DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU

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DEPUTY DIRECTOR

2004/ED-12(sn)

December 23, 2005

RECEIVED
'05 DEC 27 A10:55
OFC. OF ENVIRONMENTAL QUALITY CONTROL

The Honorable Genevieve Salmonson, Director
Office of Environmental Quality Control
State of Hawaii
State Office Tower, Room 702
235 South Beretania Street
Honolulu, Hawaii 96813

Dear Ms. Salmonson:

Re: Final Environmental Impact Statement (EIS)
Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Tax Map Keys 9-1-11: portion 7 and 9-1-12: portion 25

We respectfully request publication of the Final EIS in the next available OEQC Environmental Notice. Attached please find the following items:

- Five copies of the Final EIS.
- Completed OEQC publication form and diskette.
- An acceptance report.
- Completed Distribution Cover Letter to participants.
- Completed Distribution List.

Should you have any questions, please contact Sharon Nishiura of our staff at 523-4256.

Very truly yours,

Henry Eng, FAICP, Director
Department of Planning and Permitting

HE:nt

Attachments

posse doc 418073

ACCEPTANCE REPORT

KALOI GULCH DRAINAGEWAY IMPROVEMENTS
AT ONEULA BEACH PARK
FINAL ENVIRONMENTAL IMPACT STATEMENT (EIS)
TAX MAP KEY 9-1-12: PORTION 25 AND 9-1-11: PORTION 7

I. DESCRIPTION OF SITE

The total project site is about 6.9 acres and is located at the eastern end of the existing Oneula Beach Park. Oneula Beach Park is located within Ewa Beach, Oahu, and is owned and operated by the Department of Parks and Recreation, City and County of Honolulu (City). A portion of the project site will extend onto land that is currently owned by the applicant but will be dedicated to the City for expansion of the beach park.

Surrounding uses in the area include the Ocean Pointe development to the north and west, the Ewa Beach community to the east and the Pacific Ocean to the south. The site lies entirely within the Special Management Area (SMA) and is subject to a 40-foot shoreline setback.

II. PROPOSED DEVELOPMENT

The applicant proposes to construct the Kaloi Gulch drainageway to provide an ocean outlet through the Oneula Beach Park. The purpose of the project is to provide flood control and address regional drainage for all communities within the Kaloi Gulch watershed. The proposed improvements will be designed to meet current City 100-year storm flow requirements in accordance with its storm drainage standards. The applicant will finance construction of the project.

The existing temporary emergency drainage channel will be modified and enlarged to create a drainageway that will be about 500 feet wide and about 4 to 6 feet deep with gently sloping banks on each side. The proposed improvements include the following:

- Grading of the drainageway, including lowering a 500-foot long section of the existing shoreline berm to allow passage of the 100-year storm flow and raising the banks along the edges of the channel to contain the storm water.
- Reconstruction of a portion of the existing park access road. The roadway within the drainageway will operate as a ford structure that will allow passage of storm flows. The existing utilities will also be relocated across the drainageway.
- Construction of a second access road, in the event the main access road becomes unusable.
- Landscaping of the channel, consistent with the remainder of the park.

The proposed improvements will require a Special Management Area Use Permit (SMP) and a Shoreline Setback Variance.

III. PROCEDURE

A. An EIS Preparation Notice for the proposed project was published in the June 8, 2004 issue of The Environmental Notice. The 30-day consultation period ended on July 8, 2004. A total of 20 consultation letters were received. Comments received were incorporated and addressed in the Draft EIS.

B. Notice of the Draft EIS was published in the December 23, 2004 issue of The Environmental Notice. The 45-day public review period ended on February 7, 2005, and 23 consultation letters were received. All substantive comments were responded to by the applicant, and both comments and responses have been included in the Final EIS.

C. The Final EIS was submitted to the Department of Planning and Permitting (DPP) on December 19, 2005. Notice of the availability of that document will be published in the January 08, 2006 issue of The Environmental Notice.

D. The Final EIS includes a list of Federal, State and County agencies, public and community organizations, and individuals that were consulted curing the preparation of the EIS.

IV. EIS CONTENT

The Final EIS complies with the content requirements set forth in Section 11-200-18 of the State Department of Health Administrative Rules.

V. RESPONSES TO COMMENTS

The applicant responded to comments that were raised during the EIS Preparation Notice and Draft EIS public review periods. These comments and responses are found in Chapter 13 of the Final EIS.

VI. UNRESOLVED ISSUES

The Executive Summary of the Final EIS lists the following as unresolved issues:

A. The applicant is working with the appropriate City departments and other landowners and developers in the Kaloi drainage basin to legally define the maintenance obligations associated with the Kaloi Gulch drainageway, including: keeping the drainageway free of large debris and maintenance of the landscaping; periodic removal of accumulated silt and sediments following major storm events; and periodic inspection and maintenance of the berm height, if required.

B. The Oneula Beach Park Master Plan and the SMP (Resolution No. 01-228) approving the master plan will have to be amended to accommodate the proposed drainageway through the park. The forthcoming SMP application will address the modification to the master plan and previous SMP approval.

C. The final engineering design plans for the project are under development and will be coordinated for review and approval by the appropriate governmental agencies including the DPP, Department of Design and Construction, Department of Facility Maintenance and Office of Civil Defense. The design elements include: topographic information relating to grading and earthwork; location and details of the detour and secondary access road; details for irrigation, grass and other plant materials; and the relocation of the utilities.

In addition to the above, the following is another unresolved issue associated with the project:

D. The applicant is working with the appropriate agencies, including the Oahu and State Civil Defense, to coordinate flood preparedness. The applicant indicates that final and more detailed plans will be developed in the engineering design phase to address flood preparedness, including: notification system, such as signage, to make park users aware of the drainageway; an early warning system and evacuation procedures in the event of flooding; and recovery and clean-up procedures after a storm flow.

VII. DETERMINATION

Additional information and updates regarding the unresolved issues described in Section VI of this report can be provided in the land use permit applications required for the proposed project. Therefore, notwithstanding the above concerns and issues, the DPP of the City and County of Honolulu has determined this Final EIS to be ACCEPTABLE under the requirements of Chapter 25, Revised Ordinances, and Chapter 343, Hawaii Revised Statutes.

Approved _____

Henry Eng, FAICP, Director
Department of Planning and Permitting

DN 418072

FINAL ENVIRONMENTAL IMPACT STATEMENT
Prepared in Accordance with Hawaii Revised Statutes, Chapter 343 and
Hawaii Administrative Rules, Title 11, Chapter 200

Kaloi Gulch Drainageway Improvements at Oneula Beach Park

District of ʻEwa, Oahu, Hawaii
TMKs: (1) 9-1-011: Portion of Parcel 007 and
(1) 9-1-012: Portion of Parcel 025

December 2005

Prepared for:
HASEKO (Ewa), Inc.
91-1001 Kaimalie Street
Suite 205
ʻEwa Beach, Hawaii 96706

Prepared by:
R.M. Towill Corporation
420 Waiakamilo Road, Suite 411
Honolulu, Hawaii 96817-4941

RMTC Reference No. 1-19944-0/2P

FINAL ENVIRONMENTAL IMPACT STATEMENT

Kaloi Gulch Drainageway Improvements at Oneula Beach Park

District of ʻEwa, Oahu, Hawaii
TMKs: (1) 9-1-011: Portion of Parcel 007 and
(1) 9-1-012: Portion of Parcel 025

December 2005

Prepared Pursuant to
Hawaii Revised Statutes (HRS), Chapter 343, and
Hawaii Administrative Rules (HAR), Title 11, Chapter 200

Prepared for:
HASEKO (Ewa) Inc.
91-1001 Kaimalie Street, Suite 205
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420 Waiakamilo Road, Suite 411
Honolulu, Hawaii 96817

Brian Takeda

Brian Takeda, Planning Project Coordinator

December 15, 2005
Date of Approval

This document and all ancillary documents were prepared under my direction or supervision. This information, to the best of my knowledge, fully addresses document content requirements as set forth in HAR, Sections 11-200-17 and 11-200-18, as appropriate.

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Appendix B—-1 Numerical Modeling of Storm Drain Dischage Plume Transport, Ocean Pointe Marina, Oahu, Sea Engineering, Inc., August 2004

Appendix B-2 Kaloi Gulch Watershed Hydrologic and Sediment Study, R.M. Towill Corporation, August 2004

Appendix C – Botanical Resources Assessment Study, Kaloi Gulch Drainageway, Ewa District, Oahu, Char & Associates, June 2004

Appendix D – Avian Assessment of the Proposed Kaloi Drainageway Improvements at Oneula Beach Park Project, Rana Productions Ltd., June 2004

Appendix E – Supplemental Archaeological Survey: Subsurface Testing of Beach Areas at Marina Channel and Kaloi Drainage Channel, Ocean Pointe Project, Paul H. Rosendahl, Ph.D., Inc., July 2004

Appendix F – Oral History and Historical Documentation:
1) Report 1596-033199: Phase III Archaeological Site Preservation Plan: Phased Mitigation Program, Ewa Marina Community Project, Land of Honouliuli, Island of Oahu, Paul H. Rosendahl, Ph.D., Inc., March 1999, Appendix B: Limited Oral History Interviews; and

2) Historical Documentation Concerning the Honouliuli Area and Kamaaina Interiviews, (Compilation of Various Sources), R.M. Towill Corporation, July 2004

Appendix G Concept Plan, Kaloi Drainageway Improvements at Oneula Beach Park, Ewa, Oahu, Hawaii, R.M. Towill Corporation, April 2005.

PROJECT SUMMARY

Project	Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Proposed Action	Construction of drainageway improvements including: (1) widening of the temporary emergency drainage channel; (2) reconstruction of existing access road; and (3) accessory improvements including grassing, landscaping, fencing, and installation of signage.
Applicant or Proposing Agency	HASEKO (Ewa), Inc. 91-1001 Kaimalie Street, Suite 205 Ewa Beach, Hawaii 96706 Nelson W.G. Lee, Executive Vice President
Accepting Authority	Department of Planning and Permitting City and County of Honolulu 650 South King Street, 7th Floor Honolulu, Hawaii 96813 ~~Eric Crispin, AIA, Director~~Henry Eng, FAICP, Director
EIS PN Preparer	R. M. Towill Corporation 420 Waiakamilo Road, Suite 411 Honolulu, Hawaii 96817 Brian Takeda, Planning Project Coordinator
Location	Oneula Beach Park, Ewa Beach, Oahu TMK: (1) 9-1-12: 025
Land Ownership	Department of Parks and Recreation City and County of Honolulu 1000 Uluohia Street, Suite 309 Kapolei, Hawaii 96707 ~~William Balfour, Jr.~~Lester K.C. Chang, Director TMK: (1) 9-1-011: 007 HASEKO
TMKs	(1) 9-1-011: Portion of parcel 007 (1) 9-1-012: Portion of parcel 025
Project Area	~~3.7 acres within the approximately 28 acre Oneula Beach Park~~6.9 Acres
Existing Land Use	Beach Park
County Zoning	P-2, General Preservation
State Land Use	Urban

Permits (As Required)	FEDERAL: None STATE: Conservation District Use Permit; National Pollutant Discharge Elimination System (NPDES), Notice of Intent (NOI), for Discharges of Storm Water Assoc. w/Construction Activity; and NPDES Municipal Separate Storm Sewer System coordination with Dept. of Parks and Recreation. CITY AND COUNTY OF HONOLULU: Special Management Area Use Permit; Shoreline Setback Variance, Grading Permit.

EXECUTIVE SUMMARY

ES.1 PROJECT OVERVIEW

Haseko (Ewa), Inc. (HASEKO) proposes to ~~improve~~construct the ~~existing~~ Kaloi Gulch drainageway to provide an ocean outlet through the Oneula Beach Park in 'Ewa Beach, Oahu. The improvements will involve modifying and enlarging the existing ~~drainageway and~~ temporary emergency drainage channel. The improvements are needed to provide flood control and address regional drainage for all communities within the Kaloi Gulch Watershed.

The proposed drainageway improvements will consist of smoothening out a portion of the park to accommodate runoff overflow from the watershed. The improved drainageway will have gently sloping banks on each side. A ford will be used along the park access road to cross the drainageway. Following construction, the drainage channel will be returned to a normal condition ~~and grassed.~~consistent with the remainder of the park. The proposed improvements will be designed to meet City and County of Honolulu (City) 100-year storm flow requirements in accordance with its current Storm Drainage Standards.

ES.2 PROJECT LOCATION

The proposed project location is within the Oneula Beach Park, owned and operated by the City Department of Parks and Recreation (DPR). The project site consists of a ~~3.7~~ 6.9-acre area at the extreme eastern end of Oneula Beach Park (Tax Map ~~Key (TMK~~Keys (TMKs): (1) 9-1-011: portion of parcel 7 and (1) 9-1-012: portion of parcel 25), located in Honouliuli, in the 'Ewa District of Oahu. Oneula Beach Park is a 28-acre passive recreational park next to the Pacific Ocean (see **Figures 1-1**, **1-2** and **1-3**).

ES.3 PURPOSE AND NEED FOR THE PROJECT

The purpose of this project is to provide flood control and address regional drainage for all communities within the Kaloi Gulch Watershed. Specifically, the project is needed to enable the Kaloi Gulch drainageway through Oneula Beach Park to meet current City drainage standards for the 100-year storm flow.

ES.4 PURPOSE OF THE ~~DRAFT~~FINAL ENVIRONMENTAL IMPACT STATEMENT (~~DEIS~~FEIS)

~~The purpose of this Draft Environmental Impact Statement (DEIS) is to inform interested parties of the proposed project and to seek public comment on subject areas that should be addressed prior to the acceptance of the Final Environmental Impact Statement (FEIS). This DEIS describes existing conditions at the site and addresses the potential for adverse environmental impacts as a result of the~~ This Final Environmental Impact Statement (FEIS) is prepared for construction of the proposed Kaloi Gulch Drainageway Improvements at Oneula Beach Park project. This document is prepared in accordance with Chapter 200, Title 11, Hawaii Administrative Rules (HAR), and Chapter 343, Hawaii Revised Statutes.

The following criteria under Chapter 343, Hawaii Revised Statutes (HRS), may be triggered by this proposed ~~action. This document is prepared in accordance with Chapter 343, Hawaii Revised Statutes (HRS), and may be triggered by any of the following criteria~~project: (1) use of State or County lands or funds; (2) use within the State Conservation District; and (3) use within the Shoreline Setback, as defined by the City and County of Honolulu (see Section 343-5(a), HRS).

This FEIS provides additional information based on comments received that further describes the proposed project, the environmental conditions of the site, the potential for significant adverse impacts, and the application of mitigation measures as appropriate, to reduce or minimize the potential for significant environmental impacts.

Accordingly, there are no significant potential impacts that have been identified in this document that cannot be sufficiently addressed by the proper application of the mitigation measures as proposed.

ES.5 PROJECT ALTERNATIVES

HASEKO has considered alternative means of meeting the objectives of the proposed action. These include:

ES.5.1 NO ACTION ALTERNATIVE

~~The No Action Alternative would involve no further improvement of the existing ocean outlet to meet the City's current standard for storm flow from the watershed. The "No Action" alternative was rejected in favor of improving the existing channel to accommodate the anticipated stormwater flows. However, it is possible that a future change or an exemption from the current City drainage standard could result in the acceptability of the No Action Alternative and that this project would not be needed.~~

The project that is analyzed in this EIS is being proposed as an alternative to a regional drainage proposal that had been previously reviewed and analyzed in other environmental disclosure documents and permitted. A "no action alternative," therefore, could be interpreted to mean either 1) implementation of the already approved regional drainage proposal to lower the sewer outfall and allow regional drainage to exit through the marina, or 2) consider other options.

ES.5.2 LOWER THE HONOULULI SEWER OUTFALL TO ALLOW A REGIONAL DRAINAGE CHANNEL TO CROSS OVER THE OUTFALL AND EXIT THROUGH THE MARINA

This alternative involves lowering a major sewer outfall from the Honouliuli Wastewater Treatment Plant to enable flows from the Kaloi Gulch watershed to reach the proposed Ocean Pointe marina. This option would involve constructing a trench for a new sewer outfall pipe at a lower profile to replace the existing outfall pipe. The new pipe would be

set low enough to allow construction of an 800-foot wide drainage channel over it.

~~This alternative was eliminated from further consideration because of environmental concerns and the potential for operational impacts during construction.~~

~~ES.5.3 IMPROVE THE KALOI GULCH DRAINAGEWAY WITHIN OCEAN POINTE~~

~~This plan assumes that a different flow criterion will be used for design of the Kaloi Gulch drainageway. Enlarging the drainageway through Oneula Beach Park is needed in order to meet the current 100-year flow requirement specified by the City in their drainage standards. If a different criterion that results in a lower 100-year flow rate is used, it could mean that the capacity of the existing drainageway may already be adequate and therefore, there would be no need for drainage work to affect the park and the beach shoreline.~~

~~Should future updates or changes to the 100-year flow criterion be approved that would reduce flows sufficiently enough to rendering this option viable, then this would be the preferred option since it would result in no work in the special management area and/or conservation district and this project would not be required.~~

The concept of utilizing the Ocean Pointe marina to address regional drainage needs has been reviewed in a number of previously published environmental disclosure documents and land use permits based on this concept have already been obtained. However, recently raised environmental and operational concerns with lowering the Honouliuli sewer outfall has prompted consideration of the proposal that is the subject of this EIS as an alternative means of meeting regional drainage objectives.

ES.5.3 OTHER OPTIONS

Other regional drainage options are identified.

ES.5.3.1 MAKING EXISTING CONDITIONS PERMANENT

The current capacity of the temporary emergency drainage channel through Oneula Beach Park does not meet the current City drainage standards for the region. If no drainage improvements are made, channelized flows will have to be limited. Due to the limitations of this option, it is not a preferred alternative.

ES.5.3.2 COMBINATION OF OPTIONS

Several other drainage options are possible, including the option of assuming a different flow criterion, more closely tailored to actual anticipated flows, for design of the Kaloi Gulch drainageway, providing retention facilities in developments within the Kaloi Gulch drainage basin, and redirecting flows toward Kalaeloa and Pearl Harbor.

ES.5.4 ~~IMPROVE THE EXISTING~~ PREFERRED ALTERNATIVE – CONSTRUCT KALOI GULCH DRAINAGEWAY ACROSS A PORTION OF ONEULA BEACH PARK

This plan is the preferred alternative and involves ~~enlarging the existing~~ construction of the Kaloi Gulch drainageway through a portion of the Oneula Beach Park. This plan is preferred because it will eliminate short and long-term concerns of modifying and crossing over a major sewer outfall. The improved drainageway will follow the path of the existing ~~drainageway~~temporary emergency drainage channel, which is parallel to the sewer outfall.

Details of the plan components are further described in Chapter 2.

ES.6 SUMMARY OF POTENTIAL IMPACTS AND MITIGATION MEASURES

A number of environmental factors were assessed to ascertain the potential of the proposed project to result in negative adverse impacts. ~~The factors that were assessed are identified in **Table ES-1, Environmental Factors Assessed**~~A summary of the

potential impacts and mitigation measures are identified in **Table ES-1**, **Summary of Potential Impacts and Mitigation Measures**.

In summary, there were no environmental factors present which could not be sufficiently addressed to reduce or eliminate the potential for negative adverse impacts through the appropriate application of mitigation measures or other provisions of this project. Details of the environmental factors including the description of the existing environment, potential impacts, and mitigation measures are provided in Chapters 4, 5, and 6, of this document.

~~TABLE ES-1~~

~~Environmental Factors Considered~~

~~**NATURAL ENVIRONMENT**~~
~~CLIMATE~~
~~TOPOGRAHY~~
~~GEOLOGY AND SOILS~~
~~GROUNDWATER~~
~~SURFACE (INLAND) WATERS~~
~~AND KALOI GULCH DRAINAGEWAY~~
~~COASTAL WATER QUALITY~~
~~NATURAL HAZARDS INCLUDING~~
~~FLOOD ZONES, SEISMIC ACTIVITY,~~
~~HURRICANES, AND TSUNAMI~~
~~VISUAL RESOURCES~~
~~AIR QUALITY~~
~~NOISE~~
~~TERRESTRIAL FLORA~~
~~TERRESTRIAL FAUNA AND AVIFAUNA~~
~~MARINE BIOLOGY~~

~~**SOCIO-ECONOMIC ENVIRONMENT**~~
~~SOCIO-ECONOMIC CONTEXT OF THE PROJECT~~
~~POPULATION AND ECONOMY~~
~~LAND USE AND OWNERSHIP~~
~~PROPERTIES WITHIN PROXIMITY~~
~~TO THE PROPOSED PROJECT~~
~~HISTORIC AND ARCHAEOLOGICAL RESOURCES~~
~~TRADITIONAL CULTURAL PRACTICES~~

~~**PUBLIC SERVICES**~~
~~TRAFFIC AND ROADWAYS~~
~~WASTEWATER~~
~~POTABLE WATER~~
~~NON-POTABLE WATER~~
~~POWER AND COMMUNICATION~~
~~POLICE AND FIRE PROTECTION~~
~~HEALTH CARE AND EMERGENCY SERVICES~~
~~EDUCATION AND LIBRARY SERVICES~~
~~PARKS AND RECREATION~~

TABLE ES-1

Summary of Potential Impacts and Mitigation Measures

Potential Impacts	Mitigation Measures
1. Natural Environment	
A. Climate	No mitigation measures are required.
B. Topography	
1. Excavation of 7,110 and fill of 7,873 cy of material to construct the channel improvements.	Top soil and clean sand may be imported for landscaping and ground cover. Topography changes will not adversely affect coastal processes or littoral sand transport.
a. Operation of drainageway will cause buildup of sand and sediments.	Channel slope will facilitate capture of sediments downstream. Machinery may be used to remove sediment and restore the channel to design grades.
C. Geology and Soils	
1. Excavation of 7,110 and fill of 7,873 cy of material to form the contours of the improved and modified channel.	Excavation will not impinge important agricultural or mineral resources.
a. Air- or water-born soil particles on air and water quality.	Discussed in air quality mitigation measures.
D. Groundwater	No significant short-term or long-term mitigation measures required.
E. Surface (Inland) Waters and Kaloi Gulch Drainageway	
1. Perennial inland waters.	There are no perennial inland waters affected.
2. Volume of stormwater runoff reaching the ocean under normal circumstances involving lower intensity storms.	Proper construction of the proposed channel will have no effect on the volume of stormwater runoff for lower intensity storms.
a. When runoff does occur it will overflow into the drainage channel and park.	Proper design will allow stormwater to accumulate upstream till overtopping of the sandy berm allows flows to be released to the ocean.
F. Coastal Water Quality	
1. Coastal water quality may be potentially affected during the construction of the makai end of the regional drainage channel.	Stockpile material and excavated areas will follow required erosion control plan (ECP) and NPDES permits. Best Management Practices (BMPs) will be implemented to minimize the effect of a potential discharge.

TABLE ES-1

Summary of Potential Impacts and Mitigation Measures

Potential Impacts	Mitigation Measures
2. Coastal water quality may be impacted when storm runoff from upland areas exceeds the retention capacity that has been provided and flows to the ocean through the channel.	The report, Numerical Modeling of Storm Drain Discharge Plume Transport, indicates the site has good mixing and transport of sediments. Water quality will return to ambient conditions with no potential to violate Water Quality Standards.
G. Natural Hazards	
1. Flood Zones	
a. Potential impact of a flood event.	The proposed channel is consistent with the flood designation of the area. No adverse impacts are anticipated.
2. Seismic Activity (Earthquakes)	
a. Damage from seismic disturbances.	No mitigation measures are required.
3. Hurricanes	
a. Impact from a potential hurricane event.	
1. Impact on embankments and other solid features.	Embankments and other solid features within the channel are not likely to be susceptible to damage by hurricane force winds.
2. Impact on landscaping developed in the project area.	Project area will utilize low lying species to help resist damage from hurricane force winds.
3. Impact on runoff during a hurricane.	The effects of runoff from a severe storm such as a hurricane are described and addressed in Sections 4.5 and 4.6 of this document.
4. Tsunami	
a. Impact from a tsunami induced event.	The project is not expected to have any adverse impacts during a tsunami. The drainage channel is expected to help in the drainage of seawater from tsunami inundated and land adjacent to the channel.
H. Visual Resources	
1. Impact of the modification of a nearshore berm along the shoreline.	The natural shoreline processes are likely to return the sandy berm to its original condition.
2. Impact with decrease of large trees and other features that could impede the flow of water.	Larger plantings may be placed on the level ground immediately outside the drainageway.
3. Impact of stormwater discharge to bring silt and other debris into Oneula Beach Park.	HASEKO has committed to defining and following a maintenance or other legal agreement according to law.

TABLE ES-1

Summary of Potential Impacts and Mitigation Measures

Potential Impacts	Mitigation Measures
I. Air Quality	
1. Impact of fugitive dust generated during excavation, temporary stockpiling, and grading and filling.	Fugitive dust will be mitigated by spraying water from a stationary source or tanker truck on an as-needed basis. A dust control plan will be implemented by the project contractor to ensure compliance with state regulations.
2. Exhaust emissions from vehicles, heavy equipment and generators at the project site.	Engine exhaust will be mitigated by ensuring contractors properly maintain internal combustion engines in good working order.
J. Noise	
1. The impact of noise generated during construction activities.	Compliance with the State Department of Health Administrative Rules, Title 11, Chapter 46, Community Noise Control. Generation of noise will be temporary and will cease when construction is completed.
2. The impact of noise generated during long term maintenance activities.	Periods of maintenance or cleanup involving use of mechanical equipment is expected to be temporary, lasting no more than approximately a few days to a week.
K. Terrestrial Flora	
1. Impact on existing plants in construction area.	None of the plants observed are threatened, endangered, or a species of concern. No significant negative impact on botanical resources is expected.
2. Impact of replanting botanical species after construction.	Replanted botanical species will be suitable for the expected dry and relatively arid conditions of the site.
L. Terrestrial Fauna and Avifauna	
1. Impact of construction activities on terrestrial fauna and avifauna.	None of the species observed at the site are threatened or endangered, or a species of concern. Any displacement will be temporary due to the area being revegetated following construction, no permanent loss of habitat is anticipated.
a. Impacts to the Black-necked Stilt.	The potential for negative impacts to the Black-necked Stilt are not anticipated. Suitable habitat is located nearly that will remain undisturbed.
M. Marine Biology	
1. Impacts to benthic invertebrate communities, benthic algal assemblages, and reef fish assemblages.	Potential for negative impacts are not anticipated. Mitigation measures are not required.

