. In addition, please cc Mr. Tsuzuki with all responses to these comments.

Very truly yours,

Brian K. Minnai
BRIAN K. MINNAI
Director of Transportation

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KAREN HARRIS
MAYOR

TIMOTHY E. STEINBERGER, P.E.
ACTING DIRECTOR
GEORGE T. YAMAMOTO, P.E.
ASSISTANT DIRECTOR

February 27, 2003

CDD-A 03-0031

Mr. Rodney Haraga, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Dear Mr. Haraga:

Subject: Your Letter of October 29, 2002, Regarding the Draft Environmental Assessment for the City's Proposed Waimalu Stream Dredging Project (HWY-PS 2.8401)

Thank you for your letter regarding the Draft Environmental Assessment (EA) for the City's proposed Waimalu Stream Dredging project.

We have the following response to your concerns:

1. We will impose the recommended conditions on the contractor.
2. We will monitor the dredging per your recommendations.
3. We will coordinate the work with the Highways Bridge Design Section.

If you have any questions, please contact Tim Trang at 547-7771.

Very truly yours,

TIMOTHY E. STEINBERGER, P.E.
Acting Director

TT:FK:pio

cc: Ronald Tsuzuki, Head Planning Engineer, Highways Division
Eugene P. Dashiell, AICP, Environmental Planning Services

BERNARD L. CANTLAND
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. BOX 3378
HONOLULU, HAWAII 96801

November 7, 2002

BRUCE S. ANDERSON, P.L.D., M.P.H.
DIRECTOR OF HEALTH

PHONE: (808) 586-4337
FAX: 02-3571epo

Mr. Eugene P. Dashiell, AICP
Environmental Planning Services
1314 South King Street, Suite 952
Honolulu, Hawaii 96813

Dear Mr. Dashiell:

Subject: Draft Environmental Assessment (DEA)
Waimalu Stream Dredging, Aiea, Oahu
Tax Map Key: 9-8-007, 008, 009, 023 & 024

Thank you for the opportunity to review and comment on the subject proposal. The DEA was routed to the various branches of the Environmental Health Administration. We have the following comments:

Solid and Hazardous Waste Branch (SHWB)

The Office of Solid Waste Management (OSWM) notes the use of Waimanalo Gulch landfill as a potential site for the disposal of dredge material. Prior to disposal, we recommend that the City and County of Honolulu consider the reuse or recycling of the dredge material, if constituent levels are appropriate.

Should the dredge material be disposed at the Waimanalo Gulch landfill as proposed, it should be noted that your solid waste management permit requires screening of incoming materials prior to acceptance.

If you have any questions, please contact the Solid and Hazardous Waste Branch, Office of Solid Waste Management, at (808) 586-4226.

Environmental Planning Office (EPO)

This project is located in the Waimalu Stream/Pearl Harbor watershed. Waimalu Stream and Pearl Harbor are currently listed under section 103(d) of the Clean Water Act as being impaired by turbidity. The harbor is also listed for nutrients and suspended solids. The impaired status of these waters requires that the Department of Health establish Total Maximum Daily Loads (TMDLs) suggesting how much the existing pollutant loads should be reduced in order to attain water quality standards in the stream and estuary waters.

Mr. Eugene P. Dashiell, AICP
November 7, 2002
Page 2

Although these TMDLs are yet to be established and implemented, a first step in achieving TMDL objectives would be to prevent any project-related increases in pollutant loads. We expect that this would be accomplished through the proper application of suitable best management practices in all phases of the project.

A TMDL technical study of water quality in Waimalu and other streams in the Pearl Harbor watershed is underway. When TMDLs are established for Waimalu Stream, the State will establish pollutant load allocations for the lands surrounding the stream and develop an implementation plan to improve its water quality. One of the components of this implementation plan will be to reduce the polluted runoff entering the stream under the City's NPDES storm water permit. Thus we suggest that the Department of Design and Construction and other county departments continue participating in the TMDL development process, consult with the Department of Health Clean Water Branch (Engineering Section) to discuss how water pollution control permitting may be linked with TMDL implementation, and plan additional pollutant load reduction practices for future management of the storm drain system.