TABLE ES-1

Summary of Potential Impacts and Mitigation Measures

Potential Impacts	Mitigation Measures
2. Impacts on the Hawaiian Monk Seal.	Potential for negative impacts on the Hawaiian Monk Seal are not anticipated. Mitigation measures are not required.
3. Impacts on the Green Sea Turtle.	Potential for negative impacts on the Green Sea Turtle are not anticipated. Mitigation measures are not required.
4. Impacts on Humpback Whales.	Potential for negative impacts to Humpback Whales are not anticipated. Mitigation measures are not required.
5. Impact on the Availability of Limu as a Human Food Source.	Potential for negative impacts to Limu are not anticipated. Mitigation measures are not required.
2. Public Services	
A. Traffic and Roadways	
1. The impact of the realignment of Oneula Beach Park access road and its use as a ford to permit the passage of flood flows.	Drainageway will reduce the velocity of stormflows and concrete will reduce scour of the road. Signage will advise the public of the drainageway and to exercise caution. A temporary detour and a secondary park access road will be constructed.
2. Impact on surrounding roadway network.	No mitigation measures are required.
B. Wastewater	
1. Impact to wastewater resources in the area.	No adverse impacts to wastewater resources in the area are anticipated. Mitigation measures are not required.
C. Potable Water	
1. Relocation of the existing main supplying potable water to the park.	A new line will be set beneath the new channel bottom. Use of potable water for work crews and possible dust control and irrigation is expected to be negligible. No long-term impacts and no mitigation measures are proposed.
D. Non-Potable Water	
1. Impacts to non-potable water resources.	No impacts to non-potable water resources are expected. No mitigation measures are proposed or required.

TABLE ES-1

Summary of Potential Impacts and Mitigation Measures

Potential Impacts	Mitigation Measures
E. Power and Communication	
1. Impact on electrical or communications hookups during construction or implementation phases.	Electrical or communications hook-ups during construction or implementation are not required. Construction will be coordinated with the Dept. of Parks and Recreation (DPR) as required.
F. Police and Dire Protection	
1. Impact on Police services.	No impacts on police protection resources are expected. No mitigation measures are proposed.
2. Impact on Fire Department services.	The project contains no structures susceptible to fire. The Fire Department requires maintenance of fire apparatus access and the notification of the Fire Communication Center regarding any interruptions of the existing fire hydrant system.
G. Health Care and Emergency Services	
1. The impact of providing emergency health care for the project.	The only possible impact would be a construction-related accident requiring emergency care. The proposed project will have no long-term impact on health care and emergency services.
H. Education and Library Services	No mitigation measures are required.
I. Parks and Recreation	
1. Impact on park activities during construction.	Construction will be coordinated with the Dept. of Parks and Recreation to maintain park access and ensure consistency with the Oneula Beach Park Master Plan. This includes construction of a temporary detour road to allow vehicular traffic into and out of the park.
2. Impact on beach-oriented recreational space.	Oneula Beach Park will remain open the vast majority of time. The only time the project area may not be available would be during a major storm event, when flood flows would be discharging to the ocean through the drainage channel during a one in ten year storm.
3. Socio-Economic Environment	
A. Socio-Economic Context of the Project	No mitigation measures are required.
B. Population and Economy	
1. Impact on the population and economy of the ‘Ewa Region	No mitigation measures are required. The proposed project will not adversely impact the population or economy of the ‘Ewa Region.

TABLE ES-1

Summary of Potential Impacts and Mitigation Measures

Potential Impacts	Mitigation Measures
C. Land Use and Ownership	
1. Impact of the project site located on land owned by the City and County of Honolulu.	HASEKO will coordinate all work with DPR to modify open space within the existing beach park. This will be reviewed and approved by DPR before construction can commence. HASEKO will coordinate with the City to legally define the responsibility for maintenance.
D. Properties Within Proximity to the Proposed Project	
1. The impact on the Ocean Pointe Master Planned Community.	No mitigation measures are proposed.
2. The impact to single-family residential neighborhood to the east due to construction-generated dust and noise.	All work will comply with requirements of the State and City. As required, use of water and cover material, including aggregate, will be applied to areas subject to dust generation. Vehicles and equipment will be equipped with mufflers to reduce noise. All work will be conducted within work hours established by the State Department of Health. Other mitigation will be employed to ensure against negative impacts.
E. Historic and Archaeological Resources	
1. Possible impact of historic and archaeological resources.	If subsurface human remains are discovered, work crews will stop work and notify the State Historic Preservation Division (SHPD) immediately. HASEKO will ensure archaeological and historic preservation actions are carried out as approved by SHPD.
F. Traditional Cultural Practices	
1. Loss of access along the shoreline for purposes of gathering and harvesting marine resources.	The proposed project will not result in a loss of shoreline access. Construction may involve work on an existing berm located above the shoreline and other locations mauka within the Kaloi drainageway. No negative adverse impacts to access are anticipated. Access related mitigation measures are not recommended because access to area shoreline resources will not be affected.
2. Loss of access to archaeological sites outside project boundary.	There will be no loss of access. However, some work areas may be temporarily restricted from access to protect the public from injury. Overall access will not be impeded.
3. Impacts to marine resources during operation of the drainage outlet.	Impacts to marine resources, including limu, are not anticipated. No further mitigation measures are proposed.

ES.7 SUMMMARY OF PROJECT RELATIONSHIP TO LAND USE PLANS, POLICIES AND CONTROLS

A summary of the project's consistency with the land use plans, policies and controls of the Federal Government, the State of Hawaii and the City and County of Honolulu are provided in **Table ES-2, Summary of Land Use Plans, Policies and Controls**.

ES.~~7~~8 UNRESOLVED ISSUES

~~No significant unresolved issues have been identified which would result in the potential for negative adverse environmental impacts. Coordination with appropriate governmental regulatory agencies is ongoing to address concerns related to this project. A summary of organizations and agencies consulted for this project is provided in Chapter 11, and a record of comments and responses provided to organizations, agencies, and individuals is provided in Chapter 12.~~

~~ES.8 NECESSARY~~

ES.8.1 MAINTENANCE OF KALOI DRAINAGEWAY IMPROVEMENTS

Future maintenance of the Kaloi Drainageway Improvements project is expected to include: mowing of grass and care of planted vegetation; periodic removal of accumulated silt and sediments following major storm events; and periodic inspection and maintenance of the berm height, if required.

HASEKO has been working, and will continue to work, with the appropriate City Departments and other landowners and developers in the Kaloi drainage basin to legally define the maintenance obligations for the drainageway area. Although the details and the form of memorializing the maintenance obligations have not yet been worked out, Haseko is committed to ensuring that the drainage channel through Oneula Beach Park is kept free of large debris that may impede storm water flows through the channel, silt and other debris are removed from the channel following storm events, and the shoreline berm is maintained at an elevation that enables it to function adequately as a

storm drainage outlet.

TABLE ES-2

Summary of Land Use Plans, Policies and Controls

Plan, Policy or Control	Comments
Federal	
Department of the Army – Corps of Engineers (ACOE) Clean Water Act of 1972 Title 10, Rivers & Harbors Act of 1899 Marine Protection, Research, and Sanctuaries Act, Section 103	The proposed project is not under the jurisdiction of the ACOE. (Letter issued by ACOE dated July 12, 2004)
Federal Emergency Management Agency (FEMA)	The proposed project is designed to comply with FEMA floodway standards.
State	
State Land Use Law	The proposed project is a permitted use within the State Urban District.
Hawaii State Plan – Section 226 HRS §226-6: Economy – general	The proposed project will provide short-term employment and will support the State's long-term sustainable growth objectives. The improvements will serve to protect coastal resources from flooding, thereby contributing to Hawaii's scenic beauty.
§226-12: Physical Environment – scenic, natural beauty, and historic resources	Project design utilizes open space and natural vegetation for storm water control in order to preserve the scenic beauty of the area. Archaeological and cultural resources will not be adversely impacted. Coastal access will not be restricted by the project.
§226-14: Facility Systems – general	The proposed project is designed to provide sufficient capacity to handle regional stormwater discharges in accordance with City standards.
§226-15: Facility Systems – solid and liquid wastes	The proposed project will not result in increases of solid or liquid wastes and will not adversely impact existing waste disposal systems.

TABLE ES-2

Summary of Land Use Plans, Policies and Controls

Plan, Policy or Control	Comments
State Functional Plans	
Historic Preservation Functional Plan	Planning for the project has been coordinated with the State Historic Preservation Division and an archaeological inventory survey conducted at the site found no significant cultural resources.
Special Management Area (SMA) Guidelines	The existing SMA permits authorizing implementation of the Oneula Beach Park Master Plan will have to be amended.
City & County of Honolulu	
General Plan Natural Environment Public Safety Physical Development and Urban Design	The proposed project is consistent with General Plan objectives and policies that relate to the Natural Environment, Public Safety, and Physical Development and Urban Design.
'Ewa Development Plan	
Section 4.6.1: Drainage Systems – General	Use of open space and natural vegetation for drainage control supports the 'Ewa Development Plan general principles and policies for drainage systems.
Section 4.6.2: Drainage Systems – Kaloi Gulch	The proposed project is integrated with 'Ewa Marina as part of a regional drainage system for the Kaloi Gulch watershed. The integrated system is designed to comply with City requirements to provide sufficient capacity for stormwater treatment and control.
Zoning	Maintenance of the drainageway as open recreation space is consistent with the P-2 General Preservation District zoning and Land Use Ordinance (LUO) requirements related to flood hazard districts.
Oneula Beach Park Master Plan	Changes to the master plan as a result of the proposed project will be resolved through the process of amending the existing Special Management Area Use Permit that authorizes implementation of the master plan.

ES.8.2 PROJECT MODIFICATIONS TO ONEULA BEACH PARK MASTER PLAN

The proposed project will result in some changes to the Oneula Beach Park Master Plan. However, the changes or modifications proposed will maintain consistency with the intent and purpose of the master plan to enhance public use and enjoyment of the facility. The Special Management Area Use Permit (Resolution No. 01-228) (SMP) that authorizes the implementation of the Oneula Beach Park Master Plan will have to be amended to accommodate the proposed drainageway through the park. Public input on the master plan changes will be solicited in the SMP amendment process.

ES.8.3 FINAL ENGINEERING DESIGN PLANS

Civil engineering for the project is under development and will be coordinated for review and approval by appropriate governmental agencies including the Department of Planning and Permitting (DPP), Department of Design and Construction (DDC), Department of Facility Maintenance (DFM), and Office of Civil Defense (OCD). **Appendix G** of this document provides the project Concept Plan representing the preliminary design of the project.

Additional design elements that will be in the Final Engineering Design Plan will include, but is not limited to the following:

- Topographic information related to grading and earthwork
- The location and details of the detour and secondary access road
- Landscaping locations and details for irrigation and grass and plant materials that will be used
- Utilities and locations where the utilities will be relocated

The final plan and specifications will be subject to review and approval for conformance with Federal, State, and City and County of Honolulu regulations and laws. Because it is expected that the final plan will be subject to appropriate review by governmental agencies, no negative impacts are anticipated.

ES.8.4 UNRESOLVED ISSUES SUMMARY

While there are some issues that will require further coordination with governmental agencies before they can be resolved, there are no significant unresolved issues that have been identified that would result in further potential for negative adverse environmental impacts.

HASEKO will coordinate park changes with the DPP, DDC and DPR regarding changes to the Oneula Beach Park Master Plan and construction schedule for the project and park improvements with the goal of minimizing any disruption to park users. The implementation of the drainage channel will be coordinated with the development of the Oneula Beach Park improvements, both within the existing park as well as within the future park expansion area (east of the existing park). The permanent improvements installed within the channel area (grading, grassing, irrigation, access road, utilities and signage) will include, if necessary, temporary provisions and reconnections for maintaining public access and utility services to the park. The specific construction scheduling details will be developed following completion of the EIS and plan review processes. This will involve the review of construction drawings, environmental permits, design details to meet Federal, State, and City and County of Honolulu regulations and requirements (including the permanent and any temporary provisions for maintenance of public access and services to the park), and construction schedules.

ES.9 ~~NECESSARY~~ PERMITS AND APPROVALS THAT MAY BE REQUIRED

Environmental regulatory permits and other land use approvals which may be required for this project include the following:

STATE OF HAWAII

- *Conservation District Use Permit (CDUP); Department of Land and Natural Resources (DLNR)~~.~~*

- *Land Disposition to dredge submerged lands; DLNR~~.~~*
- *National Pollutant Discharge Elimination System (NPDES), Notice of Intent (NOI) Form C, Discharges of Stormwater Associated with Construction Activity; Department of Health~~.~~ (DOH)*
- *NPDES, Municipal Separate Storm Sewer System (MS4) Permit; DOH~~.~~*

CITY AND COUNTY OF HONOLULU

- *Special Management Area Use Permit (amend existing permit); Department of Planning and Permitting (DPP)~~.~~*
- *Shoreline Setback Variance; DPP~~.~~*
- ~~Land disposition by~~ *Authorization from the City and County of Honolulu for use of a portion of Oneula Beach Park for the regional drainage channel for Kaloi Gulch Watershed~~.~~*
- *Grading Permit; DPP*

OTHER APPROVALS

Construction related building ~~and grading~~ permits will be required for the subject action. Applications for these ministerial permits will be filed at the appropriate time with the relevant City agencies.

CHAPTER 1
INTRODUCTION

1.1 PROJECT OVERVIEW

HASEKO (Ewa), Inc. (HASEKO) is proposing to ~~improve~~construct the ~~existing~~ Kaloi Gulch drainageway to provide an ocean outlet through the Oneula Beach Park in 'Ewa Beach, Oahu. The improvements will involve modifying and enlarging the existing ~~drainageway and~~ temporary emergency drainage channel. The improvements are needed to provide flood control and address regional drainage for all communities within the Kaloi Gulch Watershed.

The proposed drainageway ~~improvements~~ will ~~consist of smoothening out a portion of the park~~ be approximately 500 feet wide and ~~300 feet long to accommodate runoff overflow from the watershed. The improved drainageway will be~~ about 4 to 6 feet deep ~~and will have~~ with gently sloping banks on each side. ~~A ford will be used along the park access road to cross the drainageway. Following construction, the drainage channel will be returned to a normal condition and grassed.~~ In conjunction with construction of this drainageway, a portion of the relocated park access road, called for in the Oneula Beach Park Master Plan, will be constructed and utilities will also be relocated. A ford will be used to cross the drainageway to allow the passage of storm flows over the access road. The proposed improvements will be designed to meet current City and County of Honolulu (City) 100-year storm flow requirements in accordance with its Storm Drainage Standards.

The ~~proposed project location is~~drainage channel will be located within the Oneula Beach Park, which is owned and operated by the City Department of Parks and Recreation~~.~~ (DPR). Portions of the project will extend onto land that is currently owned by HASEKO ~~(Ewa), Inc., proposes to coordinate with~~ but will be dedicated to the City ~~Department of Parks and Recreation~~for expansion of Oneula Beach Park. In 2001, a

Master Plan for Oneula Beach Park, including the expansion area, was adopted. Accommodation of this drainageway within the park requires modification of the master plan. HASEKO proposes to coordinate with DPR and other affected agencies to design and construct the drainageway improvements.

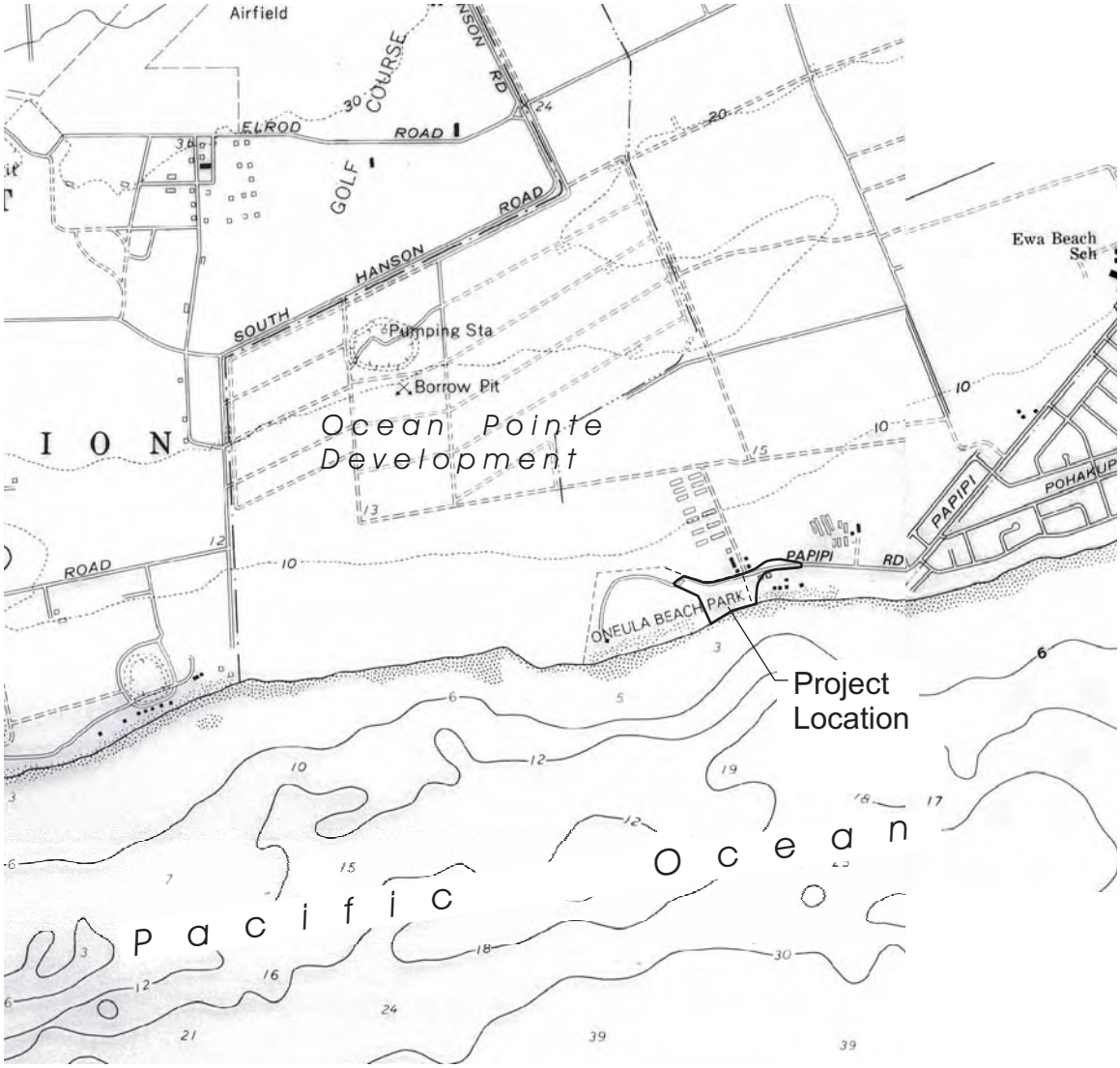
1.2 PURPOSE AND NEED FOR THE PROJECT

The purpose of this project is to provide flood control and address regional drainage for all communities within the Kaloi Gulch Watershed. Specifically, the project is needed to enable the Kaloi Gulch drainageway through Oneula Beach Park to meet current City drainage ~~standards~~requirements for the 100-year storm flow.

1.3 PROJECT LOCATION

The total project site ~~consists of a 3.7-acre area~~ is approximately 6.9 acres and is located at the ~~extreme~~ eastern end of Oneula Beach Park (Tax Map ~~Key (TMK~~Keys (TMKs): (1) 9-1-~~0~~12: portion of parcel 25 and (1) 9-1-11: portion of parcel 7), located in Honouliuli, in the ‘Ewa District of Oahu. ~~Oneula Beach Park is a 28-acre passive recreational park next to the Pacific Ocean (**Figure 1-1** and **Figure 1-2**).~~ The proposed project area of work will involve a total of approximately 6.9 acres. Land within the Oneula Beach Park will include approximately 3.7 acres that are part of the Kaloi Gulch drainageway, 0.6 acres within adjoining park land to the west, and 1.9 acres that comprise the park access roadway. Approximately 0.7 adjoining acres located to the east is on land that is currently owned by HASEKO (**Figure 1-1** and **Figure 1-2**).

Oneula Beach Park is a 28-acre passive public recreational beach park next to the Pacific Ocean. Oneula Beach Park is situated on the ‘Ewa Coastal Plain and is approximately 19 miles west of downtown Honolulu, 4 miles southeast of the City of Kapolei, and less than one-half mile west of the ‘Ewa Beach Community (Wilson Okamoto, March 2001). The existing Oneula Beach Park consists of 28.391 acres



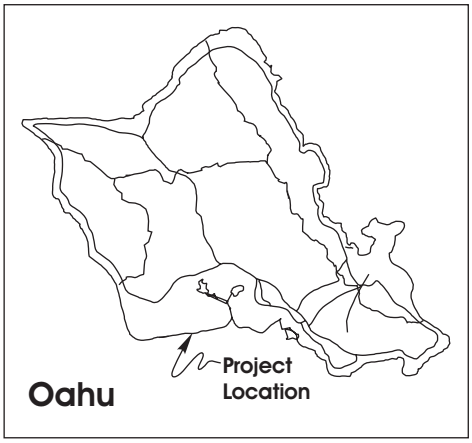
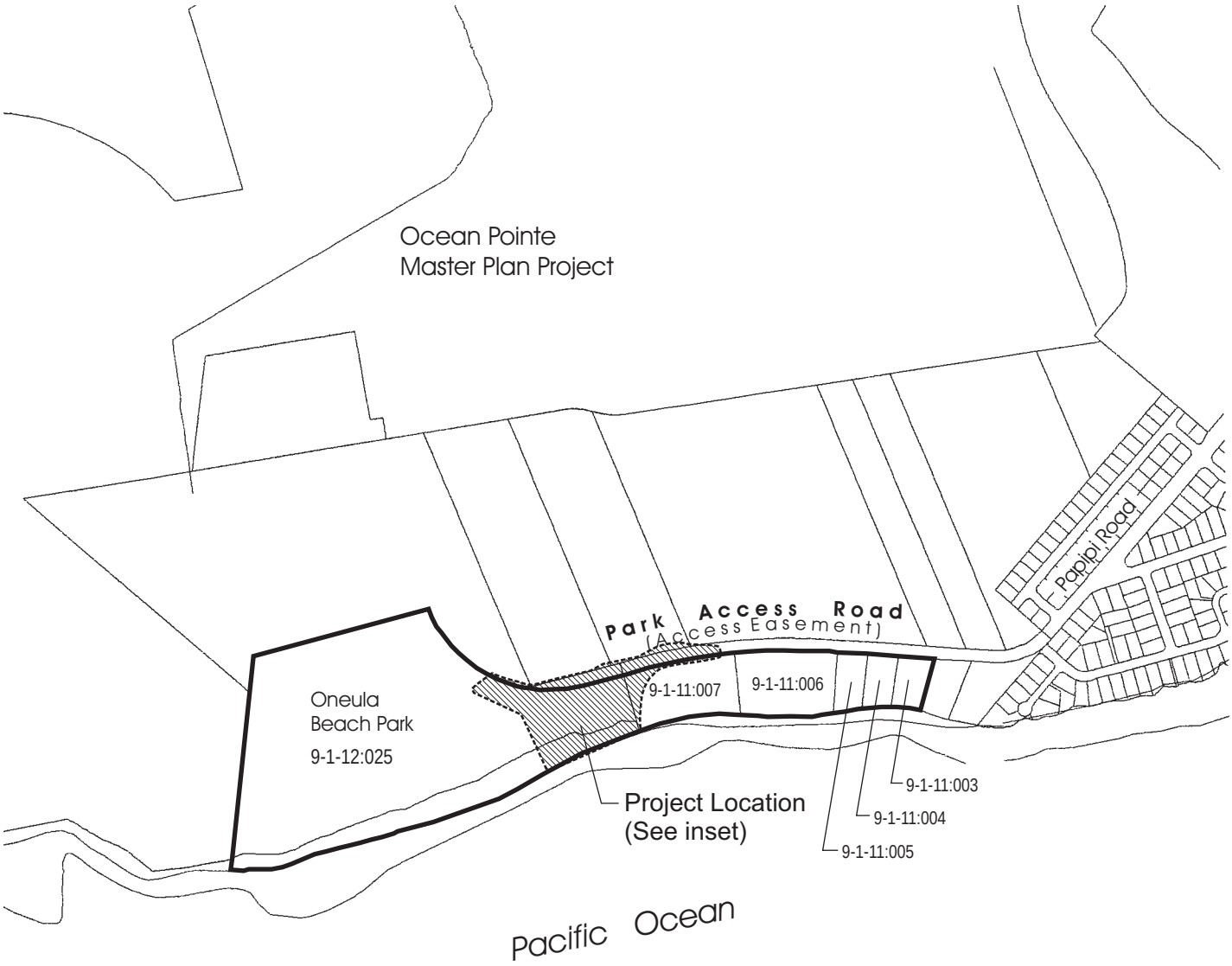


FIGURE 1-1
PROJECT LOCATION
Kaloi Gulch Drainageway
Improvements at Oneula Beach Park
HASEKO (Ewa), Inc., Ewa, Oahu, Hawaii

0 2000 Feet 4000

R. M. TOWILL CORPORATION June 2005



Reference:

DEPARTMENT OF TAXATION PROPERTY ASSESSMENT DIVISION **TAXMAPSBRANCH** STATE OF HAWAII **TAX MAP**		
SECOND TAXATION DIVISION		
ZONE	**SEC**	**PLAT**
9	1	11&12

INSET (No Scale)

Total Project Area = 6.9 Acres

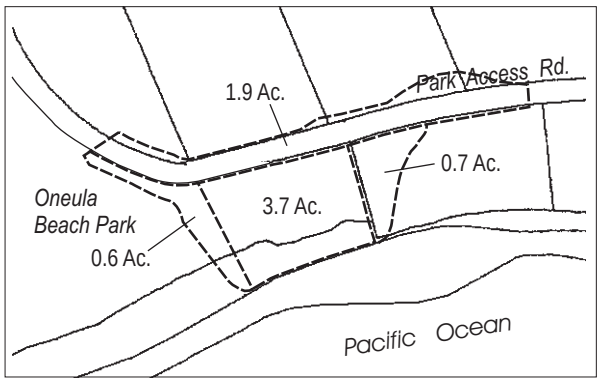


FIGURE 1-2
PROJECT SITE
TAX MAP KEYS (TMKs)
Kaloi Gulch Drainageway
Improvements at Oneula Beach Park
HASEKO (Ewa), Inc., Ewa, Oahu, Hawaii

0 800 Feet 1600

R. M. TOWILL CORPORATION June 2005

(**Figure 1-3**).

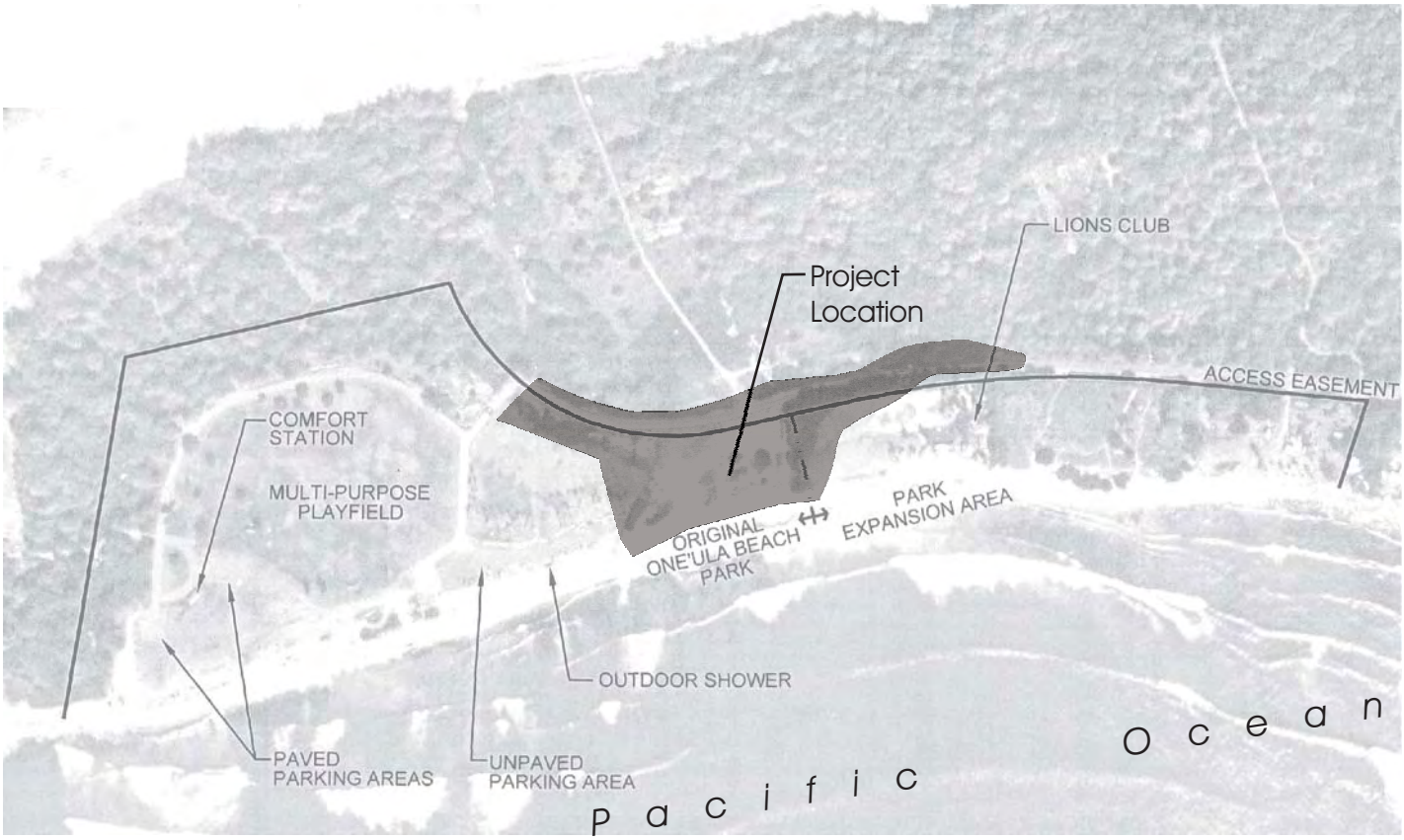
~~HASEKO (Ewa), Inc., in conformance with the Unilateral Agreement attached to Ordinance 93-94, which rezoned the site of the Ocean Pointe Project (formerly known as the 'Ewa Marina), is in the process of dedicating approximately 9.365 acres of land to the City for park purposes. This land will increase the area of Oneula Beach Park to approximately 37.8 acres. The land that will be dedicated is identified as TMKs (1) 9-1-11: parcels 3 through 7.[1] These lands front Mamala Bay to the south, a private residence and picnic/camp area are to the east, and undeveloped property is to the north and west. Access to the land that is slated for acquisition is from Papipi Road and a roadway easement extending into the park (Wilson Okamoto, March 2001). See **Figure 1-3**.~~

~~1.4 Background~~HASEKO, in conformance with the Unilateral Agreement attached to Ordinance 93-94, which rezoned the site of the Ocean Pointe Project (formerly known as the 'Ewa Marina), is in the process of dedicating approximately 9.365 acres of land to the City for park purposes. This land will increase the area of Oneula Beach Park to approximately 37.8 acres.

~~1.4.1 'Ewa Marina Drainage Plan~~The land that will be dedicated is identified as TMKs (1) 9-1-11: parcels 3 through 7.[2] These lands front Mamala Bay to the south, a private residence and picnic/camp area are to the east, and undeveloped property is to the north and west. Access to the land that is slated for acquisition is from Papipi Road and a roadway easement extending into the park (Wilson Okamoto, March 2001). (See **Figure 1-2** and **Figure 1-3)**

~~[1] TMK 9-1-11: parcel 7, which adjoins the park, is currently used by the Lions Club for picnic, camping, and for a caretaker's residence. TMKs 9-1-11: Parcels 3 through 6 are vacant (Wilson Okamoto, March 2001).~~

[2] TMK 9-1-11: parcel 7, which adjoins the park, was previously used by the Lions Club for picnic, camping, and for a caretaker's residence. The Lions Club has since vacated the property in December 2004. TMKs 9-1-11: Parcels 3 through 6 are vacant (Wilson Okamoto, March 2001, and RMTC, 2005).



Source: Final Environmental Assessment, Oneula Beach Park Master Plan
City and County of Honolulu, Department of Design and Construction, 2001

FIGURE 1-3
ONEULA BEACH PARK
EXISTING LAND USES
Kaloi Gulch Drainageway
Improvements at Oneula Beach Park
HASEKO (Ewa), Inc., Ewa, Oahu, Hawaii

0 500 Feet 1000

R. M. TOWILL CORPORATION June 2005

~~This proposed project is an alternative to the original drainage improvement plans for the Kaloi Gulch Watershed. The original plans called for Kaloi Gulch Watershed flows to be sent to the proposed Ocean Pointe marina. Two versions of drainage plans that would send flows to the marina have been proposed thus far. Both plans require modification of the major Honouliuli Wastewater Treatment Plant 84-inch sewer outfall pipe.~~

~~The first plan would involve constructing a new drainage channel to the marina by dipping about a 600-foot segment of the sewer outfall pipe through the use of an inverted siphon. That plan was approved in concept by the City in the early 1990s and HASEKO began work to design and implement the improvements. However, operational, maintenance and environmental concerns, including the potential for negative adverse impacts from modifying the existing outfall while it remains in use, and the potential for accidental spills during construction and after construction due to the presence of a drainage channel over the pipe, made the inverted siphon option undesirable.~~

~~A second plan involved constructing a new drainage channel to the marina by lowering a portion of the sewer outfall, but not dipping it as an inverted siphon. This plan was approved in 2001 by the City. The required County, State and Federal permits were also obtained for this plan. HASEKO also began work on implementing this plan. However, in 2002 many of the same operational, maintenance and environmental concerns were raised concerning the lowering of the Honouliuli Sewer Outfall.~~

~~Concerns about affecting the sewer outfall have led to the current proposal to meet the City's drainage requirements without altering the existing Honouliuli Wastewater Treatment Plant Sewer Outfall. Since the existing Kaloi Gulch Watershed is located to the east side of the outfall pipe, allowing watershed runoff to discharge through Oneula~~

Beach Park is the only feasible alternative to provide the required flood control improvements without having to cross the existing sewer outfall.

This project will cause some changes to occur to the Ocean Pointe master land use plan since the location of the Kaloi Gulch drainageway outlet is being retained rather than relocating it to the Marina. However, these adjustments will affect only the location of the land use elements and the number of previously approved housing units (4,850) or visitor units (950) at Ocean Pointe will not change (see Chapter 7, Relation to Land Use Plans, Policies and Controls.)

1.4.2 Kaloi Gulch Watershed

The topography of ʻEwa is comprised of a broad and relatively flat plain that promotes the collection and ponding of sheet flows of water flowing to the ocean during periods of heavy rainfall. The ʻEwa Plain runs from the Waianae Mountains down to the ocean.

ʻEwa has several watersheds that are land areas that run from the mountains (mauka) to the ocean (makai). One of the watersheds in ʻEwa is the Kaloi Gulch Watershed. The Kaloi Gulch Watershed consists of approximately 7,000 acres and is one of the largest watersheds on the ʻEwa Plain.

Historically, there were few well defined drainageways transmitting accumulated runoff to the coastline. Starting in the early Twentieth Century, the sugar industry constructed ditches and channels within the lower part of the Kaloi Gulch Watershed to irrigate agricultural areas and prevent flooding. One of these improvements was known as the Kaloi Ditch.

When the land was in agriculture, the sugar cane fields facilitated infiltration of most of the irrigation water on the lands and the majority of the water never reached the ocean. Agricultural features, such as ditches, furrows and berms, impeded runoff from

~~flowing downstream by interception, storage and infiltration. With the progressive urbanization of the 'Ewa Plain, the amount of impervious areas and channelized water flows increased. This created additional and concentrated stormwater runoff.~~

~~The City and County of Honolulu, in part because of the absence of a well-defined drainage channel to the ocean, has required developments that are in the Kaloi Gulch Watershed to retain portions of their storm water runoff on-site. This requirement has resulted in the creation of large areas of open space serving as detention/retention basins and provided an interim solution for drainage for the Kaloi Gulch Watershed.~~

~~However, as development grows within the Kaloi Gulch Watershed, storm runoff movement downstream will increase as agricultural features are removed and surfaces become hardened. The City and County of Honolulu, in accordance with their Storm Drainage Standards, prescribes a 100-year storm flow as the capacity requirement based on the amount of area being drained to the Kaloi Gulch drainageway through Oneula Beach Park. The current drainageway is too small to meet this flow requirement and the proposed project will enable this flood control requirement to be met.~~

~~1.4.3 Oneula Beach Park Master Plan~~

~~The Oneula Beach Park Master Plan was prepared by the Department of Design and Construction (DDC) in 2001 to identify future park improvements within the expanded park.~~

1.4 Background

1.4.1 Regional Drainage Needs

Planning for the urbanization of the `Ewa Plain began decades ago in the 1950s. All along, planners recognized that major regional drainage infrastructure for the Kaloi Gulch watershed would have to be developed to accommodate urban growth within the watershed.

Drainage in the `Ewa Plain is controlled by two major features, one natural and the other man-made. The natural factor is that the `Ewa Plain is relatively flat and under natural conditions, storm runoff flows in a sheet toward the ocean. The man-made feature is the City's sewer outfall pipe which sends treated wastewater from the Honouliuli Wastewater Treatment Plant to an offshore dispersal point on the ocean floor.

The `Ewa Coastal Plain, which is the largest coastal plain on Oahu, is fairly flat and rises gently northward toward the Waianae Range. Oneula Beach Park and the Ocean Pointe development lie at the southern (seaward) edge of the Kaloi Gulch Drainage Basin, which incorporates approximately 7,000 acres beginning mauka of the H-1 Freeway.

The topography mauka of the H-1 Freeway varies from semi-mountainous agricultural land to mountainous steep terrain. Although the lands immediately mauka of the H-1 Freeway are currently in agricultural use, the University of Hawaii acquired the property as a potential site for its West Oahu campus. (More recently, however, the University has indicated that a portion of the East Kapolei development site (makai of Farrington Highway), which is also owned by the University, is the currently preferred site for the campus.)

The H-1 Freeway runs along the foothills on the north side of the plain at an elevation of approximately 200 feet above sea level where it crosses the Kaloi Gulch drainage basin. Between the freeway and the northern boundary of Ocean Pointe, the land first drops rapidly to Farrington Highway, then more gently through the future development of East Kapolei and through Ewa Villages. The natural grade of the land becomes even flatter in the vicinity of Renton Road, dropping to a grade of less than one-half percent, and remains relatively flat through the Ewa by Gentry residential development, the as-yet undeveloped future site of Ewa Makai-West, Ocean Pointe, and to the ocean.

Also significantly influencing the drainage pattern is the Honouliuli sewer outfall pipe. The outfall, completed in 1978, is a shallow buried pipe that is located in the middle of the `Ewa Plain and divides the region into east and west drainage sectors.

Until relatively recently, the Kaloi Gulch Drainage Basin was comprised mostly of sugar cane fields that facilitated the interception and infiltration of surface water. The land has been straight plowed, contour plowed, leveled, filled and irrigated. Irrigation was aided by the construction of a ditch from the foothills toward the coastline. This ditch was capable of carrying about 500 cubic feet per second (cfs) of surface water flows. With the transition from agriculture to urban uses, this irrigation ditch has been replaced in sections by storm drainage channels that run primarily through golf courses.

When the region was predominantly in agriculture, surface flows were generally absorbed through infiltration and did not reach the sea. As recently as 1992, only 550 cfs was anticipated to reach the Ocean Pointe project site during peak flows (HASEKO (Ewa), Inc., by Wilson Okamoto & Associates, Inc., *Ewa Marina Phase I, Increment 2 Final Supplemental Environmental Impact Statement*, April 1992). With progressing urbanization, the increase in the amount of hard surfaces and channelization result in significantly more stormwater being carried downstream. When the region is fully built out, it is anticipated that approximately 11,500 cfs of stormwater could flow into the ocean from the Kaloi Gulch Drainage Basin, of which 10,800 cfs would be from east of the outfall.

Currently, the area mauka of Ewa Villages (site of the future East Kapolei development, and possibly, the West Oahu Campus of the University of Hawaii) is undeveloped. Storm water sheet flows through the fields until they enter an interceptor ditch along the mauka side of Mango Tree Road. The interceptor ditch directs the water through culverts and to detention/retention basins within the Ewa Villages Golf Course on the makai side of the road. At Renton Road, a bridge allows passage of Kaloi Gulch flows.

South of Renton Road, however, an old railroad bed (O.R.& L. Railroad) crosses the path of the Kaloi flows, which, until June 2000, restricted stormwater flows. Because of this restriction, heavy, prolonged rainfall resulted in Ewa Villages being flooded. A severe flood in November 1996 propelled the regional drainage issue to the forefront.

To minimize the risk of recurring floods, a *Technical Solution for Potential Flooding in the Kaloi Gulch Drainage Basin*, dated September 18, 1997 (Technical Solution), was developed by a group of engineers representing the owners of large properties within the Kaloi Gulch Watershed. The Technical Solution called for development of regional drainage infrastructure in phases. By June 2002, a bridge was installed at the old railroad bed to allow storm waters to flow downstream, an emergency drainage channel within the Ocean Pointe project site was constructed to accommodate the increased flows, and, because there was no marina to accept storm water flows and the outfall was not lowered so as to allow storm water to pass over it, a temporary emergency channel was constructed through Oneula Beach Park to the ocean. Currently, the capacity of the main Kaloi channel through Ocean Pointe is approximately 5,000 cfs (Gray Hong Nojima) and the maximum capacity through Oneula Beach Park is approximately 4,200 cfs (DPP Civil Engineering Branch). Under current City drainage standards, Ocean Pointe's drainage infrastructure is required to be able to accept and pass 10,800 cfs through this main Kaloi channel east of the sewer outfall.

Drainage infrastructure that already exists in Ewa Villages and Ewa by Gentry dictates the location where drainage from mauka properties enters Ocean Pointe, which is east of the outfall. It also dictates the invert elevation and grade requirements. The location and elevation of the outfall further limit the regional drainage options.

1.4.2 Alternative Ocean Outlets

The concept of a man-made marina at the seaward edge of the Kaloi watershed originated decades ago, in part to address regional drainage needs. Long before

HASEKO acquired the Ocean Pointe property in 1988, City and State governments had ratified the concept of a marina at this location.

Over the years, configuration of the marina went through several iterations. For example, the 1981 programmatic EIS depicted a marina that resembled a tree with several large branches. MSM & Associates, Inc., by Group Architects Collaborative, Inc., *Environmental Impact Statement, Ewa Marina Community, Ewa, Oahu, Hawaii,* February 1981. By 1985, the marina concept included a large western basin with branches to the east. MSM & Associates, Inc., by Dames & Moore, *Final Environmental Impact Statement, Increment II, Proposed Ewa Marina Community, Ewa, Oahu, Hawaii*, December 1985. Not long after HASEKO acquired the project, the marina configuration was again modified in 1992 to limit the impact on the caprock aquifer, to avoid impacting a valuable surfing site, and to preserve some archaeological sites. HASEKO (Ewa) Inc., by Wilson Okamoto & Associates, Inc., *Final Supplemental Environmental Impact Statement, Ewa Marina, Phase I, Increment 2,* April 1992.

Until the most recent reconfiguration in 2001, however, it had always been envisioned that the marina would straddle the Honouliuli wastewater treatment plant sewer ocean outfall that runs north-to-south through the middle of the Ocean Pointe project site. Navigability of the marina east of the outfall required that the outfall be lowered considerably. In 1980, the City Department of Public Works (now the Department of Environmental Services) approved plans for an inverted siphon in the sewer outfall to accommodate the construction of a navigable marina.

By 1997, however, environmental awareness at all levels of government had refocused the City's wastewater management program on maintenance of wastewater collection and transmission facilities and the prevention of spills and other breakdowns of wastewater systems. The maintenance requirements associated with an inverted siphon became the subject of re-examination. At the City's request, HASEKO commissioned a study by two civil engineering and environmental consulting firms, The Limtiaco

Consulting Group, Inc., in association with Berryman & Henigar, Inc. The study concluded that there is no feasible alternative to an inverted siphon to accommodate navigability over the outfall. The study also identified maintenance issues and potential odor problems with facilities that would be associated with siphoning the outfall. Consequently, HASEKO agreed to forego plans for the marina's eastern basin in order to eliminate the need for an inverted siphon.

When Ocean Pointe's master plan called for a 120-acre marina, the Kaloi drainage channel would have connected to the marina at the marina's northernmost point east of the sewer outfall. The decision to not have an inverted siphon on the outfall resulted in the reduction of the size of the marina to 70 acres by eliminating all of the waterways east of the outfall. With respect to drainage, this meant that the Kaloi drainage channel would have to be incorporated into the golf course in a configuration roughly similar to the eliminated marina waterways, terminating at the marina basin west of the outfall. This plan required the lowering, but not siphoning, of the outfall.

By 2002, HASEKO had received the necessary land use approvals to reduce the size of the proposed marina from 120 acres to 70 acres, and to reconfigure the golf course to reroute the regional drainage channel for the Kaloi Drainage Gulch to the marina. Constraints to revising the regional drainage plan were imposed by the current elevation of the sewer outfall and regional drainage infrastructure already in place and/or approved for properties mauka of Ocean Pointe. A revised master drainage plan for Ocean Pointe, working with these constraints, was approved by the Department of Planning and Permitting (DPP) on February 22, 2001 (2001 Drainage Master Plan). It called for the outfall to be lowered (but not siphoned) to accommodate regional storm flows. Pursuant to the engineering analyses documented in the *Honouliuli Sewage Outfall Relocation Conceptual Engineering Feasibility Study* (Final Report, May 2000), HASEKO and the City agreed upon a method of lowering the outfall to accommodate regional drainage.

Prior to DPP's approval of the 2001 Drainage Master Plan, operational personnel within the Department of Environmental Services (ENV) raised concerns about the method of lowering the outfall. As HASEKO began work to implement the approved 2001 Drainage Master Plan, however, ENV, which operates and controls the sewer outfall, reiterated concerns about lowering the outfall and noted that many of the same concerns that led to the rejection of the inverted siphon were present with lowering the outfall. ENV's reluctance to proceed with realignment of the sewer outfall led to exploration of alternatives, including, but not limited to, this proposal to direct regional drainage east of the sewer outfall through Oneula Beach Park rather than into the marina.

The Kaloi Gulch drainage channel, through which stormwater is conveyed from upland properties, enters the Ocean Pointe site east of the sewer outfall. Because a significant portion of the regional drainage infrastructure mauka of the Ocean Pointe property has already been developed or drainage plans have already been approved, the location of the drainage channel, as it enters the Ocean Pointe project site, cannot be relocated to the west of the sewer outfall.

Under the 2001 Drainage Master Plan stormwater flows from properties mauka of Ocean Pointe, and drainage generated from within the Ocean Pointe project would be directed into, and conveyed through, the Ocean Pointe golf course. From an area mauka of Oneula Beach Park, the drainage path would have veered to the west, over the sewer outfall, and into the west basin of the marina.

To avoid going over the outfall in order to convey stormwaters east of the outfall to the ocean, the drainage channel is being proposed to pass through Oneula Beach Park. A Drainage Master Plan for Ocean Pointe, dated April 6, 2004, prepared by R.M. Towill Corporation (2004 Drainage Master Plan), described this drainage alternative.

Portions of both the 2001 and 2004 Drainage Master Plans are similar. In both plans, drainage from both the Ocean Pointe development and from properties mauka of Ocean

Pointe is directed into the Ocean Pointe golf course, which straddles the sewer outfall. Drainage plans for storm water flows west of the outfall are the same under both the 2001 and 2004 drainage master plans. East of the outfall, however, flows will be directed southward into and through Oneula Beach Park under the 2004 Drainage Master Plan, instead of veering west into the marina as provided in the 2001 Drainage Master plan.

There currently exists a temporary emergency channel that runs in a direct north-south direction through Ocean Pointe and terminates at Oneula Beach Park. An earthen berm was constructed in June, 2000 and expanded in 2002, as part of an emergency flood control project to prevent the kind of flooding that Ewa Villages experienced in November 1996.

Under current City drainage standards, Ocean Pointe's drainage infrastructure is required to be able to accept and pass 10,800 cfs through this main Kaloi channel east of the sewer outfall. The proposed project will be able to handle flows of this magnitude from the Kaloi drainage basin without having to relocate or cross the Honouliuli sewer outfall pipe.

1.4.3 Oneula Beach Park Master Plan

Following a series of community meetings, the Oneula Beach Park Master Plan was prepared by the Department of Design and Construction (DDC) in 2001 to guide future park development, address anticipated recreational demand, and to plan the future expansion of the park. A Final Environmental Assessment was prepared for the master plan and a Finding of No Significant Impact was issued. The City Council approved the master plan by issuing a Special Management Area Use Permit that allows for the implementation of the master plan (Resolution No. 01-228). The master plan calls for ~~the following~~ improvements to be developed in two phases.

As part of the first phase, the access roadway to Oneula Beach Park will be relocated. Presently, access to Oneula Beach Park is from Fort Weaver Road, over Papipi Road, and via a roadway easement extending from Papipi Road to the park. The roadway easement is currently located entirely on HASEKO's property. Upon conveyance by HASEKO of the 9.365-acre expansion area, the roadway will have to be relocated makai or southward of its present alignment to lie within the park boundary. A short segment of the roadway, between the beach park expansion area and Papipi Road, will be within HASEKO property, over which the City will have an easement. HASEKO is obligated to construct this short segment of the access road pursuant to Condition 3.e.7 of 2003/PDH-3 (Planned Development – Housing Permit for Ocean Pointe residential Area III). This segment of the access road will be constructed in conformance with the realigned access road through the current and expanded Oneula Beach Park.

Other improvements include:

Phase I – This phase includes work on the existing 28 acres of the park:

- Relocate the existing multipurpose field and provide irrigation improvements;
- Construct a new comfort station and parking lot to service the multipurpose field;
- Resize the existing parking lot;
- Relocate the existing comfort station and outdoor shower closer to the unpaved parking area;
- Develop new picnic areas;
- Develop an Americans with Disability Act (ADA) beach access; and
- Develop an unpaved pedestrian path along the shoreline.

Phase II – This phase will include work on the 9.365-acre expansion area:

- Construct a new multipurpose community/recreation center and parking lot;

- Construct new group picnic areas;
- Develop new individual camping sites;
- Construct a new parking lot;
- Construct a new comfort station and outdoor shower;
- Provide additional ADA beach access;
- Continue with further work on the unpaved pedestrian access; and
- Provide landscaping.

The proposed drainage improvement project has been designed to minimize the potential for impacts to the Oneula Beach Park Master Plan. In particular, the drainage improvement project will involve construction at the easternmost end of the existing park boundary, roughly between the existing park and the area of park expansion. It is anticipated that the construction of this project will precede the realignment of the existing access road. The portion of the relocated park access road to be constructed in conjunction with this proposed drainageway project, therefore, will be carefully coordinated with DDC and DPR to ensure seamless continuity on either side when the remainder of the relocated access road is constructed. Subprojects associated with Phase II of the park master plan are not anticipated to be affected by the proposed project.

1.5 PURPOSE OF THE ~~DRAFT~~FINAL ENVIRONMENTAL IMPACT STATEMENT (~~DEIS~~FEIS)

~~The purpose of this Draft Environmental Impact Statement (DEIS) is to inform interested parties of the proposed project and to seek public comment on subject areas that should be addressed prior to the acceptance of the Final Environmental Impact Statement (FEIS). This DEIS describes existing conditions at the site and addresses the potential for adverse environmental impacts as a result of the proposed action.~~This Final Environmental Impact Statement (FEIS) is prepared for construction of the proposed Kaloi Gulch Drainageway Improvements at Oneula Beach Park project. This

document is prepared in accordance with Chapter 200, Title 11, Hawaii Administrative Rules (HAR), and Chapter 343, Hawaii Revised Statutes.

The following criteria under Chapter 343, HRS, may be triggered by this proposed project~~. Hawaii state law requires the preparation of this DEIS for any of the following~~: (1) use of State or County lands or funds; (2) use within the State Conservation District; and (3) use within the Shoreline Setback, as defined by the City and County of Honolulu (see Section 343-5(a), Hawaii Revised Statutes).

An EIS Preparation Notice (EISPN) was published in the June 8, 2004 issue of the State Department of Health (DOH), Office of Environmental Quality Control (OEQC), Environmental Notice. The Draft EIS for this project was subsequently published for public review by OEQC on December 23, 2004. Public comments were received during the public comment periods for the EISPN and DEIS, and at various meetings before the affected public and community. This FEIS provides additional information based on the comments received that further describes the proposed project, the environmental conditions of the site, the potential for significant adverse impacts, and the application of mitigation measures as appropriate, to reduce or minimize the potential for significant environmental impacts.

Accordingly, there are no significant potential impacts that have been identified in this document that cannot be sufficiently addressed by the proper application of the mitigation measures as proposed.

CHAPTER 2
PROJECT DESCRIPTION

2.1 INTRODUCTION

The proposed project involves ~~enlarging~~ construction of the ~~existing~~ Kaloi Gulch drainageway through the eastern end of Oneula Beach Park ~~in order~~ to meet the City's 100-year storm flow requirement. The ~~enlarged~~ drainageway will serve as an overflow outlet to the ocean that will address flood control and regional drainage for all communities within the approximately 7,000-acre Kaloi Gulch Watershed.

As the 'Ewa Plain has undergone significant development over the past quarter century, the conversion of lands from agriculture to urban has both increased and concentrated stormwater runoff. ~~Developers in the Kaloi Gulch Watershed have retained most of the stormwater on site where it can infiltrate into the ground. But runoff from periods of prolonged heavy rainfall can presently exceed the retention capacity of these features and overflow onto Ocean Pointe, across other makai lands and into the ocean~~Currently, lands mauka of Ewa Villages are largely undeveloped or in agriculture. Stormwater runoff sheet flows over these lands and much of it infiltrates the ground. Ewa Villages and Ewa by Gentry, the two existing developments mauka of Ocean Pointe, retain much of the runoff that flows onto and within their project sites within their respective golf courses. To alleviate flooding that occurred in the past, however, Ewa Villages has been allowed to pass 2500 cfs downstream. A temporary emergency channel that was constructed in June, 2000, and expanded in 2002, through the Ocean Pointe development and Oneula Beach Park provides an outlet for runoff released from Ewa Villages.

~~In order to control flooding from increased runoff within the watershed, a suitable ocean outlet that meets the current~~ Future developments, which include housing and a university campus on approximately 1,300 acres of land owned by the University of

Hawaii and the Department of Hawaiian Home Lands immediately mauka of Ewa Villages, may significantly increase the amount of runoff that reaches the ocean if sufficient retention facilities are not provided. To prevent flooding of downstream properties, runoff would have to be directed into drainage channels and an outlet to the ocean would have to be provided.