The assessment of dredging impacts presented relies upon sediment quality data, bioassays, and bioaccumulation test results from over 14 years ago. Although land use boundaries and population in the watershed have not changed since then, the types and amounts of pollutants transported through the watershed and their effects upon stream organisms may have changed. Thus we suggest that the existing sediment and biota in the stream be tested in conjunction with the proposed project.

The cultural impact assessment presented does not identify any of the sources of information used to reach the conclusions that there are no known archaeological or historic sites or known traditional or cultural practices associated with the project. We suggest that these information sources be identified and that the cultural impacts to dredge disposal sites also be considered.

If you have any questions, please call David Penn of the Environmental Planning Office at (808) 586-4337.

Sincerely,

GARY GILL
Deputy Director
Environmental Health Administration

c: SHWB
EPO

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

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JEREMY HARRIS
MAYOR

TIMOTHY E. STEINBERGER, P.E.
ACTING DIRECTOR
GEORGE T. TALLESMORE, P.E.
ASST. PORT DIRECTOR

February 27, 2003

CDD-A 03-0032

Chiyoame Fukino, Ph.D., Director
Department of Health
State of Hawaii
P.O. Box 3378
Honolulu, Hawaii 96801

Attention: Environmental Health Administration

Dear Dr. Fukino:

Subject: Your Letter of November 7, 2002, Regarding the Draft Environmental Assessment for the City's Proposed Waimanū Stream Dredging Project (02Z37/epo)

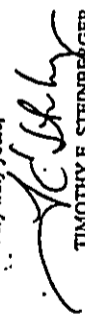
Thank you for your letter regarding the Draft Environmental Assessment (EA) for the City's proposed Waimanū Stream Dredging project.

We have the following response to your concerns:

1. The Final EA discusses reuse or recycling. The recommended alternative is ocean disposal which does not involve use of a landfill.
2. Regarding TMDLs, suitable best management practices (BMPs) will be incorporated into contract specifications, and the Final EA discusses the need for the project to incorporate suitable BMPs during construction.
3. If further sampling and testing is required during the permit application process by the reviewing authorities, such work will be done.
4. The Final EA incorporates reference for the discussion of traditional and cultural practices.

If you have questions, please contact Tim Trang at 547-7771.

Very truly yours,


TIMOTHY E. STEINBERGER, P.E.
Acting Director

TT:FK:pto

cc: Eugene P. Dashiell, AICP, Environmental Planning Services

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU
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JEREMY HARRIS
MAYOR


RANDALL K. FUJIKI, AIA
DIRECTOR
LORETTA S.C. CHUIE
DEPUTY DIRECTOR

2002/ELOG-2746 (DF)

October 9, 2002

MEMORANDUM

TO: RAE M. LOUI, P.E., DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

FROM:  RANDALL K. FUJIKI, AIA, DIRECTOR
DEPARTMENT OF PLANNING AND PERMITTING

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT WAIMALU STREAM
DREDGING, TMK: 2-8-007, 008, 009, 023 AND 024

As requested by Mr. Eugene P. Dashiell of Environmental Planning Services, we have reviewed the subject document and have the following comments to offer:

1. Page 1-2, Alternative 2:

- a) The dredged material should be hauled away after dewatering and not be allowed to permanently remain on the existing wetland area adjacent to Blaisdell Park.
- b) A stockpiling permit may be required if the dredged material is hauled to the existing wetland area for dewatering.
- c) The section should be expanded to include discussion of any special considerations if the dredged material is hauled onto the existing wetland area for dewatering. Will any special permits be required?

2. Page 3-4, Table 3-2: Revise the location of treatment for Alternatives 1 and 2.

If there are any questions, please have your staff contact Mr. Don Fujii of the Site Development Division at extension 7320.

RKF:ky
Doc No. 180697 rev1
✓cc: Environmental Planning Services (Attention: Mr. Eugene P. Dashiell)

DEPARTMENT OF DESIGN AND CONSTRUCTION
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JEREMY HARRIS
MAYOR


TIMOTHY E. STEINBERGER, P.E.
ACTING DIRECTOR
GEORGE S. TAMASAWA, P.E.
ASSISTANT DIRECTOR

February 27, 2003

CDD-A 03-0033

MEMORANDUM

TO: MR. ERIC G. CRISPIN, AIA, ACTING DIRECTOR
DEPARTMENT OF PLANNING AND PERMITTING

FROM:  TIMOTHY E. STEINBERGER, P.E., ACTING DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

SUBJECT: YOUR MEMORANDUM OF OCTOBER 9, 2002, REGARDING THE DRAFT
ENVIRONMENTAL ASSESSMENT FOR THE CITY'S PROPOSED
WAIMALU STREAM DREDGING PROJECT (FILE NUMBER 200200141)

Thank you for your memorandum regarding the Draft Environmental Assessment (EA) for the City's proposed Waimalu Stream Dredging Project.

We have the following response to your concerns:

1. The Final EA incorporates your suggestions to more completely describe Alternative 2.
2. The Final EA incorporates a revision to Table 3-2 per your suggestion.

If you have questions, please contact Tim Trang at 547-7771.

TT:FK:pto

cc: Eugene P. Dashiell, AICP, Environmental Planning Services

CCCCCCCCCCCCCCCCCC

OAHU CIVIL DEFENSE AGENCY
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET • HONOLULU, HAWAII 96813
PHONE: (808) 523-4122 • FAX: (808) 523-2429



JEREMY HARRIS
MAYOR

R. DOUG ATON
ACTING ADMINISTRATOR

September 25, 2002

MEMO TO: RAE LOUI, DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION
FROM: R. DOUG ATON, ACTING ADMINISTRATOR *[Signature]*
SUBJECT: WAIMANU STREAM DREDGING DRAFT EA REQUEST FOR
REVIEW AND COMMENTS

Thank you for the opportunity to review and comment on the above subject. Our review determines that the dredging of Waimanu Stream between the stream mouth at Pearl Harbor upstream to Moanalua Road would enhance the channel's design flow peak discharge capacity. Part of the OCDA's mission statement is to proactively prepare for and mitigate against natural and technological disasters. The Proposed Action certainly is viewed as an effort to protect the public health and safety by restoring the design channel peak discharge capacity of the Waimanu Stream flood control project.

Should you have any questions or concerns, please feel free to call me at 523-4122.

cc: Eugene P. Dashiell, AICP

DEPARTMENT OF ENVIRONMENTAL SERVICES
CITY AND COUNTY OF HONOLULU
 585 ULUKOHA STREET, SUITE 204, HONOLULU, HI 96817



Timothy E. Stemberger, P.E.
 Director
 DEPARTMENT OF ENVIRONMENTAL SERVICES

PRO 01-64

October 21, 2002

MEMORANDUM

TO: RAE M. LOUI, DIRECTOR
 DEPARTMENT OF DESIGN AND CONSTRUCTION

FROM: TIMOTHY E. STEMBERGER, DIRECTOR
 DEPARTMENT OF ENVIRONMENTAL SERVICES

SUBJECT: WAIMALU STREAM DREDGING DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for the opportunity to review the Draft Environmental Assessment for the Waimalu Stream Dredging project. We have no comments at this time.

Should you have any questions, please call Jack P. Buk, Program Coordinator, at 692-5727.

cc: Eugene P. Dashiell, Environmental Planning Services

Public Relations	76-1	Done P/09/12/02
To Eugene Dashiell	Jack P. Buk	
Date	6/11/02	
File #	692-5727	
File #	593-8330	

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU
 850 SOUTH KING STREET, 11TH FLOOR
 HONOLULU, HAWAII 96813
 Phone: (808) 522-4544 • Fax: (808) 522-4587
 Web site: www.honolulu.gov



JEREMY HARRIS
 SALVOR

RAE M. LOUI, P.E.
 DIRECTOR
 ERIC D. CRISPIN, AIA
 DEPUTY DIRECTOR
 GEORGE T. TAMASHIRO, P.E.
 ASSISTANT DIRECTOR
 CDP 02-0249

October 11, 2002

Mr. Eugene P. Dashiell, AICP
 Environmental Planning Services
 1314 South King Street, Suite 952
 Honolulu, Hawaii 96814

Dear Mr. Dashiell:

Subject: Waimalu Stream Dredging
Draft Environmental Assessment – September 2002

We are returning the enclosed Draft Environmental Assessment with our comments noted thereon for your appropriate attention and action.

If there are any questions, please contact Gregory Sue at 527-6304.