In order to meet the 100-year storm flow requirement in accordance with the City's current Storm Drainage Standards, a suitable ocean outlet is ~~being proposed~~ required to handle runoff from the Kaloi Gulch Watershed. ~~The existing Kaloi Gulch drainageway outlet through Oneula Beach Park is not able to handle the current 100-year storm flow. This limitation is caused mostly by a natural berm along the high shoreline.~~It had long been planned that the Ocean Pointe marina would serve as the ocean outlet. However, environmental and operational concerns with lowering or siphoning the Honouliuli sewer outfall pipe, which would be necessary for this purpose, has prompted an exploration of alternative ocean outlets or means of meeting the City's storm flow requirements.

~~It is possible that during the permitting process for the proposed regional drainage channel that the current City drainage standard could be modified, or an exemption from the current drainage standard could be obtained, making some or all of the proposed project unnecessary.~~ There currently exists a temporary emergency channel through Oneula Beach Park. Its current capacity, however, is not able to handle this 100-year storm flow. This limitation is caused mostly by a natural berm along the shoreline. Because of this shoreline berm, runoff from a 100-year storm will overflow the current temporary emergency channel and flood the beach park. The proposed project will increase the capacity of this ocean outlet by reducing the height of the berm, thus allowing runoff to flow into the ocean, instead of being retained in the beach park. The width, more than the depth, of the channel will be increased to handle larger storm flows without diminishing the recreational opportunities of the beach park.

~~This project proposes to improve the drainageway to meet the current City flow requirement by lowering a portion of the berm and also by clearing and leveling the area between shoreline and the park access road. The graded area will be planted and maintained for use as open park space.~~

There are two situations in which the potential for water quality impacts exists. The first ~~situation~~ is during construction~~,~~ when limited excavation of the shoreline berm will be needed to remove the sandy and underlying limestone material. The second situation is during ~~the~~ infrequent periods of prolonged rainfall when upland runoff exceeds the retention capacity within the watershed and overflows to the ocean through the drainageway channel.

~~There are no inland water bodies within the project site at the present time. The proposed action therefore does not have the potential to affect water quality in such features.~~Discharge to the ocean is anticipated to occur only during periods of prolonged heavy rainfall that are large enough to fill and overflow the various storage basins within the Kaloi Gulch Watershed. Based on the amount of storage planned by the various upland developments at ultimate build-out of the watershed, it estimated that such an event would occur, on average, about once every ten years. This statement is equivalent to saying that there is a 10 percent chance of an overflow occurring in any given year.

The channel is designed to accommodate a 100-year storm event per the City's current storm flow requirement, which is based on a regional average of gauged streams in the Leeward Oahu area. Kaloi Gulch gauge readings, however, show lower flow intensities (cfs per acre) than other streams in the Leeward Oahu grouping. Therefore, the 100-year storm flow for Kaloi Gulch should be less than the regional average used in the City standards. In addition, the amount of storage and interception capacity within the Kaloi Gulch drainage basin further reduces the amount of runoff flowing downstream. It has been observed that the relative amount of runoff occurring at the bottom of the

Kaloi drainage basin is much less than in other drainage basins in the Leeward Oahu grouping.

It is possible that the current City drainage requirement for Kaloi could be modified to reflect (1) data specific to the Kaloi Gulch drainage basin, rather than the entire Leeward Oahu grouping, and/or (2) the large amounts of storage within the Kaloi drainage basin, present, planned, and contemplated in accordance with the 'Ewa Development Plan. The new flow standard for Kaloi Gulch would be less than the current standard. In that case, the scale of the proposed project may be reduced or the project may be unnecessary.

2.2 DESCRIPTION OF THE PROPOSED ACTION

~~The proposed action is to enlarge the existing Kaloi Gulch drainageway through Oneula Beach Park to meet the current City 100-year storm flow requirement in accordance with their Storm Drainage Standards. This action is needed to help control flooding and~~ The proposed action is to construct the Kaloi Gulch drainageway that meets the City's current drainage requirements for 100-year storm flows by providing an ocean outlet through the Oneula Beach Park. The improvements will involve modifying and enlarging the existing temporary emergency drainage channel. The improvements are needed to provide flood control and address regional drainage for all communities within the Kaloi Gulch Watershed.

The proposed project has ~~four~~three major components which include: (1) ~~the Kaloi Gulch Drainageway,~~ construction of a permanent drainage channel through Oneula Beach Park, (2) the Park Access Road, and (3) a Secondary Park Access Road~~, and (4) landscaping~~. These components are described below.

More detailed engineering and construction plans will be developed at the appropriate stages (after required land use permits have been obtained) in coordination with the Department of Planning and Permitting (DPP), Department of Parks and Recreation (DPR), Department of Design and Construction (DDC), Department of Transportation Services (DTS), the Department of Facilities Maintenance (DFM), and the police, fire, and Emergency Medical Services (EMS) agencies.

2.2.1 Kaloi Gulch Drainageway through Oneula Beach Park

The existing ~~Kaloi Gulch drainageway~~temporary emergency channel through Oneula Beach Park is located within ~~a 3.7 acre area at~~ the eastern-most portion of Oneula Beach Park, between the eastern boundary of the park and the existing Honouliuli Wastewater Treatment Plant Sewer Outfall Easement. Presently, a low natural berm along the shoreline limits flow capacity to the ocean. The ~~existing drainageway~~ flow capacity of the temporary emergency channel through the beach park is less than the current City 100-year flood flow requirement of 10,800 ~~cubic feet per second (~~cfs~~)~~.

~~This project proposes to enlarge the existing Kaloi drainageway to meet the current City flow requirement by lowering a~~ The proposed project will increase the capacity of this ocean outlet by reducing the height of the berm, thus allowing runoff to flow into the ocean, instead of being retained in the beach park. The width, more than the depth, of the channel will be increased to handle larger storm flows without diminishing the recreational opportunities of the beach park.

This project proposes to meet the current City storm flow requirement by constructing the Kaloi Gulch drainageway through Oneula Beach Park. The existing temporary emergency channel will be modified and enlarged, and an approximately 500-foot-long section of the existing shoreline berm at the easternmost end of the beach park (between the east property line and the sewer outfall easement)~~. The existing berm~~ will

be lowered~~ by approximately 2 to 4 feet. The project will also clear debris and brush within the 300-foot long area between the shoreline and the park access road and leveled out grades to remove ponding and promote proper drainage. The finish bottom of the enlarged drainageway channel will be set at an elevation of 4 feet msl or higher to be above the normal wash of the waves. This work is anticipated to only include the removal of sand and silt overlying the coral outcrop. The smoothened 500-foot wide by 300-foot long area (approximate size) will be planted and maintained for use as open park space. The mauka end of the proposed drainageway channel will tie into the drainageway improvements that will be incorporated as part of the Ocean Pointe Golf Course. See **Figure 2-1, Concept Plan View**~~. Grades along the existing shoreline berm vary between 6 and 8 feet above mean sea level (msl). The berm was probably formed naturally over an extended period of time, when heavy waves would occasionally transport sand and silt up to its present location. Stormwater discharges during periods of heavy rainfall, flowing from the Kaloi Gulch and out to sea, may also have been responsible for depositing sediments which now form the surface of the berm. Although the rate at which this berm was formed is not known, it is not unreasonable to suggest that this took a period of several decades, if not longer, to occur. Based on the archaeological evaluation of the berm, no significant cultural deposits or artifacts including bones of human origin were discovered.

~~Construction and grading will involve removal of approximately 20,000 cubic yards (cy) of soil and sandy material. In order to contain flood flows within the channel and to prevent any overflow into the park or other areas, the banks along both edges of the drainageway channel will be raised to approximately 4 to 6 feet higher than the channel bottom (e.g., they will be set at an elevation of approx. 8 to 10 feet above mean sea level (msl)).~~ It is expected that the same wave and runoff forces that formed the berm in the past could reform the berm in the future. However, as with the existing berm, the rate at which reformation is expected to occur is not known.

The proposed drainageway work will lower the height of the existing shoreline berm by approximately 2 to 4 feet down to an elevation of 4 feet above msl. The grading work will allow passage of the 100-year stormflow in accordance with City requirements. If required, build-up of sand and sediments in the channel will be removed on an as-needed basis to ensure that the channel will perform adequately. Structures and other encroachments would need to be consistent with City restrictions for development within a floodway.

Once the berm is lowered and all portions of the project are completed, the berm will be periodically inspected and maintained as needed to ensure that it can function adequately as a storm drainage outlet.

To minimize the impact on park usage, the channel through the park will be wide and shallow with gently sloping banks, and will be relatively indistinguishable from the surrounding park areas. (See profiles and typical sections included in **Appendix G**; see also **Figure 2-2**.) A summary of the relationship between the existing grades and the proposed project grades are as follows:

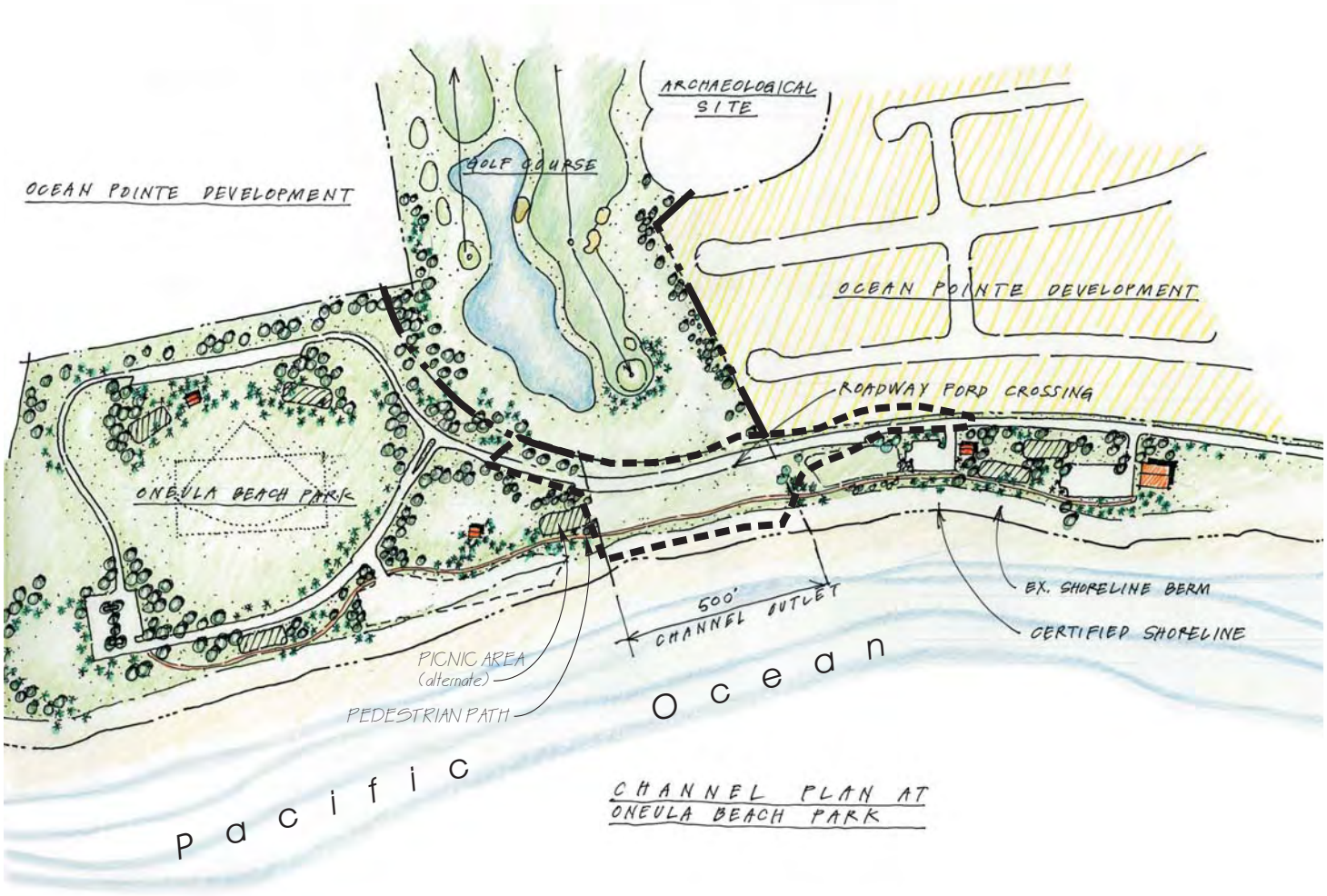
- The difference between the existing grades along the park access roadway = 10 feet (at the park property line) - 3.3 feet (about 300 feet west of the park property line) = 6.7 feet msl
- The difference between the proposed grades along the proposed park access roadway = 10 feet (top of banks near the park property line and the sewer outfall easement) - 4.5 feet (center of drainageway) = 5.5 feet msl
- The maximum grade difference in the existing emergency overflow channel = 10 feet (top of bank) - 1.8 feet (low point approximately 300 feet east of the park property line) = 8.2 feet msl

- The maximum grade difference in the proposed permanent drainageway channel = 10 feet (top of bank) - 4.0 feet (lowest excavated grade along shoreline) = 6.0 feet msl

The project will also clear debris and brush within the project area and smooth out grades to remove ponding areas and promote proper drainage within the park. The finished bottom of the new drainageway channel will be set at an elevation of 4 feet msl at the shoreline to be above the normal wash of the waves. This work is anticipated to involve the removal of sand and silt overlying the coral outcrop. The graded drainageway will be landscaped for use as passive open park space, consistent with the remainder of the park. The mauka end of the proposed drainageway channel will tie into the drainageway improvements that will be incorporated as part of the Ocean Pointe Golf Course. (See **Figure 2-1, Concept Plan View** and **Appendix G**.)

Construction and grading will involve excavation of approximately 7,110 cubic yards (cy) of soil and sandy material. In order to contain flood flows within the channel and to prevent any overflow into the park or other areas, the banks along both edges of the drainageway channel will be raised to approximately 4 to 6 feet higher than the channel bottom (e.g., they will be set at an elevation of approximately 8 to 10 feet above msl). Approximately 7,873 cy of fill or embankment will be needed primarily for the channel banks to contain flows from spreading into the beach park and for gradually sloping the park access road over the channel banks. (See **Figure 2-2, Concept Profile Views** and **Appendix G**.)

The channel banks will be set at a relatively mild slope to allow areas to be used for park space and allow pedestrian access through and across the drainageway. The mild bank slopes will also facilitate maintenance of the area which will include the periodic removal of accumulated debris and litter. The mild slope of the channel (approximately 0.2 percent) will limit flow velocities and channel shear stresses to levels acceptable for grass lining at a flow of 10,800 cfs.



Legend

Project Limits

FIGURE 2-1
CONCEPT PLAN VIEW
Kaloi Gulch Drainageway
Improvements at Oneula Beach Park
HASEKO (Ewa), Inc., Ewa, Oahu, Hawaii

No Scale

R. M. TOWILL CORPORATION June 2005

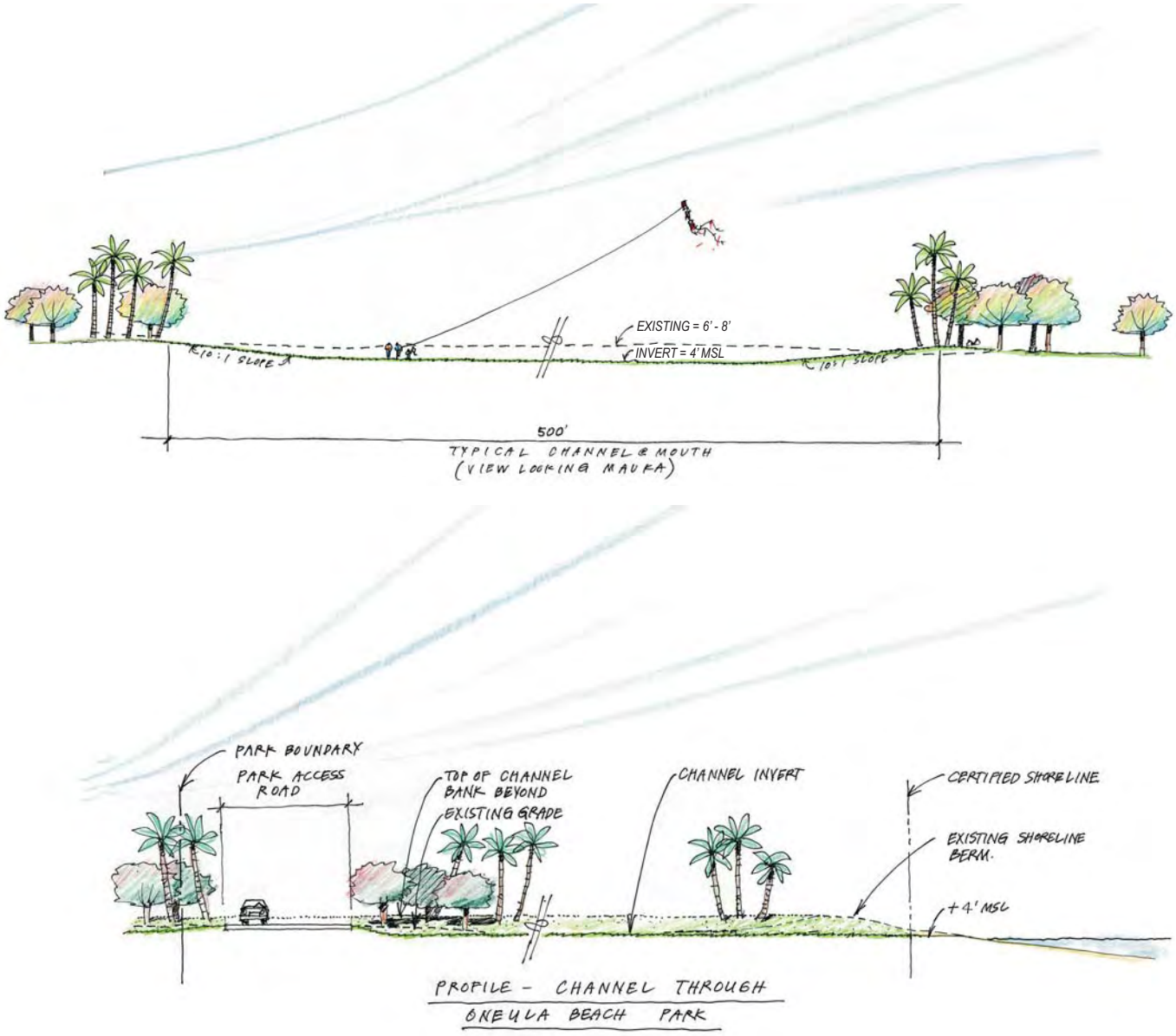


FIGURE 2-2
CONCEPT PROFILE VIEWS
Kaloi Gulch Drainageway
Improvements at Oneula Beach Park
HASEKO (Ewa), Inc., Ewa, Oahu, Hawaii

No Scale

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Bank slopes inside the channel will be 10 percent (10 feet horizontal to each 1 feet vertical or 10H : 1V) or flatter. The outside slopes of the east bank will be approximately 5% (20H:1V) and 20% (5H:1V) along the outside of the west bank. The west bank has a steeper slope in order to minimize the amount of fill that will have to be placed over the Honouliuli sewer outfall. The proposed grade differences between the top of bank and the sewer outfall easement outside the drainageway will be less than 2 feet. However, for ADA accessibility, slopes will be 5% or less along the park access road and the pedestrian access route along the shoreline.

The ~~channel banks will be set at a relatively mild slope (e.g., 1 feet vertical to each 10 feet horizontal) to allow areas to be used for park space and allow pedestrian access through and across the drainageway. The mild bank slopes will also facilitate mowing and maintenance of the area.~~

~~The~~ extent of work on the drainageway channel will affect only a part of the shore area and will not extend down to the ocean. Therefore, beach access along the shoreline will generally not be affected unless there are construction safety concerns. Temporary pedestrian routes will also be designated to maintain access across the drainageway area throughout the construction period.

~~It is planned that a maintenance agreement will be developed whereby maintenance may either be by the golf course operator, by an entity designated by HASEKO. Due to the dry conditions, grass cover in the channel may be thin and sand may be used as a supplement for ground cover. Maintenance activities will involve mowing what grass does grow and the periodic removal of debris and litter accumulated there.~~HASEKO has been working, and will continue to work, with the appropriate City Departments and other landowners and developers in the Kaloi drainage basin to legally define the maintenance obligations for the drainageway area. Although the details and the form of memorializing the maintenance obligations have not yet been worked out, HASEKO is committed to ensuring that the drainage channel through Oneula Beach Park is kept

free of large debris that may impede storm water flows through the channel, silt and other debris are removed from the channel following storm events, and the shoreline berm is maintained at an elevation that enables it to function adequately as a storm drainage outlet.

2.2.2 Park Access Road

~~The existing park access road will be reconstructed across the drainage channel to operate as a ford structure that will allow overflow passage of storm flows. The reconstructed access road will be set along the bottom of the drainageway channel and will follow approximately the same alignment as the current access road. It will be 20 feet wide to accommodate two lanes of traffic and will be reconstructed with concrete in order to prevent washout during passage of storm flows. Grassed shoulders will be used along both sides of the roadway.~~

~~The access road is expected to operate as a ford only when there is overflow into the drainageway channel from the Kaloi Gulch Watershed. Overflow is anticipated to occur only during periods of prolonged heavy rainfall that are large enough to fill and overflow the various storage basins within the Kaloi Gulch Watershed. Based on the amount of storage planned by the various upland developments at ultimate build-out of the watershed, it estimated that such an event would occur, on average, about once every ten years. [This statement is equivalent to saying that there is a 10 percent chance of an overflow occurring in any given year. Under interim conditions, when the watershed is not fully developed, the estimated frequency of overflow will be less.]~~

~~Appropriate signage and postings will be installed to inform the public about potential for flooding across the roadway and within drainageway channel area of the park. The signage will indicate that the access road is subjected to flooding during periods of heavy rainfall and warn motorists and pedestrians not to cross when flood conditions exist. Signage will also indicate that an alternative access roadway is available and may also list contact information for emergency and maintenance services.~~

~~Existing utilities, consisting of a 12-inch water line and an overhead electrical power line, will also be relocated across the drainageway channel. The water line will be set deeper to allow more protective cover and the~~

Presently, access to Oneula Beach Park is from Fort Weaver Road, over Papipi Road, and via a roadway easement extending from Papipi Road to the park. The roadway easement is currently located entirely on HASEKO's property. Upon conveyance by HASEKO of the 9.365-acre expansion area, the roadway will have to be relocated makai or southward of its present alignment to lie within the park boundary. As part of the Kaloi drainage improvements project, the portion of the access road that crosses the channel will be constructed in its realigned location. It is anticipated that the construction of this project will precede the realignment of the existing access road. The portion of the relocated park access road to be constructed in conjunction with this proposed drainageway project, therefore, will be carefully coordinated with DDC and DPR to ensure seamless continuity on either side when the remainder of the access road is constructed. Temporary provisions will be constructed, as necessary, to maintain public access and utility (water, power, and telephone) services to the beach park.

The park access road will be set along the bottom of the drainageway channel and will operate as a ford structure that will allow overflow passage of storm flows. The access road will be 24 feet wide to accommodate two lanes of traffic and will be constructed with concrete across the drainageway in order to prevent washout during passage of storm flows. Realigned portions of the access road outside the drainageway will be constructed with asphaltic concrete (AC). The realigned access road will transition and tie back into the existing park access road beyond both sides of the drainageway. Grassed shoulders will be used along both sides of the roadway. The difference in road bed material and color will help delineate the limits of the drainageway.

It is anticipated that the existing park access road will remain in service for vehicles and pedestrian traffic while the new realigned access road and drainageway are being constructed. After the new access road is opened, the existing access road will be closed and removed. Temporary access routes will be used when tie-ins are made to the existing roadway.

At a flow rate of 10,800 cfs, the water depth over the roadway will be approximately 3.7 feet and the flow velocity will be approximately 6 feet per second. Thus, road closure would be required during these 100-year storm events. Additionally, wave run-up into the channel during high surf and storm conditions may reach the access road and require closure of the roadway.

Appropriate signage and postings will be installed to inform the public about potential for flooding across the roadway and within the drainageway channel area of the park. The signage will indicate that the access road is subjected to flooding during periods of heavy rainfall and warn motorists and pedestrians not to cross when flood conditions exist. Signage will also indicate that an alternative access roadway is available and may also list contact information for emergency and maintenance services.

Existing utilities, consisting of a 12-inch water main and overhead electrical power and telephone lines, will also be relocated across the drainageway channel. The overhead electrical ~~line~~lines will be set underground to eliminate poles within the channel area.

2.2.3 Secondary Park Access Road

A second access road will be installed to provide an alternate means for vehicles and pedestrians to enter and exit the ~~western~~northern portion of Oneula Beach Park in the event the main access road become unusable, either because of flooding, wave run-up, or because of repair and maintenance. The road will initially be unpaved during the construction phase. Following the end of construction of the drainageway

improvements, the road will be 20 feet wide and will use ~~asphalt concrete (~~AC~~)~~ pavement with grassed shoulders. ~~Its design will be consistent with access roads within City parks and will not be a major public roadway.~~

The location of this secondary park access road is currently ~~in the planning stage and a location is being considered~~ planned to be at the north~~western~~ end of the beach park~~, adjacent to or near by the parking area.~~. See **Appendix G**, for the preliminary location that has been identified for this road, including the point of connection with the existing roadway system. The final location of the road, signage and other features will be developed by HASEKO in ~~consultation~~coordination with ~~the Department of Parks and Recreation~~DPR and other City agencies, as appropriate.

2.2.4 Landscaping

The Kaloi drainageway channel through Oneula Beach Park will be landscaped to serve as passive open park space~~. The landscape plan will call for topsoil and grass to be used as practicable within the drainageway channel. Where grass cover is anticipated to be thin, due to the dry or poor soil conditions, imported sand will be used as ground cover.~~ consistent with the remainder of the park. Clean sand and topsoil may have to be imported as necessary to support the establishment of grass and ground cover in the graded areas. Temporary grassing and/or hydromulching will be used as necessary for temporary erosion control purposes during construction.

Whenever feasible, native and endemic vegetation will also be used. Trees will be planted only along the upper portions of the channel banks to minimize flow obstructions within the drainageway channel. ~~A permanent irrigation system will be installed in the drainageway channel as an expansion to the park's existing irrigation system.~~

Other park improvements that are planned to be undertaken by the Department of Parks and Recreation are described in the next section.

2.2.5 Public Safety

2.3 ONEULA BEACH PARK MASTER PLAN

The Oneula Beach Park Master Plan was prepared by the Department of Design and Construction (DDC) to identify future park improvements within the expanded park. The master plan calls for the following improvements to be developed in two phases.

Phase I – This phase includes work on the existing 28 acres of the park:

- Relocate the existing multipurpose field and provide irrigation improvements;
- Construct a new comfort station and parking lot to service the multipurpose field;
- Resize the existing parking lot;
- Relocate the existing comfort station and outdoor shower closer to the unpaved parking area;
- Develop new picnic areas;
- Develop an Americans with Disability Act (ADA) beach access; and
- Develop an unpaved pedestrian path along the shoreline.