Very truly yours,

 RAE M. LOUI, P.E.
 Director

GS:ct

Enclosure

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DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU
850 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
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RAE M. LOUI, P.E.
DIRECTOR
ERIC B. CRONIN, AIA
DEPUTY DIRECTOR
GEORGE E. TAMARINO, P.E.
ASSISTANT DIRECTOR

JEREMY HARRIS
MAYOR

DEPARTMENT OF FACILITY MAINTENANCE
DIVISION OF ROAD MAINTENANCE
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, HONOLULU, HAWAII 96813
TELEPHONE: (808) 522-4071 FAX: (808) 522-4077



LARRY J. LEOPARDI, P.E.
ACTING DIRECTOR AND CHIEF ENGINEER

RECEIVED
CIVIL DIVISION
C & C OF HONOLULU

OCT 15 12 1

CDD-A 02-0276

October 28, 2002

Mr. Eugene P. Dashiell, AICP
Environmental Planning Services
1314 South King Street, Suite 952
Honolulu, Hawaii 96814

Dear Mr. Dashiell:

Subject: Waimalu Stream Dredging
Draft Environmental Assessment - September 2002

We are forwarding the Department of Facility Maintenance, Division of Road Maintenance's response to the Draft Environmental Assessment.

Should you have any questions, please contact Jann Dacanay of the Civil Division's Section A at 547-7506.

Very truly yours,

RAE M. LOUI, P.E.
Director

JD:FK:pto
Attach.
cc: DEM-Road Division (Hugh Liu)

October 10, 2002

MEMORANDUM

TO: MARVIN M.W. CHAR, CHIEF
CIVIL DESIGN AND ENGINEERING DIVISION
DEPARTMENT OF DESIGN AND CONSTRUCTION

FROM:
LARRY LEOPARDI, CHIEF
DIVISION OF ROAD MAINTENANCE

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT
WAIMALU STREAM DREDGING

We have reviewed the subject draft environmental assessment and offer no comments. Should you have any questions, please contact Hugh Liu of my staff at 5337.

IN WRITING TO:
DRM 02-800

DOC
Received

OCT 15 2002

CRD
02-402197

Eugene P. Dashiell, AICP
Environmental Planning Services
1314 South King Street, Suite 951
Honolulu, Hawaii 96814

Tel/Fax: 808-593-8330
Cell: 808-371-0745
E-Mail: dashiell@java.net
www.java.net/environmental-planning



DEPARTMENT OF THE NAVY
COMMANDER
NAVY REGION HAWAII
817 ROSELL AVENUE, SUITE 118
PEARL HARBOR, HAWAII 96844-4814

April 13, 2001

Commander
Pacific Division
Naval Facilities Engineering Command
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

Mr. Eugene P. Dashiell, AICP
Environmental Planning Services
1314 South King Street, Suite 951
Honolulu Hawaii 96814

Dear Mr. Dashiell:

Subject: Request for Assistance to Obtain Approval to Transport Dredge Material from Waimalu Stream via Seagoing Vessel or Tug and Barge through Pearl Harbor to the Federally Approved Ocean Disposal Site and CDF (Confined Disposal Facility) at Waipio Peninsula

1. On behalf of the City and County of Honolulu we are preparing an Environmental Assessment for maintenance dredging of the Waimalu Stream Flood Control Project. Our preferred disposal alternative is likely to be at the federally approved offshore disposal site in Mamala Bay. We have approximately 35,000 cubic yards of material to dispose which we consider to be uncontaminated and suitable for ocean or other disposal. Maintenance dredging is required at this location to maintain adequate channel capacity for protection of public health and safety. The project was previously dredged and the material ocean-disposed in 1986-1987.
2. We request your assistance in obtaining permission to transport this material by seagoing vessel (or tug and barge) from the dredge site to the disposal area.
3. We would like to consider use of Waipio Peninsula as an alternative disposal site for purposes of preparing the Environmental Assessment. If possible, can you provide us a copy of the Environmental Assessment prepared by your office for the subject CDF?

Please call me (593-8330 or 371-0745) to discuss this or if you have questions. Thank you for your assistance in this matter.

Sincerely Yours,

Eugene P. Dashiell

Eugene P. Dashiell, AICP

Copies: E. Hee, P.E., Engineers Surveyors Hawaii, Tyler Sugihara, P.E., City and County of Honolulu

5090
Ser N465/10045
31 OCT 2001

SUBJECT: REQUEST FOR ASSISTANCE TO OBTAIN APPROVAL TO TRANSPORT DREDGE MATERIAL FROM WAIMALU STREAM VIA SEAGOING VESSEL OR TUG AND BARGE THROUGH PEARL HARBOR TO THE FEDERALLY APPROVED OCEAN DISPOSAL SITE; AND CDF (CONFINED DISPOSAL FACILITY) AT WAIPIO PENINSULA

In response to your April 13, 2001 letter for the proposed maintenance dredging of the Waimalu Stream Flood Control Project, we regret to inform you that we cannot support your request to utilize the Navy's Confined Disposal Facility located at Waipio Peninsula for disposal of Waimalu Stream dredged materials.

With regard to the possibility of transporting dredged material by barge from the Waimalu Stream site through Pearl Harbor to the ocean disposal site in Mamala Bay, security requirements preclude unrestricted transit through Pearl Harbor by any/all commercial vessels at this time. However, should the security situation change, we would be happy to discuss the conditions under which transport might be allowed depending upon more detailed information related to your specific requirement (i.e. time, quantity, duration, number of trips, security considerations, environmental controls, etc.).

Should you have any further questions, please contact Ms. Julie Muraoka at 471-1171, extension 274.

Sincerely,

J. L. Mustain

J. L. MUSTAIN
Captain, CEC, U. S. Navy
Program Manager for Facilities,
Environmental,
Safety & Passenger Transportation
By direction of
Commander, Navy Region Hawaii

Eugene P. Dashiell ACP
Environmental Planning Services
1314 South King Street, Suite 951
Honolulu, Hawaii 96814

Telephone/FAX: 808.593.8330
Cell Phone/Voice Mail: 371.0745
E-mail: dashiell@lava.net
www.lava.net/environmental-planning

August 22, 2000

Member, American Institute of Certified Planners

U.S. Army Engineer District
Attention: Mr. George Young
U.S. Army Corps of Engineers, Building T-1
Fort Shafter, Hawaii 96858

Dear Mr. Young:

Subject: Waimalu Stream - Proposed Maintenance Dredging

The City and County of Honolulu is proposing to perform maintenance dredging of the channelized portion of Waimalu Stream and a small tributary, approximately between H-1 and Pearl Harbor (see attached map). This project was previously dredged in the late 1980's under PODCO-O 1996-D. At that time, an estimated volume of 54,000 cubic yards was dredged and hauled by barge through Pearl Harbor to an approved disposal site in the Pacific Ocean.

We anticipate a similar or lesser volume of sediment to be dredged, but will not know for sure until the surveys are completed. It is likely that ocean disposal will also be a preferred alternative.

My firm is working with AECOS (Snookie Mello), under subcontract to Engineers Surveyors Hawaii (Eric Hee) on behalf of the City (Department of Design and Construction, Tyler Sughara).

We request a determination from your office regarding the proposed project, and also your assistance and participation during our development of the sampling plan. It may be appropriate for us to meet with you regarding this project before we proceed. If so, please call me at 593-8330 or 371-0745.