Phase II – This phase will include work on the 9.365 acre expansion area:

- Construct a new multipurpose community/recreation center and parking lot;
- Construct new group picnic areas;
- Develop new individual camping sites;
- Construct a new parking lot;
- Construct a new comfort station and outdoor shower;

- ~~Provide additional ADA beach~~

Although the use of public open space recreation areas for drainage purposes is not unusual, consultation with the Oahu[1] and State Civil Defense[2] agencies has been initiated to coordinate requirements for flood preparedness. Final and more detailed plans will be developed in the engineering design phase of the project to address the following situations.

1. Prior to stormwater flows an early warning system will alert Oneula Beach Park users that water will begin to flow in the drainageway and across the access road ford. The design and features of the early warning system will be determined based on the final design of the drainageway and appurtenant features. This effort is expected to involve the civil defense agencies as well as all agencies identified above.

2. Prior to stormwater flows a notification system will be put into place to make park users aware of the presence and location of the Kaloi drainageway within the park. It is expected that because stormwater flows are anticipated to occur only rarely and during a 1 in 10 year storm event, the use of signage and postings will be an appropriate means of providing this information.

The signage will indicate that the access~~;~~

- ~~Continue with further work on the unpaved pedestrian access;~~ road is subjected to flooding during periods of heavy rainfall and
- ~~Provide landscaping.~~

[1] Telephone conference and e-mail transmittal of project information to Mr. Harold Buckle, June 9, 2005, and Mr. John Cummings, June 24, 2005, Oahu Civil Defense Agency.
[2] Telephone conference with Mr. Norman Ogasawara, State Civil Defense Agency, June 9, 2005.

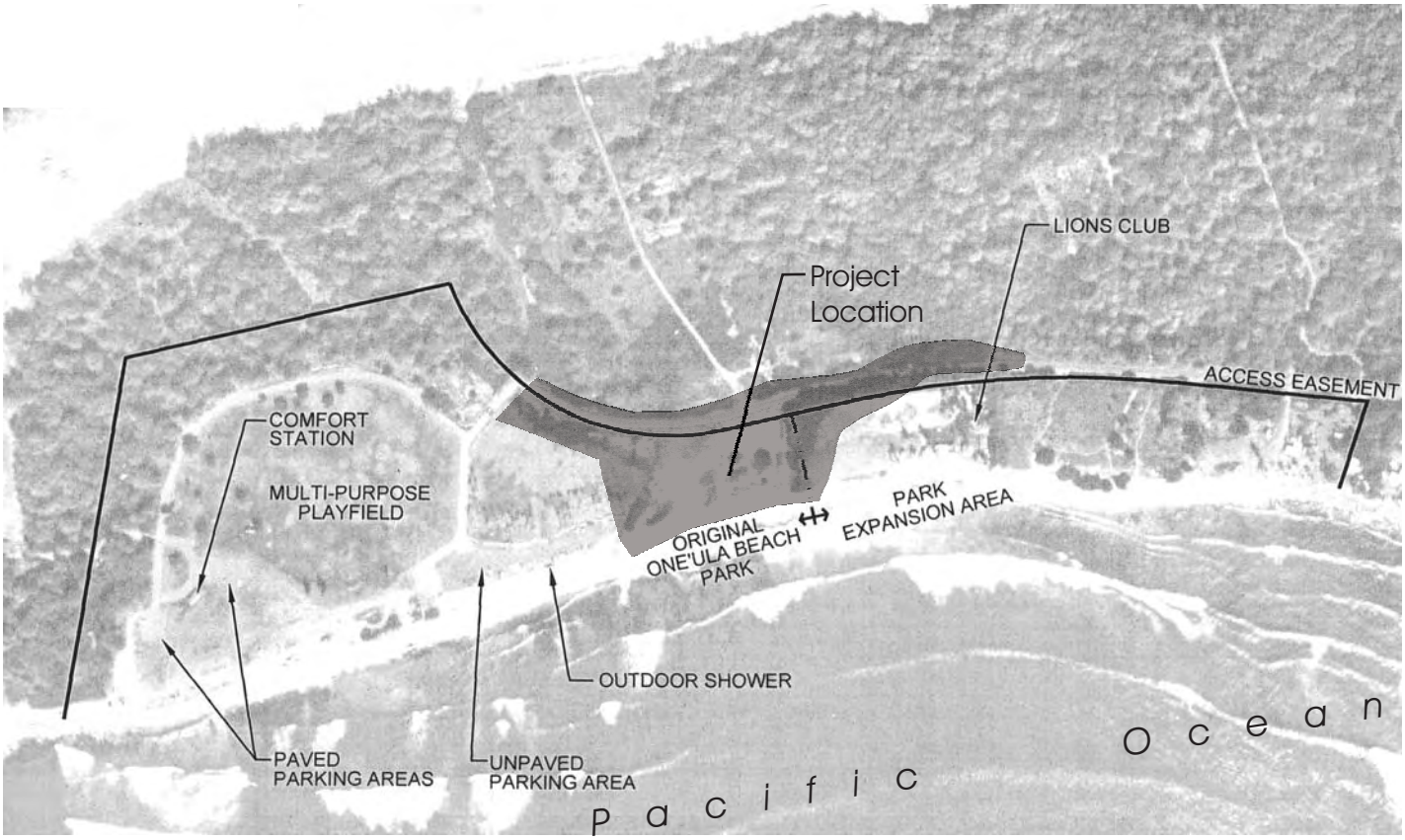
~~The actual construction schedule for the proposed improvements has not been developed by the Department of Parks~~ will warn motorists and ~~Recreation and is subject to funding by the City Council.~~ pedestrians not to cross when flood conditions exist. Signage will also indicate that an alternative access roadway is available and may also list contact information for emergency and maintenance services.

3. During periods when there is flooding, evacuation procedures to be followed will be managed by a designated party. The details of the specific evacuation procedures and the identification of the designated party will be prepared and coordinated by HASEKO in consultation with the agencies identified above.

4. After the cessation of flooding, recovery procedures to be followed will be practiced to facilitate any clean-up and recovery effort that may be required. These procedures are expected to involve inspection and maintenance of the drainageway and facilities within Oneula Beach Park. Other procedures will be developed in coordination with the agencies.

2.3 IMPACTS ON ONEULA BEACH PARK MASTER PLAN

The proposed drainage improvements ~~will be~~ are designed to minimize the potential for impacts to the Oneula Beach Park Master Plan. In particular, the drainage improvements will involve construction only at the easternmost end of the existing park boundary (**Figure 2-3, Oneula Beach Park Existing Land Uses**), roughly between the existing park and the area of park expansion.



Source: Final Environmental Assessment, Oneula Beach Park Master Plan
City and County of Honolulu, Department of Design and Construction, 2001

FIGURE 2-3
ONEULA BEACH PARK
EXISTING LAND USES
Kaloi Gulch Drainageway
Improvements at Oneula Beach Park
HASEKO (Ewa), Inc., Ewa, Oahu, Hawaii

0 500 Feet 1000

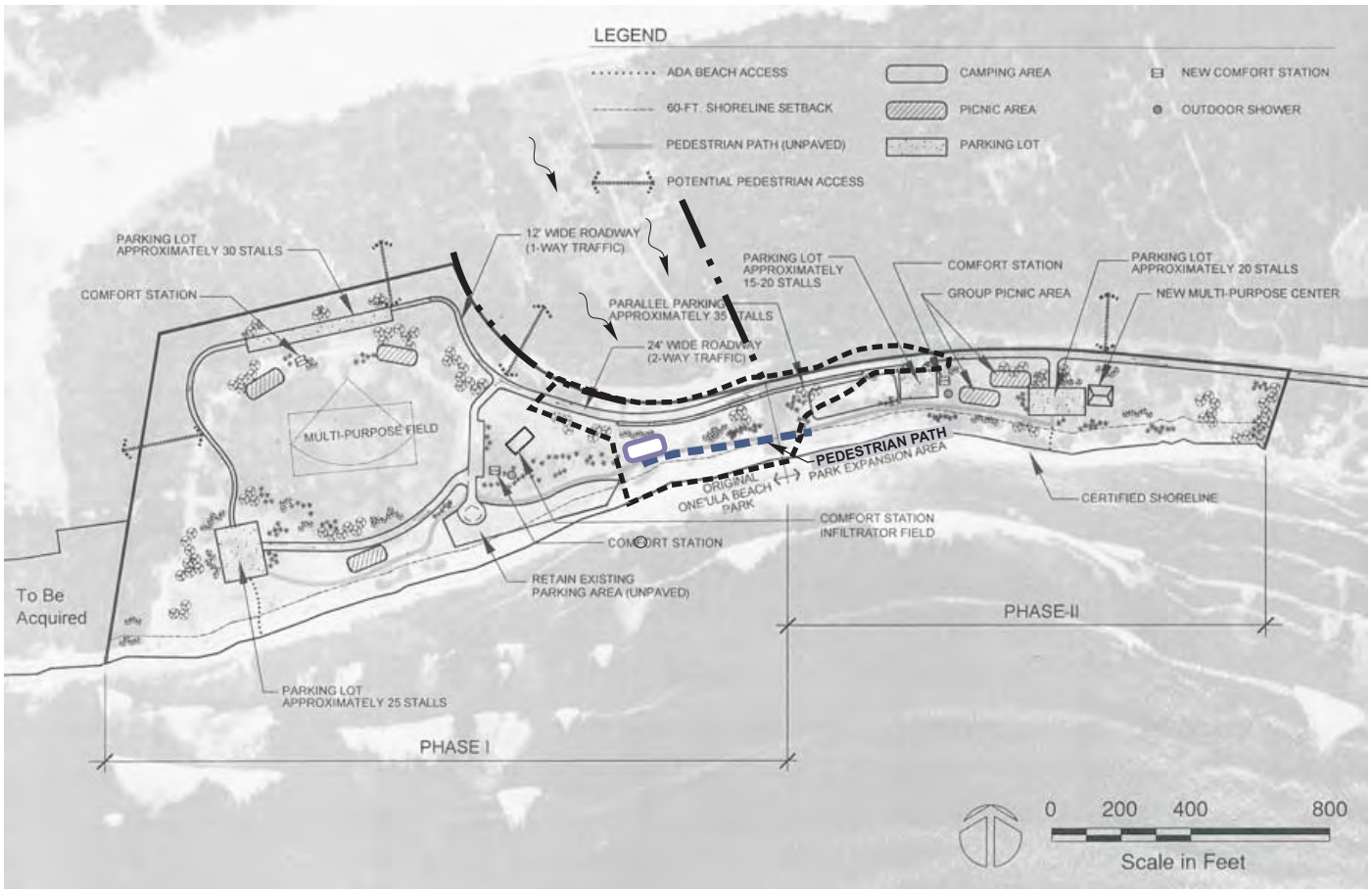
R. M. TOWILL CORPORATION June 2005

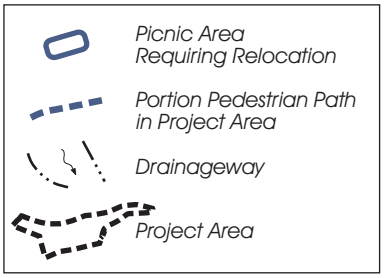
~~An examination of the project shows that the~~The drainage channel will be located in an area where ~~landscaping has been planned as part of Phase I~~the current Master Plan calls for landscaping and a group picnic area consisting of picnic tables and benches (**Figure 2-4, Project Relationship to Oneula Beach Park Master Plan**). ~~A group~~It is proposed that the picnic area~~, which will~~ be moved away from the drainage channel to a more appropriate location further to the west where there is sufficient open space to accommodate this use.

HASEKO will coordinate work required for the subject project with DPP, DPR, and DDC regarding changes to the Oneula Beach Park Master Plan, and construction schedule for the project and park improvements, with the goal of minimizing any disruption to park users. The implementation of the drainage channel will be coordinated with development of the Oneula Beach Park improvements both within the existing park as well as within the future park expansion area (east of the existing park).

The permanent improvements installed within the channel area (grading, grassing, access roads, utilities and signage) will include, if necessary, temporary provisions and reconnections for maintaining public access and utility services. The specific construction scheduling details will be developed following completion of the EIS and plan review processes. This will involve the review of construction drawings, environmental permits, design details to meet State and City regulations and requirements (including the permanent and any temporary provisions for maintenance of public access and services to the park), and construction schedules.

The modification of the park access road to a location further makai of the present location will be designed to be consistent with the park master plan. No significant change or impact is expected because: (1) the road will remain in the same alignment as shown in the Oneula Beach Park Master Plan; and (2) work on the road will be undertaken by HASEKO as part of the drainage system improvement project.





SOURCE: Base Drawing from Oneula Beach Park Master Plan, Dept. Of Design and Construction, Prepared by Wilson Okamoto & Assoc., Inc., March 2001, updated June 2005.

FIGURE 2-4
PROJECT RELATIONSHIP TO ONEULA BEACH PARK MASTER PLAN
Kaloi Gulch Drainageway
Improvements at Oneula Beach Park
HASEKO (Ewa), Inc., Ewa, Oahu, Hawaii

0 400 800 Feet

R. M. TOWILL CORPORATION June 2005

~~consist of picnic tables and benches, is also planned to be located in a portion of the west bank of the drainage channel. It is proposed that the picnic area be moved away from the drainage channel to a more appropriate location further to the west where there is sufficient open space to accommodate this use. It is expected that this minor adjustment will be accomplished through coordination with DDC.~~

~~Other coordination efforts between HASEKO and DDC and/or DPR will include: coordinating the overall construction schedules for both projects to ensure against the potential for adverse impacts to the park and park users; and coordinating the planned landscaping treatment within the modified drainage channel to ensure that appropriate species can be placed there.~~

~~Subprojects associated with Phase II of the Master Plan for the park are not anticipated to be affected by the proposed project.~~

~~The modification of the park access road will be designed to be consistent with the park master plan. No significant change or impact is expected because: (1) the road will remain in roughly the same alignment; and (2) work on the road will be undertaken by HASEKO as part of the drainage system improvement project.~~

~~The relocation of a portion of the unpaved pedestrian path will require further investigation to determine if the alignment can remain within the drainageway. If a segment of the path requires realignment, then costs associated with the redesign would be paid for by HASEKO.~~

The unpaved pedestrian path will need to meander slightly to go around the two outer banks of the drainageway at 5 percent slopes. The unpaved pedestrian path is planned to be designed and graded as part of the proposed drainageway improvements project.

2.4 CONSTRUCTION ACTIVITIES

Construction will involve the use of vehicles, heavy equipment, machinery, and personnel to complete grading of the channel, ~~re~~construction of the access road ~~into a concrete ford~~and utilities, landscaping and irrigation, and installation of accessory improvements such as signage and temporary access ~~routes.~~provisions. Environmental controls to protect from erosion and dust will be implemented. ~~Temporary irrigation will be used to establish grass covering and other plantings.~~

Temporary pedestrian and vehicular access routes will be used to maintain ingress and egress to and from the park throughout the construction period.

All work will be performed in accordance with safe construction practices and in compliance with State and City rules and regulations ~~of the State of Hawaii and City and County of Honolulu~~. No adverse effects associated with construction are anticipated.

2.5 PROJECT SCHEDULE AND COST

Project scheduling will be based on approval of required environmental permits and coordination with the community, construction plan review and approval from required governmental agencies, and bid and selection of a contractor. It is estimated that construction of the proposed drainage improvements would begin in ~~2005.~~2006. Construction is expected to last approximately 6 to 12 months.

It is estimated that the proposed improvements will cost approximately ~~$500,000.~~ $1.5 Million. This cost will be borne by HASEKO.

CHAPTER 3
ALTERNATIVES TO THE PROPOSED ACTION

3.1 INTRODUCTION

HASEKO has considered alternative means of meeting the objectives of the proposed action~~. As stated in Chapter 1, the proposed action involves enlarging the existing drainageway through a portion of the Oneula Beach Park~~ , which is to provide an adequate drainage course to the ocean for watershed runoff~~. It is needed~~ sized to meet the City's 100-year storm flow requirements~~ and will~~. The goals are to provide flood control and address regional drainage for communities within the Kaloi Gulch watershed. This section presents a summary of alternatives considered. ~~The "No Action" Alternative is provided as a requirement of Chapter 343, Hawaii Revised Statutes (HRS).~~

3.2 NO ACTION ALTERNATIVE

~~The No Action Alternative would involve no further improvement of the existing ocean outlet to meet the City's current standard for storm flow from the watershed.~~

~~Currently, the Kaloi Gulch drainageway through Oneula Beach Park consists of an open, unimproved area, about 300 feet wide, situated on the easternmost end of the park. A levee was installed along the eastern edge of the drainageway to contain and to keep flood waters from flowing eastward along Papipi Road. It was installed as part of an emergency flood control project that was constructed to provide relief to Ewa Villages.~~

~~The drainageway outlet through Oneula Beach Park can presently handle approximately 5,000 to 7,000 cfs without causing potential flooding impacts upstream. The outlet flow capacity is limited because it is partially blocked by a natural berm along the shore. The existing channel and upland flood control works (e.g., retention and detention basins)~~

~~are adequate for the current level of development within the watershed. However, the City's 100-year design flow requirement is 10,800 cfs for the entire watershed.~~

~~If no further improvements were made to the existing drainageway outlet, there would be limitations on capacity to handle the projected amount of watershed runoff. This limitation would dictate the nature of development of lands mauka of Ocean Pointe within the watershed. Since there would be insufficient capacity at the Kaloi Gulch drainageway outlet, mauka developments would proceed similar to the Gentry and Ewa Villages projects, where floodwaters are held on-site to lessen downstream runoff impacts. The implementation and long-term effectiveness of these flood control works for developments within the watershed will be important in meeting the flow limitation of the Kaloi drainageway outlet. Alternatively, subject to approval by the City, lands mauka of Ocean Pointe may consider processing an alternative path to the ocean that has sufficient capacity, other than discharging to the Kaloi Gulch drainageway.~~

~~The scope of the proposed improvements have assumed that development will continue to occur within the Kaloi watershed and therefore the "No Action" alternative was rejected in favor of improving the existing channel to accommodate the anticipated stormwater flows. However, it is possible that a future change or an exemption from the current City drainage standard could result in the acceptability of the No Action Alternative and that this project would not be needed.~~

~~3.3 LOWER THE HONOULULI SEWER OUTFALL TO ALLOW A REGIONAL DRAINAGE CHANNEL TO CROSS OVER THE OUTFALL~~

~~This alternative involves lowering approximately 2,000 feet of a major 84-inch diameter sewer outfall from the Honouliuli Wastewater Treatment Plant to enable flows from the Kaloi Gulch watershed to reach the proposed Ocean Pointe marina. See **Figure 3-1, Lowered Sewer Outfall Location**. This option would involve constructing a trench for the new 84-inch sewer outfall pipe at a lower profile (approximately 4 feet lower than existing depth) to replace the existing outfall pipe. The new pipe would be set low enough to allow construction of an 800-foot wide drainage channel over it. See **Figure 3-2, Typical Cross-Section of Sewer Outfall: Existing and Lowered Sewer Outfall**.~~

~~This alternative was eliminated from further consideration because of environmental concerns and the potential for operational impacts during construction.~~The project that is analyzed in this EIS is being proposed as an alternative to a regional drainage proposal that had been previously reviewed and analyzed in other environmental disclosure documents and permitted. A "no action alternative," therefore, could be interpreted to mean either 1) implementation of the already approved regional drainage proposal to lower the sewer outfall and allow regional drainage to exit through the marina, or 2) consider other options.

3.3 LOWER THE HONOULIULI SEWER OUTFALL TO ALLOW A REGIONAL DRAINAGE CHANNEL TO CROSS OVER THE OUTFALL AND EXIT THROUGH THE MARINA

This alternative involves lowering a major sewer outfall from the Honouliuli Wastewater Treatment Plant to enable flows from the Kaloi Gulch watershed to reach the proposed Ocean Pointe marina. This option would involve constructing a trench for a new sewer outfall pipe at a lower profile to replace the existing outfall pipe. The new pipe would be set low enough to allow construction of an 800-foot wide drainage channel over it.

The concept of utilizing a man-made marina at the seaward edge of the Kaloi watershed to address regional drainage needs was initiated decades ago. It has been reviewed in a number of previously published environmental disclosure documents, including:

- MSM & Associates, Inc., by Group Architects Collaborative, Inc., February 1981, *Environmental Impact Statement, Ewa Marina Community, Ewa, Oahu, Hawaii.*
- MSM & Associates, Inc., by Dames & Moore, December 1985, *Final Environmental Impact Statement, Increment II, Proposed Ewa Marina Community, Ewa, Oahu, Hawaii.*
- Haseko (Ewa) Inc., by Wilson Okamoto & Associates, April 1992, *Final Supplemental Environmental Impact Statement, Ewa Marina, Phase I, Increment 2.*

Until 2001, it had always been envisioned that the marina would straddle the Honouliuli wastewater treatment plant sewer ocean outfall that runs north-to-south through the middle of the Ocean Pointe project site. Navigability of the marina east of the outfall required that the outfall be lowered considerably. In 1980, the City Department of Public Works (now the Department of Environmental Services) approved plans for an inverted siphon in the sewer outfall to accommodate the construction of a navigable marina.

By 1997, however, environmental awareness at all levels of government had refocused the City's wastewater management program on maintenance of wastewater collection and transmission facilities and the prevention of spills and other breakdowns of wastewater systems. The maintenance requirements associated with an inverted siphon became the subject of re-examination. At the City's request, HASEKO commissioned a study by two civil engineering and environmental consulting firms, The Limtiaco Consulting Group, Inc., in association with Berryman & Henigar, Inc. The

study concluded that there is no feasible alternative to an inverted siphon to accommodate navigability over the outfall. The study also identified maintenance issues, potential odor problems, and potential spills with facilities that would be associated with siphoning the outfall. Consequently, HASEKO agreed to forego plans for the marina's eastern basin in order to eliminate the need for an inverted siphon.

The decision to not have an inverted siphon on the outfall resulted in the reduction of the size of the marina from 120 to 70 acres by eliminating all of the waterways east of the outfall. With respect to drainage, this meant that the Kaloi drainage channel would have to be incorporated into the golf course in a configuration roughly similar to the eliminated marina waterways, terminating at the marina basin west of the outfall. This plan required the lowering, but not siphoning, of the outfall.

This alternative involves lowering approximately 2,000 feet of a major 84-inch diameter sewer outfall from the Honouliuli Wastewater Treatment Plant to enable flows from the Kaloi Gulch watershed to reach the proposed Ocean Pointe marina. (See **Figure 3-1, Lowered Sewer Outfall Location**.) This option would involve constructing a trench for the new 84-inch sewer outfall pipe at a lower profile (approximately 4 feet lower than existing depth) to replace the existing outfall pipe. The new pipe would be set low enough to allow construction of an 800-foot wide drainage channel over it. (See **Figure 3-2, Typical Cross-Section of Sewer Outfall: Existing and Lowered Sewer Outfall**.)

HASEKO has obtained the necessary land use approvals to reduce the size of the proposed marina from 120 to 70 acres and to reconfigure the golf course to reroute the Kaloi regional drainage channel to the marina. Constraints to revising the regional drainage plan were imposed by the current elevation of the sewer outfall and regional drainage infrastructure already in place and/or approved for properties mauka of Ocean Pointe. A revised master drainage plan for Ocean Pointe, working with these

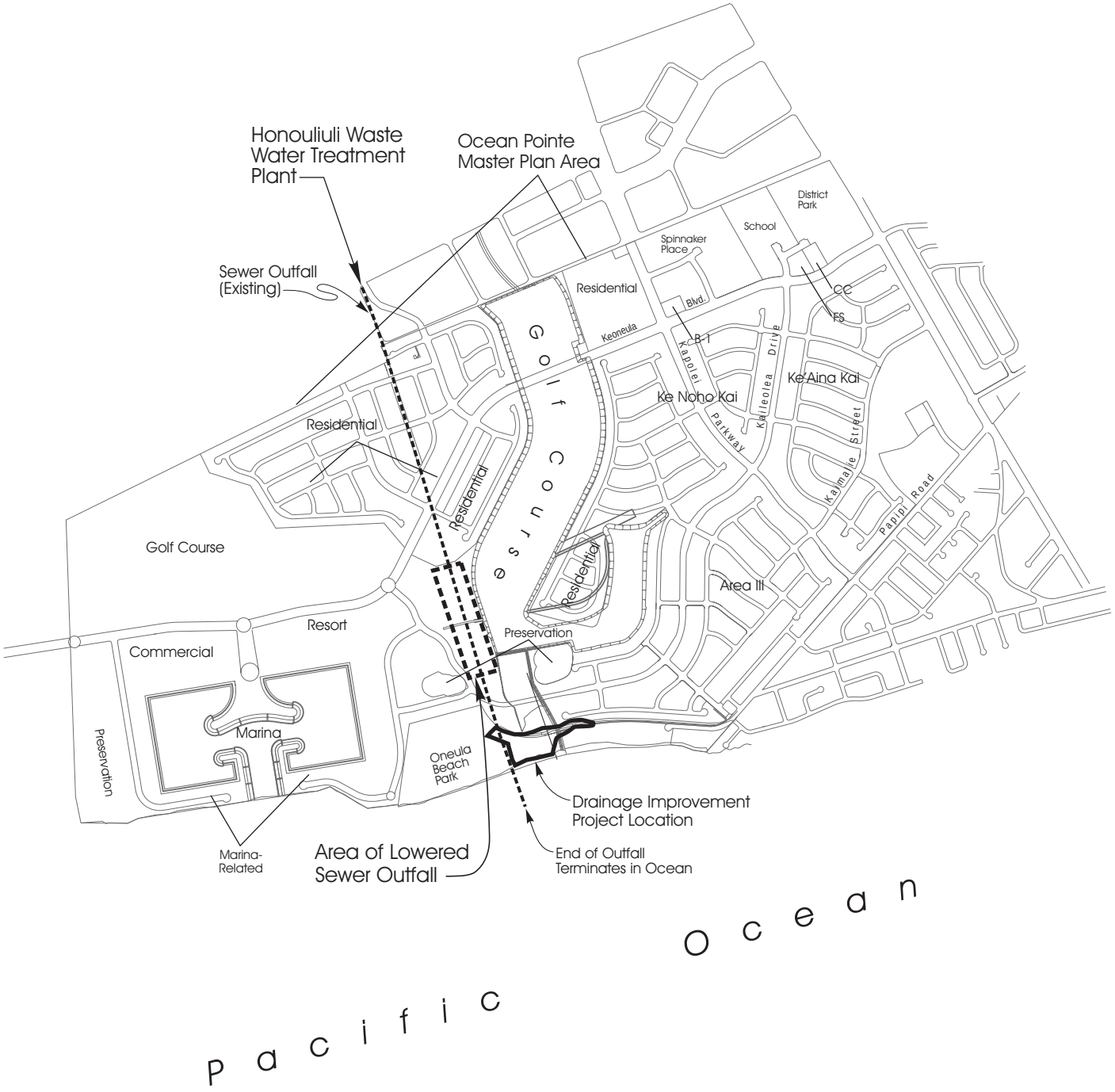


FIGURE 3-1
LOWERED SEWER OUTFALL LOCATION
Kaloi Gulch Drainageway
Improvements at Oneula Beach Park
HASEKO (Ewa), Inc., Ewa, Oahu, Hawaii

0 1600 Feet 3200

R. M. TOWILL CORPORATION June 2005

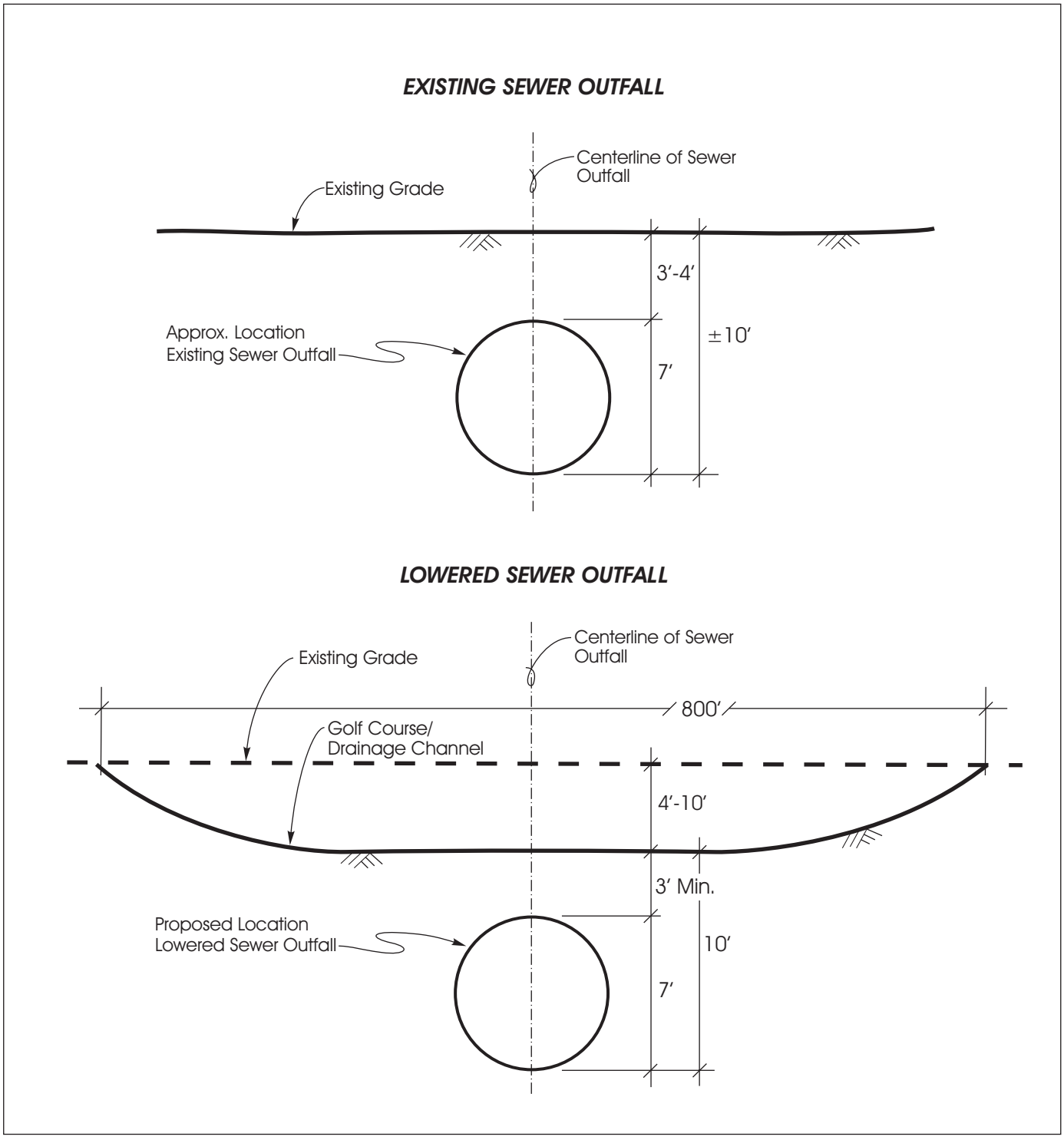


FIGURE 3-2
TYPICAL CROSS-SECTION OF SEWER OUTFALL: EXISTING & LOWERED OUTFALL
Kaloi Gulch Drainageway
Improvements at Oneula Beach Park
HASEKO (Ewa), Inc., Ewa, Oahu, Hawaii

NO SCALE

constraints, was approved by the DPP on February 22, 2001 (2001 Drainage Master Plan). It called for the outfall to be lowered (but not siphoned) to accommodate regional storm flows. Pursuant to the engineering analyses documented in the *Honouliuli Sewage Outfall Relocation Conceptual Engineering Feasibility Study* (Final Report, May 2000), Haseko and the City agreed upon a method of lowering the outfall to accommodate regional drainage.

Prior to DPP's approval of the 2001 Drainage Master Plan, operational personnel within the ENV raised concerns about the method of lowering the outfall. These ~~potential impacts include~~concerns included:

- Odor that results from a spill or during construction of the cross-over period;
- Possible complications (e.g~~.~~.., construction damage) involving need to maintain operations of the outfall for the duration of construction;
- The possibility of treated sewage effluent spills both during construction and in its permanent condition;
- Possible complications with sediments entering the deep ocean outfall and impacting the diffuser outlet; and,
- Possible unforeseen circumstances during or after construction could create the need to shut down the outfall. Honouliuli Wastewater Treatment Plant services most of Central and Leeward Oahu and such an occurrence may result in a catastrophic loss of service and/or emergency effluent discharges.

As HASEKO began work to implement the 2001 Drainage Master Plan, ENV, which operates and controls the sewer outfall, reiterated concerns about lowering the outfall. ENV's reluctance to proceed with realignment of the sewer outfall led to exploration of

alternatives, including, but not limited to, this proposal to direct regional drainage east of the sewer outfall through Oneula Beach Park rather than into the marina.

The Kaloi Gulch drainage channel, through which stormwater is conveyed from upland properties, enters the Ocean Pointe site east of the sewer outfall. Because a significant portion of the regional drainage infrastructure mauka of the Ocean Pointe property has already been developed or drainage plans have already been approved, the location of the drainage channel, as it enters the Ocean Pointe project site, cannot be relocated west of the sewer outfall.

Under the 2001 Drainage Master Plan, stormwater flows from properties mauka of Ocean Pointe, and drainage generated from within the Ocean Pointe project would be directed into, and conveyed through, the Ocean Pointe golf course. From an area mauka of Oneula Beach Park, the drainage path would have veered to the west, over the sewer outfall, and into the west basin of the marina.

The existing elevation of the outfall is too high for runoff to flow from the east side over to the west side of the outfall and into the marina. Thus, to avoid lowering the outfall, in order to convey stormwaters east of the outfall to the ocean, the drainage channel is being proposed to pass through Oneula Beach Park. A Drainage Master Plan for Ocean Pointe, dated April 6, 2004, prepared by R.M. Towill Corporation (2004 Drainage Master Plan), described this drainage alternative.

Portions of both the 2001 and 2004 Drainage Master Plans are identical. In both plans, drainage from both the Ocean Pointe development and from properties mauka of Ocean Pointe is directed into the Ocean Pointe golf course, which straddles the sewer outfall. Drainage plans for storm water flows west of the outfall are the same under both the 2001 and 2004 drainage master plans. East of the outfall, however, flows will be directed southward into and through Oneula Beach Park under the 2004 Drainage

Master Plan, instead of veering west into the marina as provided in the 2001 Drainage Master plan. This FEIS is prepared for the purpose of evaluating the environmental impacts of discharging storm runoff into the ocean by directing it through Oneula Beach Park.

The option of directing flows over the outfall and into the marina has not been foreclosed. However, because of the concerns raised by ENV, the proposed project, which does not require any relocation or crossing of the sewer outfall, is being explored as an alternative.

- ~~Possible unforeseen circumstances during or after construction could create the need to shut down the outfall. Honouliuli Waste Water Treatment Plant services most of Central and Leeward Oahu and such an occurrence may result in a catastrophic overland spill followed by a major loss of service.~~

~~Due to the flatness of the area and the existing pipe elevations, there would be a minimum separation (approximately three (3) feet) between the bottom of the large drainage channel and the top of the new sewer pipe. Two issues of concern were raised in the *Honouliuli Sewage Outfall Relocation, Conceptual Engineering Feasibility Study* conducted by Limtiaco and Associates (May 2000). First, if the pipe was damaged during construction, spills could potentially enter the channel where it would then flow unimpeded into the marina and eventually into nearshore waters. Odors and public exposure to the treated sewage effluent would also be a concern. Second, the projected drainage flows through the channel would be a potential risk because of scouring effects which could expose or damage the sewer pipe.~~

~~The cross-over from the existing pipe to the new pipe was also a source of concern as this work will entail the construction of a large holding pond to contain the sewer effluent while the existing pipe is cut and connected to the new pipe.~~

~~This alternative of lowering the outfall is a modified version of a previous plan that involved dipping or bending the sewer outfall as an inverted siphon across the drainage channel.~~

~~The inverted siphon plan as presented in the Limtiaco study was accepted initially by the City's Department of Environmental Services, but later was reconsidered due to operational, maintenance, cost, and environmental concerns and is no longer being considered. One of the reasons the City rejected this alternative was that the inverted section along the sewer pipeline could potentially be at a location where sediments could collect and lead to more maintenance and increased potential for a spill.~~

~~3.4 IMPROVE THE KALOI GULCH DRAINAGEWAY WITHIN OCEAN POINTE~~

~~This plan assumes that a different flow criterion will be used for design of the Kaloi Gulch drainageway. Enlarging the drainageway through Oneula Beach Park is needed in order to meet the current 100-year flow requirement specified by the City in their drainage standards. If a different criterion that results in a lower 100-year flow rate is used, it could mean that the capacity of the existing drainageway may already be adequate and therefore, there would be no need for drainage work to affect the park and the beach shoreline.~~

~~The plan would involve improving the Kaloi Gulch drainageway within the Ocean Pointe project for on-site flood control, but would not include work at Oneula Beach Park nor along the shoreline.~~

~~The method used by the City to determine the 100-year design flow is based on the results of statistical analyses of stream gage data. As more years of streamflow records become available, the City may update their drainage standards to reflect the more current statistical data. The last such update by the City occurred in 1988. The City is in the process of preparing another update, however it is not known at this time when it will be completed and if it will be approved. Consequently, this option is not being considered further at this time because the project must comply with the current City drainage standards. Should future updates or changes to the 100-year flow criterion be approved that would reduce flows sufficiently enough to rendering this option viable, then this would be the preferred option since it would result in no work in the special management area and/or conservation district and this project would not be required.~~

~~3.5 IMPROVE THE EXISTING KALOI GULCH DRAINAGEWAY ACROSS A PORTION OF ONEULA BEACH PARK~~

~~This plan is the preferred alternative and involves enlarging the existing~~

3.4 OTHER OPTIONS

3.4.1 Make Existing Conditions Permanent

Currently, the area mauka of Ewa Villages (site of the future East Kapolei development, and possibly the West Oahu Campus of the University of Hawaii) is undeveloped. Stormwater sheet flows through the fields until they enter an interceptor ditch along the mauka side of Mango Tree Road. The interceptor ditch directs the water through culverts and to detention/retention basins within the Ewa Villages Golf Course on the makai side of the road. At Renton Road, a bridge allows passage of Kaloi Gulch flows. South of Renton Road, however, an old railroad bed (O.R.& L. Railroad) crosses the path of the Kaloi flows, which, until June 2000, restricted storm water flows. Because of

this restriction, heavy, prolonged rainfall resulted in Ewa Villages being flooded. A severe flood in November 1996 propelled the regional drainage issue to the forefront.

To minimize the risk of recurring floods, a *Technical Solution for Potential Flooding in the Kaloi Gulch Drainage Basin*, dated September 18, 1997 (Technical Solution), was developed by a group of engineers representing the owners of large properties within the Kaloi Gulch Watershed. The Technical Solution called for development of regional drainage infrastructure in phases. By June 2002, a bridge was installed at the old railroad bed to allow stormwaters to flow downstream, an emergency drainage channel within the Ocean Pointe project site was constructed to accommodate the increased flows, and, because there was no marina to accept stormwater flows and the outfall was not lowered so as to allow stormwater to pass over it, a temporary emergency channel was constructed through Oneula Beach Park to the ocean. Currently, the capacity of the main Kaloi channel through Ocean Pointe is approximately 5,000 cfs and the maximum capacity through Oneula Beach Park is approximately 4,200 cfs.

The current capacity of the temporary emergency channel does not meet the current City drainage standards for the region. If no drainage improvements are made, flows into and out of Ewa Villages and points downstream will only accommodate channelized flows of 2,500 cfs. If the constriction at the railroad bed is modified, channelized flows may be increased to the capacity of the existing temporary emergency channel through Oneula Beach Park (4,200 cfs maximum). Due to the limitations of this option, it is not a preferred alternative.

3.4.2 Combination Of Options

Several other drainage options are possible. However, inasmuch as they depend upon standards not approved at this time and require coordination with other landowners and developers in the Kaloi Gulch drainage basin, these options, while they continue to be explored, are not deemed preferred alternatives at this time.

One option is to assume a different flow criterion, more closely tailored to actual anticipated flows for design of the Kaloi Gulch drainageway. Current City storm drainage design standards require that the Kaloi drainage channel be able to handle 10,800 cfs. This design standard for a 100-year storm is based on a regional average of gauged streams in the Leeward Oahu area. Kaloi Gulch gauge readings, however, show lower flow intensities (cfs per acre) than other streams in the Leeward Oahu grouping. Therefore, the 100-year storm flow for Kaloi Gulch should be less than the regional average used in the City standards. In addition, the amount of storage capacity within the Kaloi Gulch drainage basin further reduces the amount of runoff flowing downstream. It has been observed that the relative amount of runoff occurring at the bottom of the Kaloi drainage basin is much less than in other drainage basins in the Leeward Oahu grouping.

It is possible that the current City drainage requirement for Kaloi could be modified to reflect data specific to the Kaloi Gulch drainage basin, rather than the entire Leeward Oahu grouping, and/or the large amounts of storage within the Kaloi drainage basin, present, planned, and contemplated in accordance with the ‘Ewa Development Plan. The new flow standard for Kaloi Gulch would be less than the current standard. In that case, the scale of the proposed project may be reduced.

If the new flow standard for Kaloi utilized the effects of storage within the watershed, such retention facilities would be sized to retain all runoff increases generated from within their respective property boundaries and limit channelized runoff to downstream properties. Improvements to the Kaloi Gulch drainageway within the Ocean Pointe project for on-site flood control would still be necessary.

Another option is to direct flows from mauka of the railroad bed westward toward Kalaeloa and Pearl Harbor, thereby reducing the amount of flows through the Kaloi drainage channel east of the outfall.

3.5 PREFERRED ALTERNATIVE – CONSTRUCT KALOI GULCH DRAINAGEWAY ACROSS A PORTION OF ONEULA BEACH PARK

This plan involves construction of the Kaloi Gulch drainageway through a portion of the Oneula Beach Park. Details of the plan components are described in Chapter 2.

This plan is ~~preferred~~being explored as an alternative to the currently approved plan of directing runoff over the outfall and into the marina because it will eliminate short and long-term concerns of modifying and crossing over a major sewer outfall. The ~~improved~~proposed drainageway will follow the path of the existing ~~drainageway~~temporary emergency channel, which is parallel to the sewer outfall.

Since the proposed drainageway ~~overflow channel~~ will be dry most of the time, it will be landscaped to function as passive park open space~~. The area would be a beautification over present conditions and would be~~ , and would be consistent with the remainder of the park and compatible with the Oneula Beach Park Master Plan improvements.

The plan will also address and correct poor drainage conditions and ponding on the access road at the entrance to Oneula Beach Park. The improvements will eliminate ponding by smoothening and grading of the area to drain more effectively. ~~The plan also addresses maintenance and upkeep of the affected park area to ensure that the park will not be adversely impacted. These issues are being addressed by a commitment from HASEKO to ensure that necessary maintenance is provided.~~

The plan also recognizes that maintenance will be required. HASEKO has been working, and will continue to work, with the appropriate City Departments and other landowners and developers in the Kaloi drainage basin to legally define the maintenance obligations for the drainageway area. Although the details and the form of memorializing the maintenance obligations have not yet been worked out, HASEKO is committed to ensuring that the drainage channel through Oneula Beach Park is kept free of large debris that may impede stormwater flows through the channel, silt and other debris are

removed from the channel following storm events, and the shoreline berm is maintained at an elevation that enables it to function adequately as a storm drainage outlet.

CHAPTER 4
AFFECTED ENVIRONMENT
POTENTIAL IMPACTS AND MITIGATION MEASURES

This chapter assesses the environmental consequences of the proposed action. It describes the existing physical environment of the area and evaluates the potential for short-term and long-term impacts. Mitigation measures that will be used to reduce or eliminate the potential for adverse effects are also described.

4.1 CLIMATE

The climate of the ‘Ewa region is typical for leeward areas of Oahu, with relatively arid conditions and an average annual rainfall of 18-20 inches. Temperatures in the region range from an average daily minimum of 70 degrees Fahrenheit (F) to an average daily maximum of 84 degrees F. Persistent northeasterly trade winds range on average from 8 to 18 miles per hour (WorldClimate, 2004).

Impacts and Mitigation Measures

The proposed project does not have the potential to alter the regional climate or weather patterns. Consequently, no mitigation measures are required.

4.2 ~~4.2~~ TOPOGRAHY

~~The southern edge of the ‘Ewa Coastal Plain slopes gently toward the Pacific Ocean at a rate of approximately 20 feet per mile. Kaloi Gulch follows the general topography of the ‘Ewa Coastal Plain in its descent to the sea.~~ The Ewa Coastal Plain, which is the largest coastal plain on Oahu, is fairly flat and rises gently northward toward the Waianae Range. Oneula Beach Park and the Ocean Pointe development lie at the southern (seaward) edge of the Kaloi Gulch Drainage Basin, which incorporates approximately 7,000 acres beginning mauka of the H-1 Freeway.

The topography mauka of the H-1 Freeway varies from semi-mountainous agricultural land to mountainous steep terrain. Although the lands immediately mauka of the H-1 Freeway are currently in agricultural use, the University of Hawaii acquired the property as a potential site for its West Oahu campus. (More recently, however, the University has indicated that a portion of the East Kapolei development site (makai of Farrington Highway), which is also owned by the University, is the currently preferred site for the campus.)

The H-1 Freeway runs along the foothills on the north side of the plain at an elevation of approximately 200 feet above sea level where it crosses the Kaloi Gulch drainage basin. Between the freeway and the northern boundary of Ocean Pointe, the land first drops rapidly to Farrington Highway, then more gently through the future development of East Kapolei and through Ewa Villages. The natural grade of the land becomes even flatter in the vicinity of Renton Road, dropping to a grade of less than one-half percent, and remains relatively flat through the Ewa by Gentry residential development, the as-yet undeveloped future site of Ewa Makai-West, Ocean Pointe, and to the ocean.

The area within Oneula Beach Park that would be altered as part of the proposed project ~~maintains this same~~has a gentle mauka-makai slope. The shoreline at the extreme makai end of the drainageway consists of a gently sloping limestone and sand beach. Under most conditions, only the limestone is exposed along the shoreline.

Man-made alterations to the topography have influenced drainage patterns in the Kaloi Gulch drainage basin. One of the most significant man-made features is the Honouliuli sewer outfall pipe. The outfall, completed in 1978, is a shallow buried pipe that is located in the middle of the Ewa Plain and divides the region into east and west drainage sectors.

Until relatively recently, the Kaloi Gulch Drainage Basin was comprised mostly of sugar cane fields that facilitated the interception and infiltration of surface water. The land has been straight plowed, contour plowed, leveled, filled and irrigated. Irrigation was aided by the construction of a ditch from the foothills toward the coastline. This ditch was capable of carrying about 500 cfs of surface water flows. With the transition from agriculture to urban uses, this irrigation ditch has been replaced in sections by storm drainage channels that run primarily through golf courses.

When the region was predominantly in agriculture, surface flows were generally absorbed through infiltration and did not reach the sea. As recently as 1992, only 550 cfs was anticipated to reach the Ocean Pointe project site during peak flows. (HASEKO (Ewa), Inc., by Wilson Okamoto & Associates, Inc., *Ewa Marina Phase I, Increment 2 Final Supplemental Environmental Impact Statement*, April 1992.) With progressing urbanization, the increase in the amount of hard surfaces and channelization result in significantly more stormwater being carried downstream. When the region is fully built out, it is anticipated that approximately 11,500 cfs of storm water could flow into the ocean from the Kaloi Gulch Drainage Basin, of which 10,800 cfs would be from east of the outfall.

Currently, the area mauka of Ewa Villages (site of the future East Kapolei development, and possibly, the West Oahu Campus of the University of Hawaii) is undeveloped. Stormwater sheet flows through the fields until they enter an interceptor ditch along the mauka side of Mango Tree Road. The interceptor ditch directs the water through culverts and to detention/retention basins within the Ewa Villages Golf Course on the makai side of the road. At Renton Road, a bridge allows passage of Kaloi Gulch flows. South of Renton Road, however, an old railroad bed (O.R.& L. Railroad) crosses the path of the Kaloi flows, which, until June 2000, restricted storm water flows. Because of this restriction, heavy, prolonged rainfall resulted in Ewa Villages being flooded. A severe flood in November 1996 propelled the regional drainage issue to the forefront.

To minimize the risk of recurring floods, a *Technical Solution for Potential Flooding in the Kaloi Gulch Drainage Basin*, dated September 18, 1997 (Technical Solution), was developed by a group of engineers representing the owners of large properties within the Kaloi Gulch Watershed. The Technical Solution called for development of regional drainage infrastructure in phases. By June 2002, a bridge was installed at the old railroad bed to allow storm waters to flow downstream, an emergency drainage channel within the Ocean Pointe project site was constructed to accommodate the increased flows, and, because there was no marina to accept storm water flows and the outfall was not lowered so as to allow stormwater to pass over it, a temporary emergency channel was constructed through Oneula Beach Park to the ocean. Currently, the capacity of the main Kaloi channel through Ocean Pointe is approximately 5,000 cfs and the maximum capacity through Oneula Beach Park is approximately 4,200 cfs.

The proposed project assumes further man-made alterations in topography in the lands mauka of Oneula Beach Park that will increase the rate of storm water runoff that will have to be channelized and discharged into the ocean.

Impacts and Mitigation Measures

The proposed project will result in a slight alteration of the current topography within ~~the modified drainageway.~~Oneula Beach Park. Approximately ~~20,000 cubic yards~~7,110 cy of soil and sandy material ~~is anticipated to~~will be excavated ~~to form the contours of the improved~~ and ~~modified~~approximately 7,873 cy of fill or embankment will be needed to form the contours of the new channel. All of the cut material will be used to reshape the channel and to allow banks with a height of approximately 8 to 10 feet above ~~mean sea level (~~msl~~)~~. Topsoil and sand may be imported for landscaping and ground cover. As shown in **Figure 2-2**, the slope of the channel sides (except along the Sewer Easement) will be gentle (approximately ~~1 foot vertical for every~~ 10 percent or 10 feet horizontal for every 1 foot vertical). The gentle slope will ensure that the ~~entire~~ area can be used for

passive recreation. The gentle slope ~~also~~ will also facilitate park maintenance within the channel area. The bank slope on the outside of the channel along the side of the easement will be 20 percent (5H : 1V) in order to minimize fill areas. This steeper slope is not anticipated to be a problem since the grade difference between the top of bank and the existing ground along that side will be low (2 feet or less). In addition, grading of a pedestrian shoreline path across the drainageway (with a slope of 5 percent or less) will be done as part of this project.

The grade changes that are planned are small, even in the context of the 'Ewa Plain. By setting the lowest point in the channel at an elevation of 4 feet above msl, the design ~~ensures that the channel will not interrupt movement along the~~helps to maintain shoreline ~~area or cause waves to intrude~~ access and reduce the level of wave run-up into ~~inland areas of~~ the park.

The existing shoreline consists mostly of coral and reef rock. At the channel excavation depth of 4 feet msl, the shoreline is anticipated to consist of coral reef rock. Erosion potential is not anticipated to be a significant factor due to the hardness of the reef rock.

No change in topography that would adversely affect coastal processes or littoral sand transport (i.e., movement of sand along the shore) is planned.

Regular maintenance ~~will consist of lawn irrigation and the regular mowing of the grass at approximately~~of the drainage channel will be the same ~~level~~ as provided for the rest of Oneula Beach Park~~. This maintenance will prevent~~ with additional emphasis on preventing the growth of shrubs and trees that could restrict the drainage capacity of the channel.

Special maintenance will include removal of any sand build-up along the shore area and removal of sediments that may be deposited during overflow events.

~~The gentle channel slope will help to minimize re-entrainment of sediments and the upstream retention basins will help greatly to capture and prevent heavier sediments from being transported downstream.~~ It may be necessary to use machinery occasionally to remove accumulated sediment to restore the channel to its original design grades. The upstream retention basins will serve as the primary means for capture and prevent heavier sediments from being transported downstream.

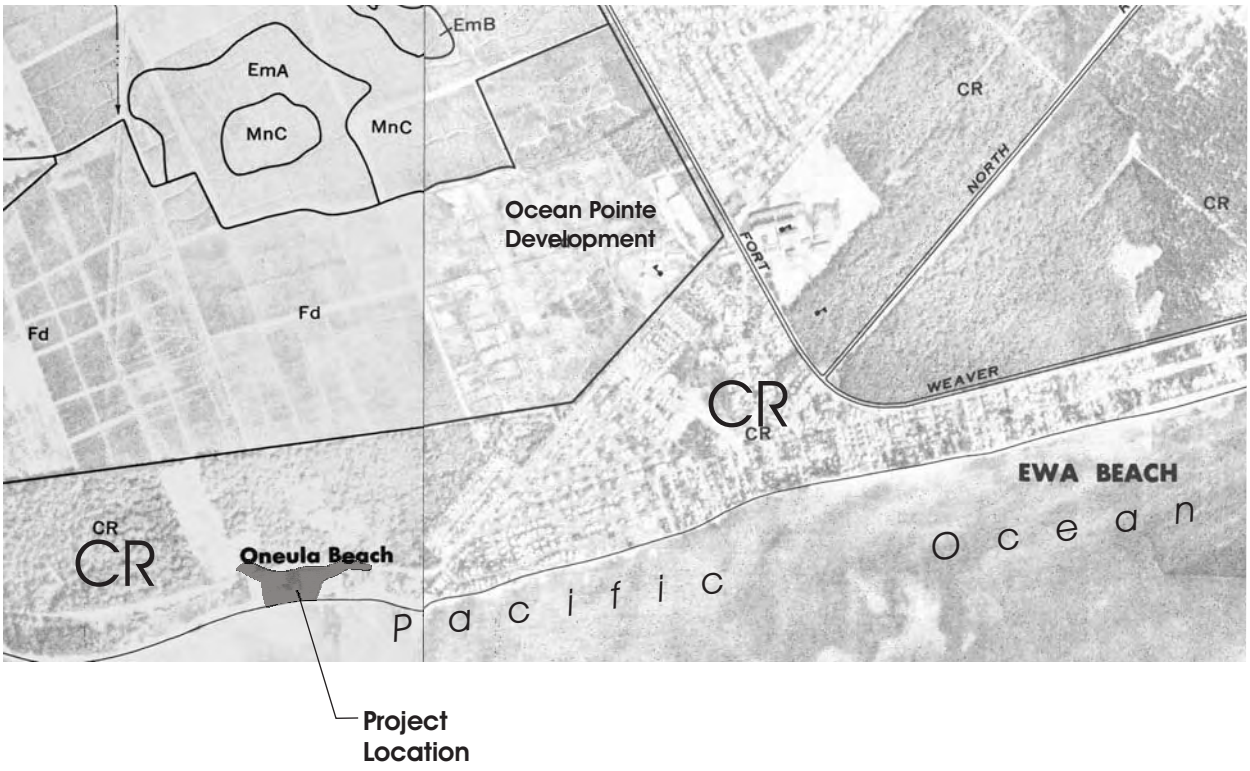
4.3 GEOLOGY AND SOILS

The 'Ewa Coastal Plain is composed of a sequence of marine sediments underlain by volcanic basalts of the Koolau series at depths of 800 to 1,000 feet below msl. The overlying sedimentary deposits are often referred to as "caprock," which is composed of fossil coral reefs layered between silt and clay of marine and terrestrial origin (City and County of Honolulu, Department of Design ~~DDC~~and Construction, 2001).