Sincerely yours,

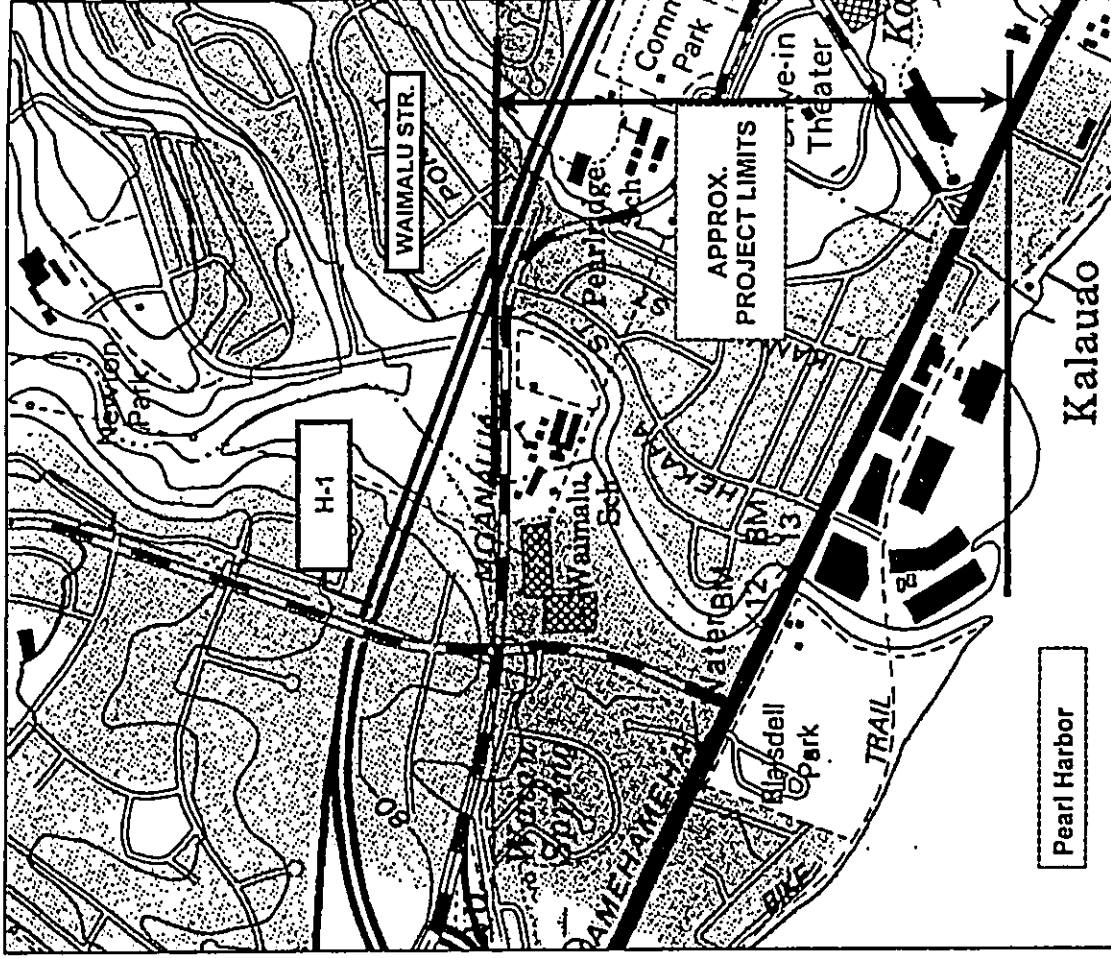


Eugene P. Dashiell

Enclosure

Copies with enclosure: DOH-CWB; DLNR-CWRM; ESH, AECOS

Waimalu Stream - Proposed Maintenance Dredging
City and County of Honolulu
(Not to Scale)



Eugene P. Dashiell AICP
Environmental Planning Services
1314 South King Street, Suite 951
Honolulu, Hawaii 96814

Telephone/FAX: 808.593.8330
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E-mail: dashiell@lava.net
www.lava.net/environmental-planning

October 20, 2000

Member, American Institute of Certified Planners

U.S. Army Engineer District
Attention: Mr. Farley Watanabe
U.S. Army Corps of Engineers, Building T-1
Fort Shafter, Hawaii 96858

Dear Mr. Watanabe:

Subject: Waimalu Stream - Proposed Maintenance Dredging

Per our discussion of October 17, I am enclosing a copy of the recent survey of the subject project area. ESH is working to prepare a drainage study, stream profiles and quantity take-offs. When these products are available I will forward them to you.

I have also enclosed a one-half size copy of the design drawings for the previous dredging project of 1989. If we find a full size set of drawings I will forward copies to you.

Snookie Mellow of AECOS and I will be in contact with you, perhaps next week to further discuss our proposed procedure on this project.

If you have questions or comments, please call me at 593-8330 or 371-0745.

Sincerely yours,

Eugene P. Dashiell

Enclosure

Copies w/o: ESH, AECOS

HONOLULU J. CAFFERTINO
GOVERNOR



STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. BOX 3378
HONOLULU, HAWAII 96831-3378

November 27, 2000

SPENCE S. ANDERSON, PH.D., M.P.H.
DIRECTOR OF HEALTH

BY: [Signature]
11062ccc.00

Mr. Eugene P. Dashiell, AICP
November 27, 2000
Page 2

A Water Quality Certification issued by the Department under the authorization of CWA, §401, HRS, §§342D-50(a) and 342D-53, and HAR, §11-54-09.1 is required if the Honolulu Engineer District (HED) determines that the proposed maintenance dredging and ocean disposal activities require a Department of Army permit authorized under CWA §404.