The U.S. Department of Agriculture, Soil Conservation Service, classifies the project site as coral outcrop (CR), which consists of coral or cemented calcareous sand (U.S. Department of Agriculture, 1972) (**Figure 4-1**). This soil is not suitable for agricultural use, particularly when it is located in dry coastal areas such as the project site. Neither does it represent a useful mineral resource.

Impacts and Mitigation Measures

The ~~removal~~excavation of approximately ~~20,000 cubic yards~~7,110 cy and fill of approximately 7,873 cy of soil and sandy material to create the planned overflow channel configuration will not affect important agricultural or mineral resources. The effects of air- or water-born soil particles on air and water quality are described later in this chapter.



Coral outcrop (CR) consists of coral or cemented calcareous sand. Elevations range from sea level to approximately 100 feet. Coral outcrop is geographically associated with Jaucas, Keaau, and Mokuleia soils (U.S. Department of Agriculture, 1972).

FIGURE 4-1
SOILS MAP
Kaloi Gulch Drainageway
Improvements at Oneula Beach Park
HASEKO (Ewa), Inc., Ewa, Oahu, Hawaii

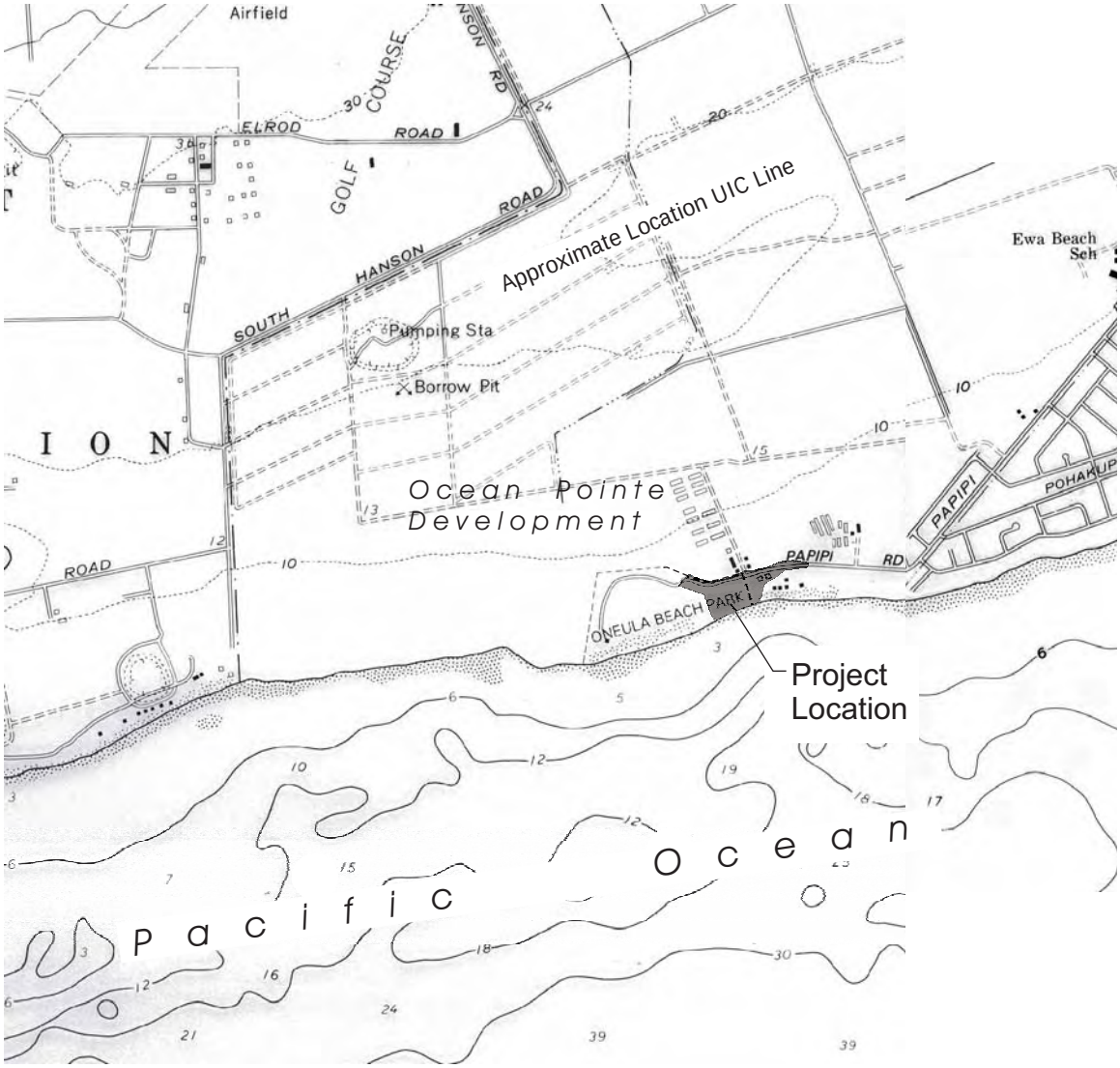
0 2000 Feet 4000

R. M. TOWILL CORPORATION June 2005

4.4 GROUNDWATER

Groundwater beneath the project area occurs in two aquifers. Water in the upper aquifer, referred to as the 'Ewa Caprock Aquifer, is too salty to drink but is suitable for some types of irrigation uses. The 'Ewa Caprock Aquifer is a designated groundwater management area subject to regulation by the State Commission on Water Resource Management (CWRM). CWRM has allocated water from the 'Ewa Caprock Aquifer to several users for golf course and landscape irrigation on the east 'Ewa Plain (DDC, 2001). The deeper basal aquifer consists of fresh water in the lavas of the Koolau Volcanic Series. The top of this aquifer is nearly 1,000 feet beneath the surface ~~and is separated from the caprock aquifer by several hundred feet of relatively impermeable material. As a result, there is virtually no connection between the two beneath the project site.~~ . This caprock has a permeability that is much lower than the basalt, which forms the basal aquifer that is beneath the caprock. However, caprock is very heterogeneous and on the low end, have both marine muds that have very low permeability, as well as coral formations which have permeability that may exceed that of the basalt. The key factor that mitigates any impact on the basal aquifer from any construction activities at the caprock surface is that basal aquifer water is under a positive pressure caused by the confining nature of the caprock. This means that water flow is upward from the basal aquifer, not down from the ground space (or shallow excavation).

The project site is seaward of the Underground Injection Control (UIC) Line established by the State ~~Department of Health (DOH).~~DOH. All areas inland or mauka of the UIC Line are within potable water aquifer zones subject to regulation and protection by DOH. (See **Figure 4-2**~~.~~)



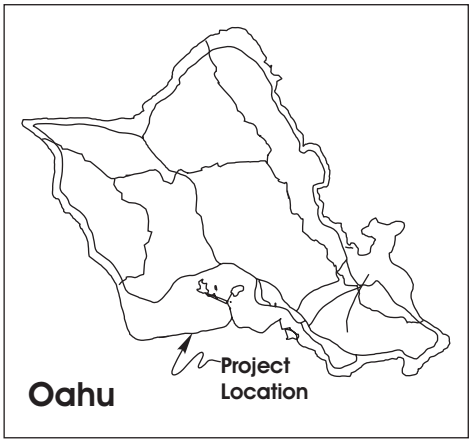


FIGURE 4-2
PROJECT SITE RELATION TO UNDERGROUND INJECTION CONTROL (UIC) LINE
Kaloi Gulch Drainageway
Improvements at Oneula Beach Park
HASEKO (Ewa), Inc., Ewa, Oahu, Hawaii

0 2000 Feet 4000

R. M. TOWILL CORPORATION June 2005

Impacts and Mitigation Measures

No significant short-term or long-term impacts to groundwater resources are expected from the proposed drainage improvement project. ~~No construction will take place that has the potential to introduce or release into the soil any substance that could adversely affect groundwater. The work will not be deep enough to expose groundwater.~~The work will involve site grading above the groundwater table. Utilities including water, sewer and electrical, will be trenched below groundwater and require dewatering. All construction dewatering work will be done in accordance with agency requirements. In addition to water from a flood overflow, the drainageway channel will also receive ~~water from landscape irrigation and from storm~~localized runoff ~~occurring over the area~~, including runoff from the concrete park access road. Most of the local runoff is anticipated to infiltrate into the ground.

Since the project area is seaward of the UIC Line, no impact to potable aquifers is expected.

4.5 SURFACE (INLAND) WATERS AND KALOI GULCH DRAINAGEWAY

The tributary area of the Kaloi Gulch Watershed is approximately 10.4 square miles (**Figure 4-3**). There are no perennial streams in the vicinity of the proposed project, according to the Hawaii Stream Assessment (State of Hawaii, 1990). The lower portions of the gulch in the vicinity of the project site are normally dry.

As the ‘Ewa Plain has undergone significant development over the past quarter century, conversion from agriculture to urban has both increased and concentrated stormwater runoff within the ~~watershed. Developers in the~~ Kaloi Gulch ~~Watershed have installed basins for retention and detention to contain and store large amounts of storm water within their developments where it infiltrates into the ground~~drainage basin. Currently, lands mauka of Ewa Villages are largely undeveloped or in agriculture.

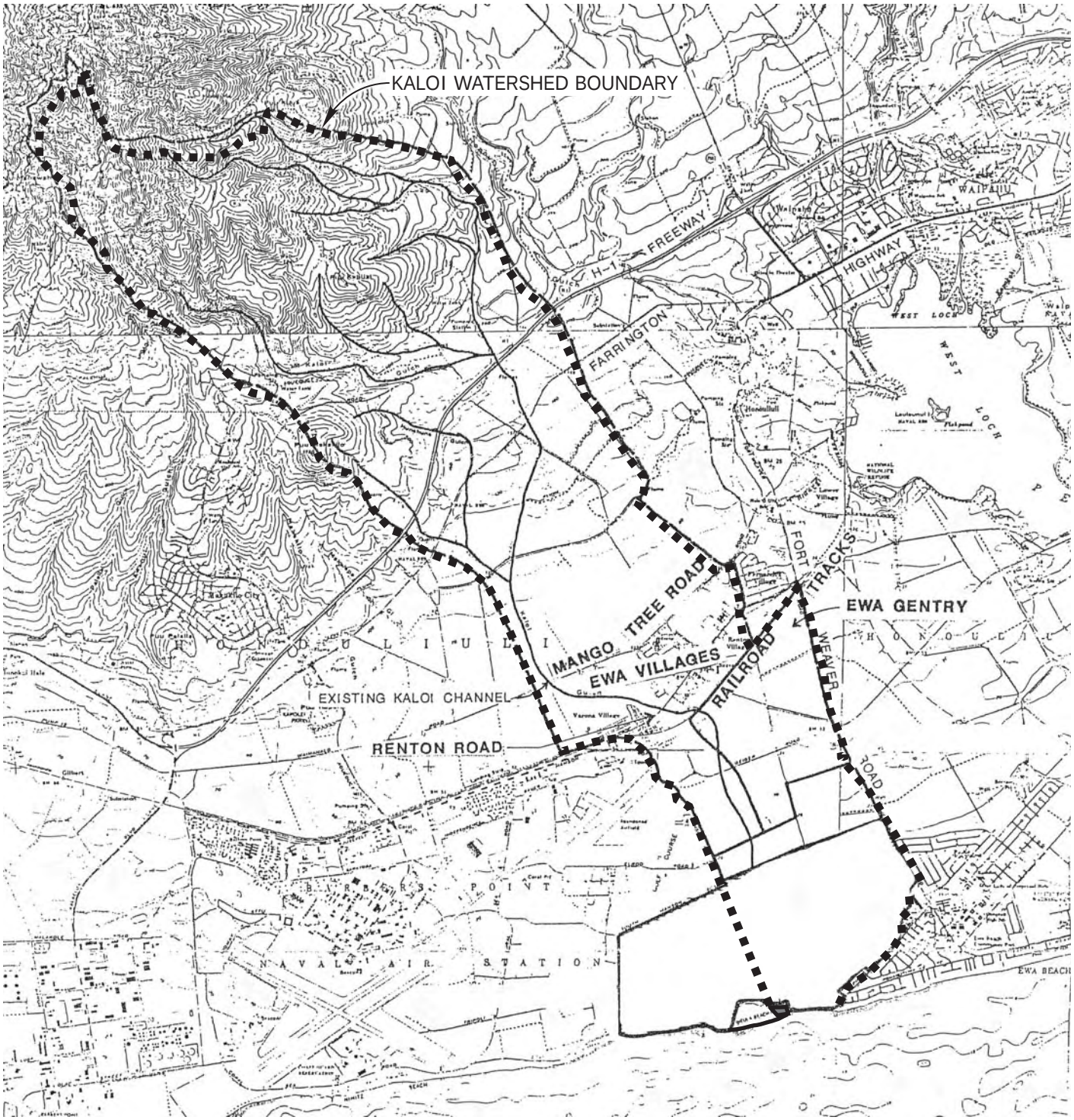


FIGURE 4-3
KALOI WATERSHED TRIBUTARY AREA
Kaloi Gulch Drainageway
Improvements at Oneula Beach Park
HASEKO (Ewa), Inc., Ewa, Oahu, Hawaii

0 5,000 Feet 10,000

R. M. TOWILL CORPORATION June 2005

Stormwater runoff sheet flows over these lands and much of it infiltrates the ground. Ewa Villages and Ewa by Gentry, the two existing developments mauka of Ocean Pointe, retain much of the runoff that flows onto and within their project sites within their respective golf courses. To alleviate flooding that occurred in the past, however, Ewa Villages has been allowed to pass 2,500 cfs downstream. A temporary emergency channel that was constructed in June 2000, and expanded in 2002, through the Ocean Pointe development and Oneula Beach Park provides an ocean outlet for runoff released from Ewa Villages.

~~Runoff during periods of prolonged heavy rainfall, however, can exceed the retention capacity of these features and overflow onto makai lands, including Ocean Pointe and Oneula Beach Park. To accommodate this overflow and to provide flood relief for upland communities, HASEKO in June 2000 constructed an overflow emergency channel through the Ocean Pointe site.~~ Future developments, which include housing and a university campus on approximately 1,300 acres of land owned by the University of Hawaii and the Department of Hawaiian Home Lands immediately mauka of Ewa Villages, may significantly increase the amount of runoff that reaches the ocean if sufficient retention facilities are not provided. To prevent flooding of downstream properties, runoff would have to be directed into drainage channels and an outlet to the ocean would have to be provided.

~~The existing Kaloi Gulch drainageway outlet through Oneula Beach Park is presently limited by a natural berm along the shore and is not large enough to meet the current City 100-year storm flow capacity requirement of 10,800 cubic feet per second (cfs). It is estimated that the existing drainageway can handle about 5,000 to 7,000 cfs without causing potential flood impacts upstream.~~In order to meet the 100-year stormflow requirement in accordance with the City's current Storm Drainage Standards, a suitable ocean outlet is required to handle runoff from the Kaloi Gulch Watershed. It had long been planned that the Ocean Pointe marina would serve as the ocean outlet. However,

environmental and operational concerns with lowering or siphoning the Honouliuli sewer outfall pipe, which would be necessary for this purpose, has prompted an exploration of alternative ocean outlets or means of meeting the City's storm flow requirements.

There currently exists a temporary emergency channel through Oneula Beach Park. Its current capacity, however, is not able to handle this 100-year storm flow. This limitation is caused mostly by a natural berm along the high shoreline. Because of this shoreline berm, runoff from a 100-year storm will overflow the current temporary emergency channel and flood the beach park. The proposed project will increase the capacity of this ocean outlet by reducing the height of the berm, thus allowing runoff to flow into the ocean, instead of being retained in the beach park. The width, more than the depth, of the channel will be increased to handle larger storm flows without diminishing the recreational opportunities of the beach park.

Impacts and Mitigation Measures

There are no perennial inland waters in the project area that could be affected by the proposed project.

The proposed project ~~is consistent with~~will modify the ~~Ocean Pointe Drainage Master Plan approved by the City in April 2004. It will bring the portion of the drainageway~~ existing temporary emergency drainage channel through Oneula Beach Park ~~into conformance with~~to a permanent regional drainageway that meets the current 100-year storm flow requirements of the City Storm Drainage Standards. Construction and maintenance of the proposed improvements will provide flood control and address regional drainage for communities within the Kaloi Gulch Watershed~~ and eliminate or minimize flooding of nearby areas which would otherwise occur~~.

Construction of the proposed channel will ~~have no effect on the volume~~ increase the ability of stormwater runoff ~~reaching~~to reach the ocean ~~under normal~~

~~circumstances involving lower intensity storms. However, it has the ability to~~ and will convey ~~more~~these flows ~~should extremely large discharges occur~~safely to the ocean without backing-up and causing flood impacts upstream.

Storm runoff and sediment quantities from the Kaloi Gulch watershed under existing and future conditions were evaluated by R. M. Towill Corporation for the Sea Engineering, Inc., report entitled, *Numerical Modeling of Storm Drain Discharge Plume Transport, Ocean Pointe Marina*, Oahu, dated August 2004.

A model of the Kaloi Gulch Watershed was developed to estimate storm runoff and sediment quantities. The analytical software tool used to create the watershed model is referred to as *Hydrologic Simulation Program Fortran* (HSPF). This tool was selected because of its use by ~~the State Department of Health~~DOH to model Pearl Harbor watersheds for the Total Maximum Daily Load (TMDL) assessments of limited water quality segments.

The HSPF software enables continuous simulation of meteorological conditions. For this study, the calendar year 1996 was modeled due to the higher than normal rainfall experienced that year. Storms that occurred in November of 1996 were very severe and caused major flooding in ‘Ewa Villages and other parts of Oahu. The size of the November 5, 1996 event was estimated as a 70-year event ~~(~~based on a 13-hour duration~~)~~.

Primary data required to support the model include watershed physical characteristics (pervious and impervious lands, and topography) and meteorological data (rainfall, evapotranspiration and wind). Supporting data used by the model includes sediment characteristics, retention and detention storages, and runoff percolation losses.

Calibration of the model is necessary to produce meaningful results. ~~Model~~Hydrologic calibration of runoff quantities ~~was performed by~~ entailed

adjusting model results to closely match ~~actual measurements~~readings taken ~~at~~ by the US Geological Survey at Gauging Station 2124.5 situated along Kaloi Gulch just above the H-1 Freeway.

Calibration of sediment quantities was performed by adjusting model results to closely match sediment loadings experienced during the 1996 storm at ~~'~~Ewa Villages. Topographic survey data of deposited sediment from a Federal Emergency Management Agency (FEMA) damage survey report ~~was~~ were used to ~~estimate~~ quantify the amount of delivered sediment ~~quantities~~.

The calibrated watershed model was then used to simulate the entire year of 1996 using hourly rainfall data recorded at the Kunia Gauging Station from the National Weather Service. Two conditions were evaluated: 1) existing watershed build-out conditions; and 2) fully developed watershed build-out conditions.

For existing watershed conditions, the 1996 simulation resulted in no discharge reaching the ocean for the entire year through the Kaloi Gulch drainageway at Oneula Beach Park. ~~There~~ The model shows results consistent with historical accounts that there is sufficient storage and infiltration capacity to contain all runoff from that year within the watershed. Factors that contributed to these findings include the mostly undeveloped (pervious) state of the watershed, presence of existing storage (over 200 acre-feet retention and 600 acre-feet detention~~)~~), and high rate of downward percolation losses (especially in the lower watershed area and within the retention basins).

Under fully developed watershed conditions, the 1996 simulation resulted in two discharge occurrences at Oneula Beach Park (3,400 cfs on Nov~~.~~ember 5 and 2,300 cfs ~~–~~on Nov~~.~~ember 16). It was assumed that under fully developed conditions there would be ~~a –~~total watershed storage of 300 acre-feet for retention and 800 acre-feet for detention among all developments within the

watershed. This assumption is based on the storages indicated by the various development drainage master plans on file with the City and on the East Kapolei Drainage Master Plan proposed by the Housing and Community Development Corporation of Hawaii, State of Hawaii.

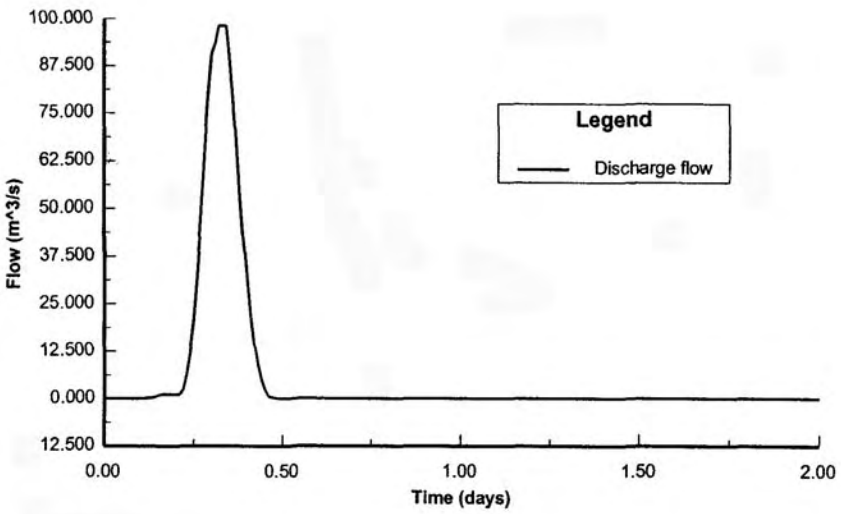
The watershed model was also used to estimate how often overflow would be expected into the Kaloi drainageway channel through Oneula Beach Park under developed watershed conditions.

Figure 4-4 presents the flood hydrograph for two rainfall events. The first is for an event where runoff slightly exceeds the retention capacity of the upstream retention facilities and water begins flowing to the ocean. The recurrence interval for such a rainfall event was estimated at approximately once every 10 years, based on a standard 24-hour duration storm and Type I rainfall distribution as used by the Natural Resources Conservation Service (NRCS), U. S. Department of Agriculture, for the Hawaiian Islands. ~~Recurrences~~Rainfall recurrences were estimated from the 1984 State Department of Land and Natural Resources (DLNR) rainfall frequency study of Oahu.

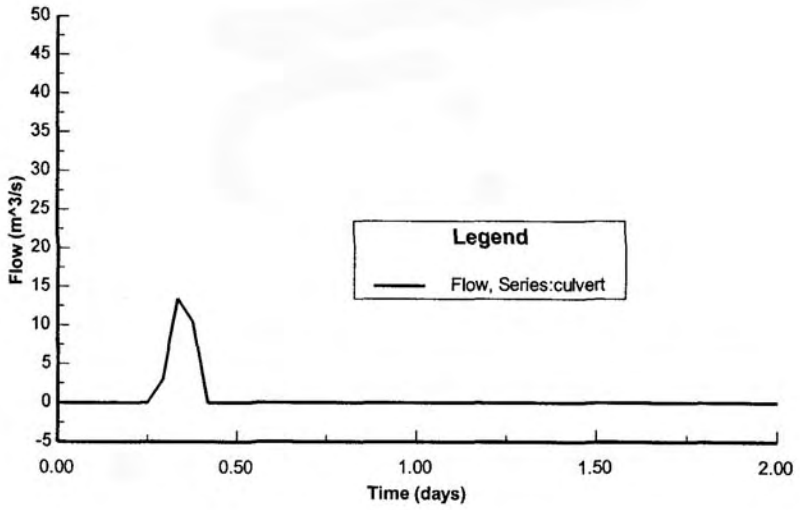
The storm discharge scenarios selected for input included the following:

- The actual November 5, 1996 storm rainfall simulated using developed watershed conditions. The 24-hour rainfall total on that date was approximately 9-inches as measured at the Kunia Substation gauge and is estimated to be a 70-year, 13-hour event or 20-year, 24-hour rainfall event. The simulated ~~overflow into~~ flood in the drainageway ~~channel~~ for this storm lasts about 7 hours and reaches a peak flow of approximately ~~+/-~~3,460 cfs~~.~~ (98 cubic meters per second (cms)).

20-YEAR DISCHARGE HYDROGRAPH



10-YEAR DISCHARGE HYDROGRAPH



Source: Sea Engineering, Inc., August 2004
(Figure 4-7. November 5, 1996 20-Year and 10-Year Discharge Hydrograph)

FIGURE 4-4
20 AND 10 YEAR STORM DISCHARGE HYDROGRAPH, NOVEMBER 5, 1996
Kaloi Gulch Drainageway
Improvements at Oneula Beach Park
HASEKO (Ewa), Inc., Ewa, Oahu, Hawaii

- An 8-inch rainfall simulated using the standard NRCS Type I, 24-hour rainfall pattern for developed conditions. This rainfall is estimated to be a 10-year, 24-hour rainfall event. The simulated overflow for this storm lasts about 3 hours and reaches a peak flow of approximately +/– 470 cfs (13.4 cms).

The 10- and 20-year flow events were selected for analysis because they represent significant events that have a reasonable probability of occurrence in any given year, and thus would likely be responsible for evident environmental impacts due to the outlet (see **Appendix B-1** for additional information on other parameters selected for data input).

The frequency of overflow into the Kaloi drainageway channel from the watershed is dependent on the size of the storm and on the amount of storage and infiltration available within the watershed. As upland developments continue, inclusion of storm–water storage provisions to hold and infiltrate runoff within their developments becomes a significant factor for reducing the frequency of ocean discharges.

~~It is expected that under normal circumstances that waves will maintain the low, sandy berm across the makai end of the Kaloi Channel. On the infrequent occasions when watershed runoff does overflow into the drainageway channel and begins to flow through the park, it will likely begin to pond within the low-lying grassy area just upstream of the low sandy berm until enough has accumulated that overtopping occurs. Once overtopping occurs, flow would be expected to scour away the sandy berm and allow flows to be released makai to the ocean~~The proposed drainageway work will lower the height of the existing shoreline berm by approximately 2 to 4 feet down to an elevation of 4 feet above msl. The grading work will allow passage of the 100-year stormflow in accordance with City requirements. Once the berm is lowered and all portions of

the project are completed, the berm will be periodically inspected and maintained as needed to ensure that it can function adequately as a storm drainage outlet.