4. If mechanical dredging (such as clam shell dredging) is used, adverse impact resulting from the initial dredged spoils dewatering process shall be minimized before the dredged spoils be loaded on to the barge.

Should you have any questions, please contact Mr. Edward Chen, Engineering Section of the Clean Water Branch, at (808) 586-4309.

Sincerely,

[Signature]
DENIS R. LAU, P.E., CHIEF
Clean Water Branch

EC:cr

C: HED/COE
CWRM/DLNR
Office of Planning/CZM Program, DBEDT
EPO/DOH
Tyler Sugihara, DDC/CCH

Mr. Eugene P. Dashiell, AICP
Environmental Planning
1314 South King Street, Suite 951
Honolulu, HI 96814

Dear Mr. Dashiell:

Subject: Comments on the Proposed Waimalu Stream Maintenance Dredging Project

Thank you for the opportunity to review and comment on the subject project. Your letter of August 22, 2000 was received on November 15, 2000. The following are our comments:

1. Waimalu Stream discharges into Pearl Harbor. The proposed dredging activity also involves a section of the stream channel that is tidally influenced by the Pearl Harbor Estuary. Pearl Harbor Estuary is listed by the Department of Health (Department) as "Water Quality Limited Segment" in accordance with §303(d) of the Federal Clean Water Act (CWA) and may be subject to additional water pollution control requirements such as Total Maximum Daily Load. Please contact the Department's Environmental Planning Office at (808) 586-4337 for details.
2. In compliance with requirements contained in §342D-50(a) of the Hawaii Revised Statutes (HRS) and §11-54-03 of the Hawaii Administrative Rules (HAR), site-specific best management practices shall be developed and implemented to isolate and confine the construction (including dredging) activity(ies) and prevent the potential pollutant(s) discharges from entering or reentering State waters. An applicable monitoring and assessment plan shall also be developed and implemented to ensure the compliance of applicable State water quality standards as specified in HAR, Chapter 11-54.
3. The following discharges shall not be allowed:
 - a. Return flow/overflow of decant water or supernatant from the dredged spoils or runoff from the barge during the barge loading process.
 - b. Return flow or spills from the barges while transporting dredged spoils for ocean disposal.

Eugene P. Dashiell AICP
ENVIRONMENTAL PLANNING
1314 South King Street, Suite 951
Honolulu, Hawaii 96814

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E-mail: dashiell@lava.net
Internet: <http://www.lava.net/environmental-planning>

Member, American Institute of Certified Planners

August 22, 2000

Department of Health
Clean Water Branch
Attn: Mr. Dennis Lau
919 Ala Moana Blvd., 3rd Floor
Honolulu, Hawaii 96814

Dear Mr. Lau:

Subject: Waimalu Stream Maintenance Dredging

I am writing to request a determination from your agency regarding the subject work. I have attached our letter to the Corps of Engineers regarding our request for a determination of their jurisdiction, and a request for their assistance/coordination. If you would like to inspect the project area with us, or attend coordination meetings of the permitting agencies please let me know.

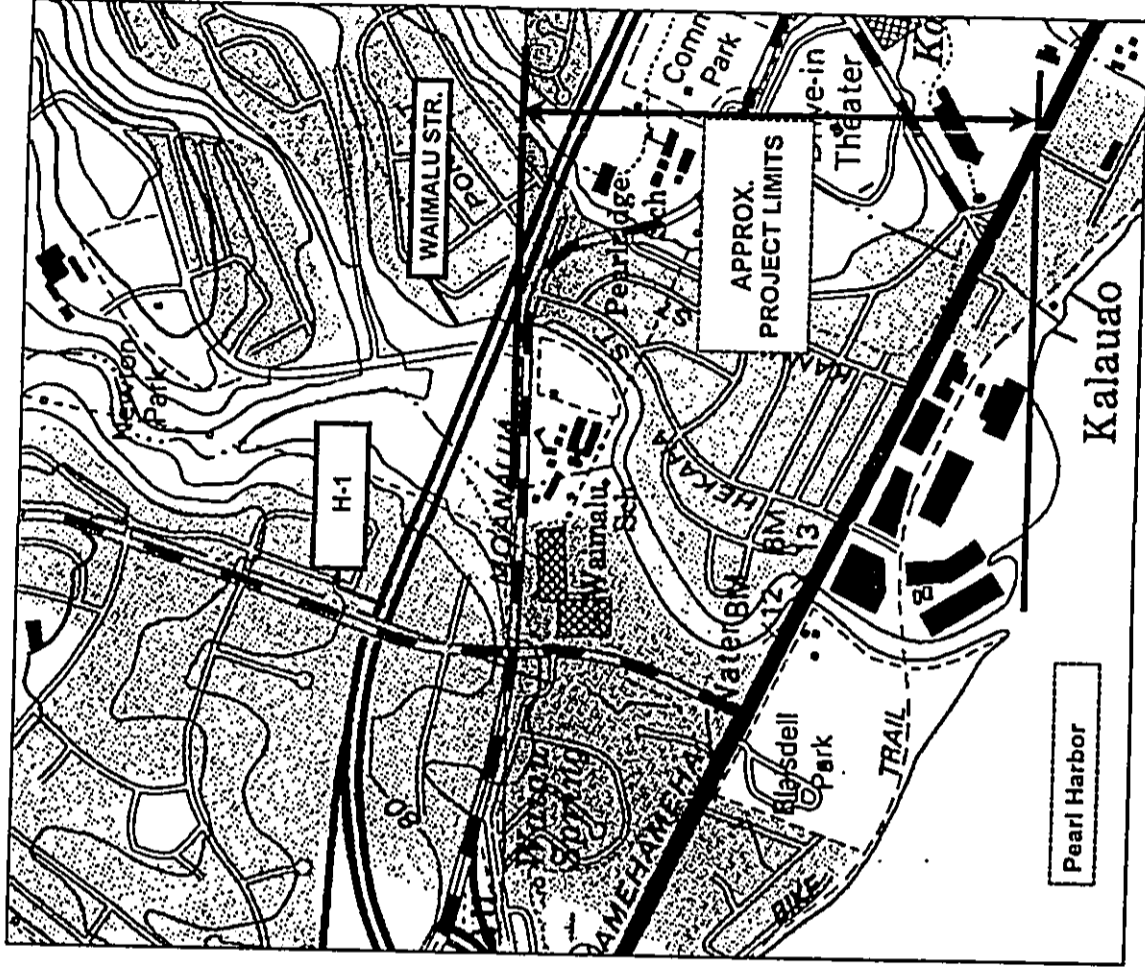
Please call me (593-8330) if you have comments or questions.

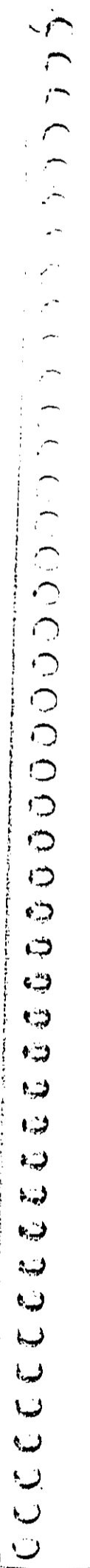
Sincerely yours,


Eugene P. Dashiell

Enclosure

Waimalu Stream -- Proposed Maintenance Dredging
City and County of Honolulu
(Not to Scale)





Eugene P. Dashiell, AICP
Environmental Planning Services
1314 South King Street, Suite 951
Honolulu, Hawaii 96814

Tel/Fax: 808.593.8330
Call: 808.371.0745
E-Mail: dashiell@lava.net
www.lava.net/environmental-planning

April 13, 2001

Commander
Pacific Division
Naval Facilities Engineering Command
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

Subject: Request for Assistance to Obtain Approval to Transport Dredged Material from Waimalu Stream via Seagoing Vessel or Tug and Barge through Pearl Harbor to the Federally Approved Ocean Disposal Site, and CDF (Confined Disposal Facility) at Waipio Peninsula

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Please call me (593-8330 or 371-0745) to discuss this or if you have questions. Thank you for your assistance in this matter.

Sincerely Yours,

Eugene P. Dashiell, AICP

Copies: E. Hee, P.E., Engineers Surveyors Hawaii; Tyler Sugihara, P.E., City and County of Honolulu