4.6 COASTAL WATER QUALITY

~~4.6.1 INTRODUCTION~~

4.6.1 Introduction

The proposed drainage improvements would provide a defined outlet to the ocean for stormwater runoff from the Kaloi Watershed. Except under extreme conditions, runoff would not enter the drainageway through the park. Further, the bottom of the channel (approximately 4 feet msl) closest to the shoreline is expected to be above the wash of the waves. Hence, there are only 2 situations when the potential for water quality impacts exist. The first is during construction of the makai end of the regional drainage channel. The second is during the very infrequent periods when storm runoff from upland areas exceeds the retention capacity that has been provided and flows to the ocean through the channel.

4.6.2 Existing Marine Water Quality

The State ~~of Hawaii~~ has classified the marine waters off the project site as Class "A" Open Coastal Waters. HASEKO has monitored water quality in the ocean water off the Ocean Pointe site for more than a decade. The monitoring program was initiated in accordance with the monitoring program for the Ocean Pointe ~~Marina~~marina to ensure adherence to water quality standards of the State ~~Department of Health~~DOH (Hawaii Administrative Rules (HAR), Chapter 11-54). With the proposed addition of an ocean outlet at Oneula Beach Park, the extent of monitoring has been expanded to include the area of the proposed project (Marine Research Consultants, July 2004).

Summary of Marine Water Quality Monitoring

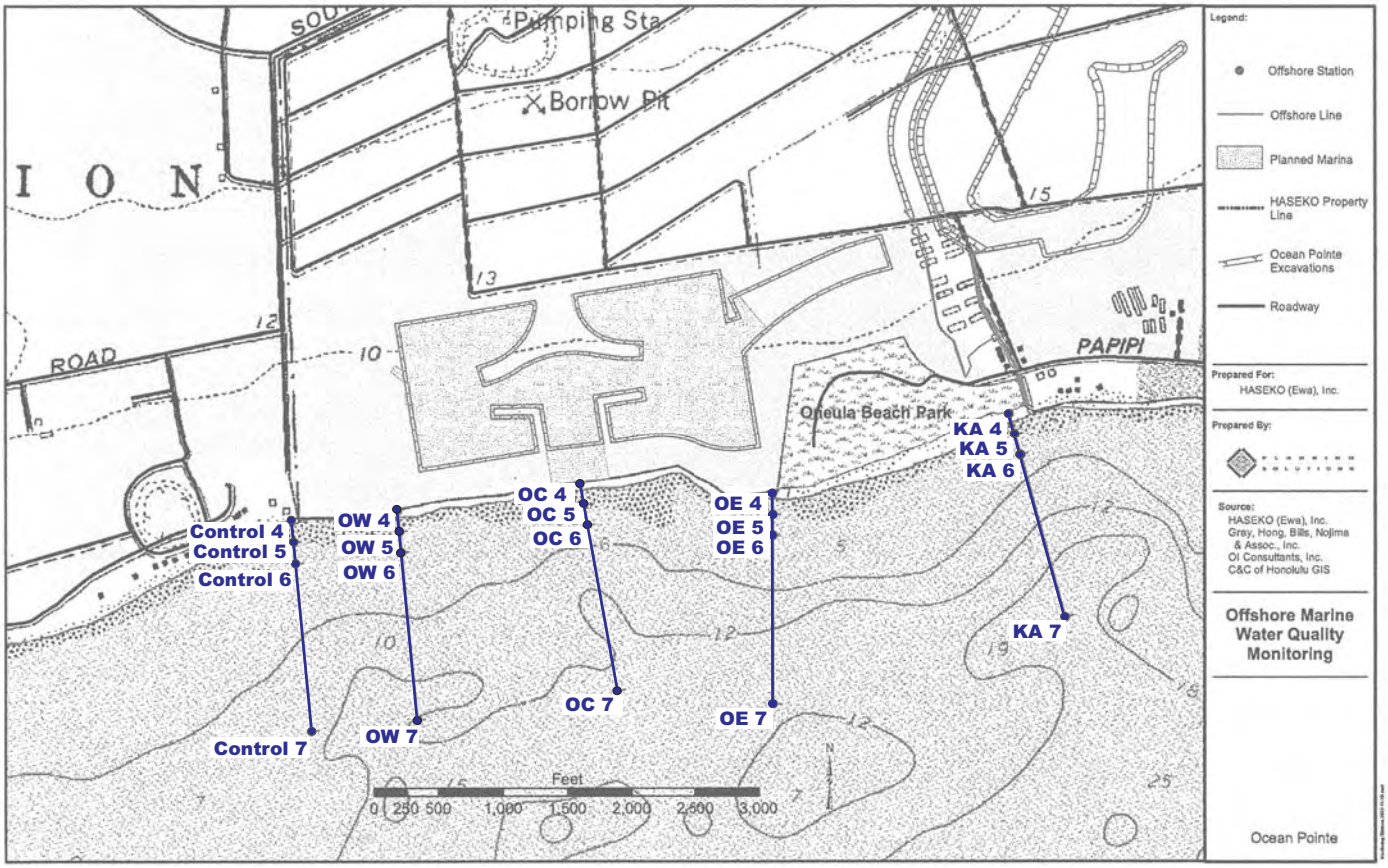
More than 30 surveys have been completed since the start of monitoring. The summary data presented is based on results prepared by Marine Research Consultants (July 2004) (see **Appendix A**).

Figure 4-5 shows the location of the transects where monitoring stations have been placed to collect data. Two of the sites (OW and OE) were located to the west and east of the planned marina entrance channel, respectively; a third, Sampling Transect Site OC, is located in the center of the proposed entrance channel. A control station (Control) is situated near the western end of the property.

The purpose of the control station is to measure water quality in a location not greatly influenced by water flowing out of the proposed marina or by other possible influences of landside development. The newest sampling transect (designated KA on the figure) originates directly offshore of Kaloi Gulch at the eastern boundary of Oneula Beach Park.

Water quality has been measured at 7 stations on each transect from the shoreline to approximately 500 meters offshore. Such a sampling scheme spans the greatest range of salinity with respect to potential input of materials from the shoreline. Sampling is more concentrated in the nearshore zone because this area is most likely to show the effects of shoreline modification. With the exception of the shoreline stations, samples are being collected at 2 depths: a surface sample from within approximately 10 centimeters (cm) of the sea surface; and a bottom sample from within 1 meter of the sea floor.

Water quality parameters evaluated include all of the specific criteria designated by ~~the Department of Health~~DOH for open coastal waters in HAR, Chapter 11-54, Section 6 (Open Coastal Waters). These criteria include :



Source: Marine Research Consultants/Planning Solutions, Inc., July 5, 2004

FIGURE 4-5
MONITORING STATIONS
Kaloi Gulch Drainageway
Improvements at Oneula Beach Park
HASEKO (Ewa), Inc., Ewa, Oahu, Hawaii

Scale as Noted

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Abbrev.	Constituent	Abbrev.	Constituent
TN	Total nitrogen (TN/TON)		pH
NO_3	Nitrate + nitrite nitrogen		Salinity
NH_4	Ammonium nitrogen		Temperature
TP	Total phosphorus (TP/TOP)	PO_4	Orthophosphate phosphorus
Chl a	Chlorophyll a	Si	Silica
	Turbidity	TSS	Total suspended solids

Several generalizations relevant to the proposed project can be drawn from the over 10-year-long historical monitoring record:

- Ocean water quality has not been significantly affected by construction on the Ocean Pointe site. Water quality off the site is comparable to that at the control station. The variability in the input and mixing characteristics of groundwater efflux at the shoreline off the Ocean Pointe site appears to be the principal influence on water chemistry.

- Distinct horizontal gradients are evident for Si, NO_3-, and TN, which showed decreases along the transect from the shoreline to the offshore stations. Salinity showed the opposite trend, rising with increasing distance offshore. Vertical stratification between surface and bottom samples was also evident. The sampling site off of Kaloi Gulch (KA) showed only small horizontal gradients in any water chemistry constituent.

- Other constituents not related to groundwater efflux (NH_4 +, TN and TOP) showed few trends except for slightly higher concentrations of TN and TOP at the shoreline of all five sites. NO_3- measurements were lower in a zone along the shoreline while turbidity and TSS showed a pattern of decreasing values with distance from shore.

- Construction dust does not appear to have increased TSS off the Ocean Pointe site.

- Calculations of geometric means of water chemistry constituents collected at each station over many years reveal exceedances of geometric mean criteria for NO3-, NH4+,TN, turbidity and Chl a on all of the survey transects, including the control transect. All of the samples that exceeded geometric mean limits for NO3-, NH4+ and TN were close to shore. The exceedances are not related to activities on the Ocean Pointe site.

4.6.3 ~~DISCUSSION OF~~ Discussion of Water Quality

The construction of the proposed project will make it possible for the periodic discharges that are expected from the channel to enter the ocean. Once there, the fresh water and suspended sediment plume (i.e., stormwater runoff from the Kaloi Gulch Watershed) that it would create would persist for a period of time before conditions return to pre-discharge levels. Plume transport and mixing in coastal waters is a complex process that depends on both discharge and ambient characteristics. The discharge plume will be transported and dispersed due to coastal waves and currents, and will also spread due to the buoyancy of the plume itself. Numerical modeling of the discharge plume and measurement of existing nearshore currents was performed by Sea Engineering, Inc., to evaluate these processes and to ascertain the possible impact to the environment. The report, *Numerical Modeling of Storm Drain Discharge Plume Transport*, is attached as **Appendix B-1**. Estimated sediment values from the Kaloi Gulch Watershed evaluation were used as input to the Sea Engineering numerical models. The models that were used and the key findings from the analysis are summarized below.

The modeling approach addressed complex wave induced currents and mixing, and tide and wind-driven currents. It ~~looks~~looked at the combined effect of tidal water levels, wind speed and direction, wave speed and direction, storm discharge, and total suspended solids in the storm water discharge to calculate the dispersal rate of the plume in the ocean. This required the use and integration of both a wave model and a

transport/circulation model, with the wave model being used to provide input to the transport/circulation model. Estimated sediment pollutographs representing sediment transport loadings of silt, sand and clay particles from the Kaloi Gulch Watershed was used as input to the transport/circulation model. It also required detailed bathymetric information concerning the shoreline fronting the project area.

- Wave Model. The wave model REF/DIF-SHORECIRC was used to calculate how incoming waves interact with the offshore bathymetry. SHORECIRC is a state-of-the-art model designed to analyze nearshore wave-driven circulation. REF/DIF is a wave propagation model that is used to calculate the change in wave characteristics due to refraction and diffraction as the wave progresses from deepwater to the shoreline. REF/DEF calculates the zones of wave breaking, wave heights, wave direction, and wave energy dissipation. The REF/DIF-SHORECIRC modeling provided a spatial grid of radiation shear stresses and energy dissipation due to breaking waves (or rip currents) that helps drive the transport model.

- Transport Model. The circulation/transport analysis used the Environmental Fluid Dynamics Code (EFDC) model. EFDC is a widely used, EPA-approved, state-of-the-art 3-dimensional hydrodynamic model used to simulate hydrodynamics and water quality in rivers, lakes, estuaries, and coastal regions.[1] EFDC was also used to calculate suspended sediment concentration, settling, and deposition.

- Watershed Sediment Transport Model. A model of the Kaloi Gulch Watershed was developed to estimate sediment quantities. The analytical

[1] This model has many advanced capabilities: it allows for variations in water properties and currents at different depths; it allows input of nearshore wave radiation stresses and wave dissipation for simulation of surf zone circulation and transport; it allows users to test numerous alternative discharge control structures such as culverts, weirs and spillways; and it allows input of time varying flows with time varying concentrations of contaminants.

software tool *Hydrologic Simulation Program Fortran* (HSPF) was used. The HSPF software enables continuous simulation of meteorological conditions. Primary data required to support the model include watershed physical characteristics (pervious and impervious lands, and topography) and meteorological data (rainfall, evapotranspiration and wind). Supporting data used by the model include sediment characteristics, retention and detention storages, and runoff percolation losses. Calibration of sediment quantities was performed by adjusting results to closely match sediment loadings experienced during the 1996 storm at ʻEwa Villages. Topographic survey data of deposited sediment from a FEMA damage survey report was used to estimate delivered sediment quantities.

- Bathymetry (The measurement of the depth of bodies of water). The offshore area fronting the project site contains a broad fringing reef with water depths of less than 7 meters (approximately 23 feet). Offshore of the storm drainage outlet, the reef is approximately 1,000 meters (approximately 3,280 feet) wide, and to the east broadens to about 2,000 meters (approximately 6,560 feet) wide. Between the 40 meter (approximately 130 feet) and 100 meter (approximately 328 feet) water depths, there is a broad embayment. Immediately offshore of the drainage outlet, a broad, shallow channel is present in the reef. Detailed bathymetric information on these areas was used in the modeling.

Potential Impacts

The EFDC model was used to predict plume behavior and water quality for 8 different scenarios. These scenarios bracket the range of possible tidal, wind, and wave conditions that could be present for the 2 prototypical discharge scenarios identified in Section 4.5. The results of the model runs are summarized in **Table 4-1**.

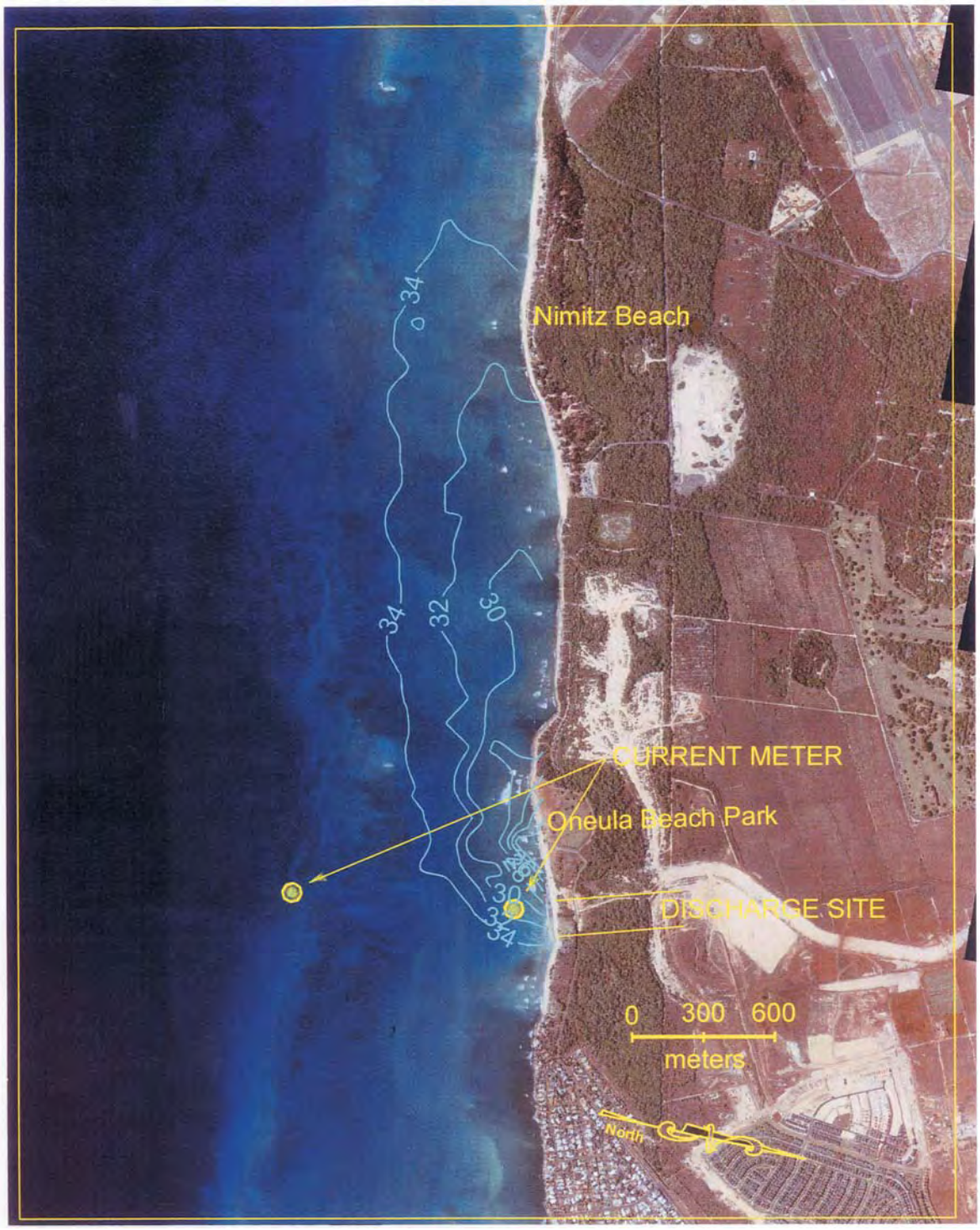
Table 4-1
Model Run Results

Run No.	Run Description	Maximum Plume Size (meters)	Time Required to Meet State DOH Salinity Standard of 31.5 ppt (hours)	Max Sediment Deposition (mm)	Time Req'd to Approach Ambient TSS* Level (hours)
1	20-yr, mod Tide	1200 x 4500	12	1.9	24
2	20-yr, mod ebb tide	1400 x 4200	12		
3	20-yr, strong tide	900 x 5500	8		
4	20-yr, weak tide	1500 x 3600	12		
5	20-yr, mod tide, kona wind and waves	800 x 3300	<3	0.75	12
6	20-yr, mod tide, south swell	500 x 2400	<3		
7	10-yr, mod tide	500 x 2300	6	0.125	24
8	10-yr, mod tide, kona wind and waves	170 x 500	<3	0.04	6

Note: Plume is defined as water with salinity below the State water quality standard of 31.5 ppt

The modeling results show that the site is characterized by good transport and mixing. In general, the plume generated by storm runoff at the project site stays relatively close to the shoreline. It can move either eastward or westward from the outlet depending upon the net tidal flow at the time of the discharge (which is limited to a few hours for the more frequent discharges and to approximately a day for the very large (and rare) event that was modeled). Most importantly, the very infrequent nature of the discharge and the rapidity with which the receiving water returns to ambient conditions means that there is no potential to violate State Water Quality Standards.

Summary of Potential Water Quality Effects of a 10-year, 24-hour Storm Discharge. **Figure 4-6A and Figure 4-6B** depicts the maximum extent of the discharge plume during calm sea (no waves or wind) conditions and moderate tides (which may be taken as a practical “worst-case” situation for this kind of discharge event).

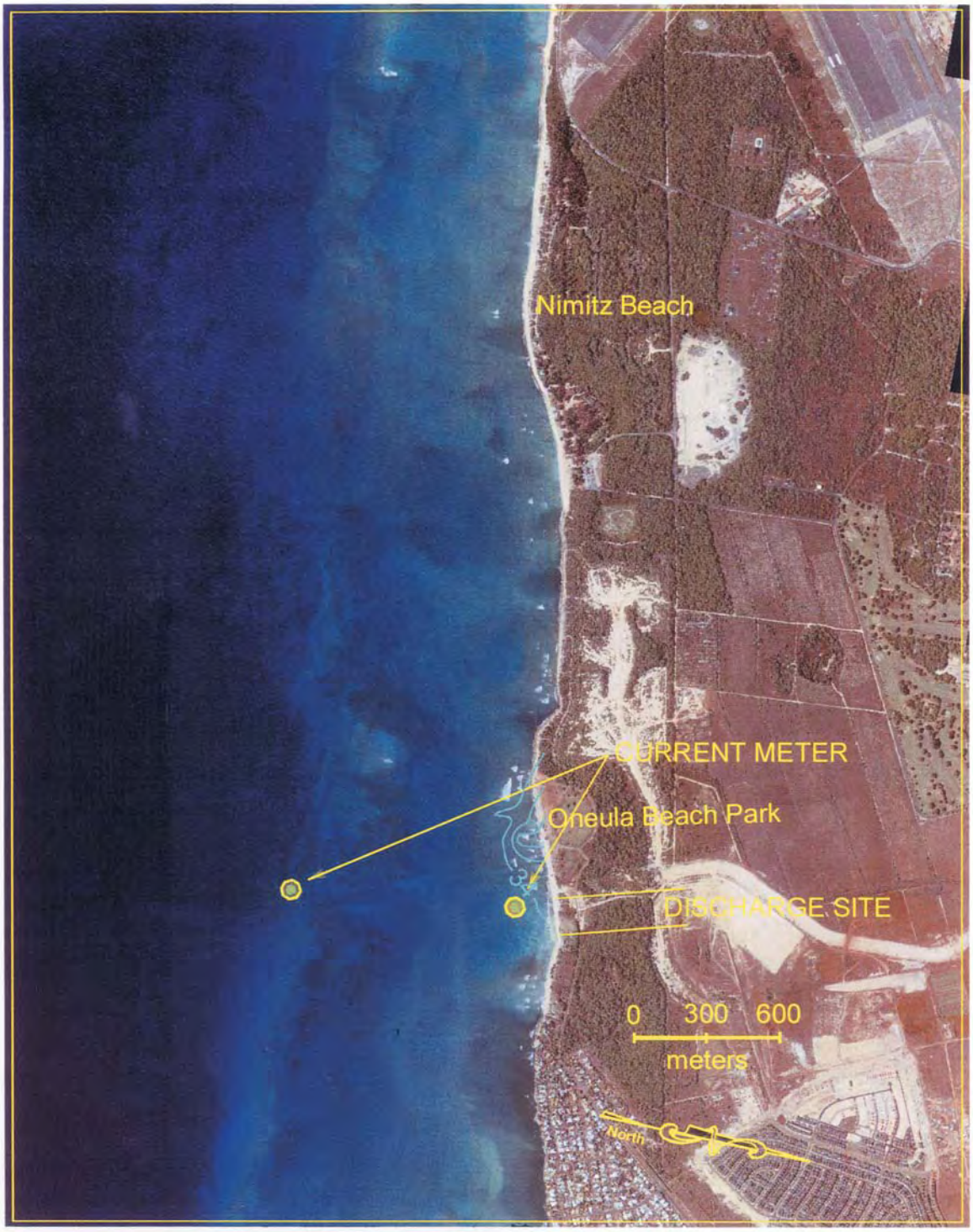


Source: Sea Engineering, Inc., August 2004
Note: Contours are in parts per thousand (ppt).

FIGURE 4-6A
MINIMUM SURFACE LAYER SALINITY
for 10-Year Discharge Event and Moderate Tides
Kaloi Gulch Drainageway
Improvements at Oneula Beach Park
HASEKO (Ewa), Inc., Ewa, Oahu, Hawaii

Scale as Indicated

R. M. TOWILL CORPORATION June 2005



Source: Sea Engineering, Inc., August 2004
Note: Contours are in parts per thousand (ppt).

FIGURE 4-6B
MINIMUM BOTTOM LAYER SALINITY
for 10-Year Discharge Event and Moderate Tides
Kaloi Gulch Drainageway
Improvements at Oneula Beach Park
HASEKO (Ewa), Inc., Ewa, Oahu, Hawaii

Scale as Indicated

R. M. TOWILL CORPORATION June 2005

Under these conditions, all of the water affected by the plume would return to meet DOH's salinity standard of 31.5 parts per thousand (ppt) within 6 hours or less after the peak discharge outflow. Suspended solids concentrations in all of the affected area would return to ambient levels within a day of the time the stormwater discharge from the outlet ceases.

Perfectly calm conditions such as those assumed for this first scenario are rare at the project site. The presence of wind and Kona waves dramatically increases mixing and decreases sediment deposition. Kona waves reduce the maximum plume dimensions to about 500 x 170 meters. Under these conditions, water salinity is predicted to fall below 31.5 ppt only for a brief time immediately offshore of the discharge site. Similarly, suspended sediment concentrations in the water are predicted to return to ambient levels within 6 hours of the peak discharge. This is because the breaking waves efficiently mix and diffuse the plume throughout the water column.

~~Summary of Potential Water Quality Effects of Worst-Case Discharge~~

~~Worst-case conditions at the site are represented by the 20-year discharge event occurring when there are no waves or wind to promote mixing and dispersion. The water quality effects of the discharge under these conditions were evaluated in Model Runs 1 to 4. Under these conditions, the plume (defined as the area~~

Summary of Potential Water Quality Effects of Worst-Case Discharge

Worst-case conditions at the site are represented by the 20-year discharge event occurring when there are no waves or wind to promote mixing and dispersion. The water quality effects of the discharge under these conditions were evaluated in Model Runs 1 to 4. Under these conditions, the plume (defined as the area within which salinity is less than 31.5 ppt) is calculated to stay near to the shoreline, and if the outflow coincides with ebb tide, extend up to 2,400 meters

to the east in the vicinity of ‘Ewa Beach. Under these worst case mixing conditions, the maximum time required for the salinity in all areas to return above 31.5 ppt is 12 hours after the peak discharge outflow. Further, the plume is largely confined to the surface water layer; plume waters with salinity below 28 ppt come in contact with the seafloor only in the immediate vicinity of the discharge site. This is important because it shows that the plume only has the potential to affect benthic organisms where it touches the bottom.

The presence of breaking waves, which are common along the shoreline in question (particularly during storm events that produce sufficient rainfall to result in a discharge from the Kaloi Gulch Outlet), dramatically increase mixing. This is illustrated by the results of Model Runs 5 and 6. Kona waves or south swells reduce the time required for salinity in all areas affected by the discharge to return to above 31.5 ppt to less than 3 hours after the peak discharge outflow. Breaking waves also diminish the maximum plume dimensions. This is because the breaking waves efficiently mix and diffuse the plume throughout the water column. This also means that plume waters mix to the bottom layers and contact the seafloor. Plume waters with salinity less than 28 ppt extend 300 meters offshore near the discharge site. This low salinity water remains in contact with the bottom for only a brief time–-well below any reported thresholds of impacts to corals (Coles, 1992).

Suspended sediment transport and deposition were also computed for Runs 1 and 5. During the worst-case conditions represented by Run 1 (maximum discharge, and no winds or waves), the model calculates that 1.9 millimeters (mm) (0.07 inches) of sediment could be deposited in the most heavily impacted area immediately offshore of the channel. Deposition rapidly diminishes with distance; the model calculates sediment deposition of only 0.17 mm (0.007 inches), 300 meters offshore of the discharge, and 0.26 mm (0.01 inches), 1,000 meters west of the discharge. Suspended solids concentrations are calculated to

approach ambient levels approximately 1 day after the end of the storm discharge. As shown in Run 5, waves significantly decrease sediment deposition, and increase suspended sediment mixing and dispersion.

Mitigation Measures

Construction of the project will involve excavation, stockpiling, and earthwork requiring the movement of excavated materials. ~~Although this~~This work will involve ~~removing~~ excavation of approximately ~~20,000 cubic yards~~7,110 cy of soil and sandy of material. Approximately 7,873 cy of fill will be needed for the channel banks, essentially all of ~~it~~which will be native to the project site. Only the selected material needed for the construction of roads and other earthworks within the project area will be imported.

The potential for release of sediments in stormwater runoff from excavated areas and stockpile material sites will be addressed through the City-required Erosion Control Plan (ECP) and National Pollutant Discharge Elimination System (NPDES), Construction Stormwater Permit application which will be filed for this project. The ECP and NPDES permit applications will provide for use of Best Management Practices (BMPs) to prevent or mitigate the potential for impacts to State waters as a result of stormwater runoff from the construction site. BMPs will be implemented as required by law.

~~There is no practicable way to eliminate through mitigation the effects of the discharge once it has occurred. The focus is therefore on using Best Management Practices throughout the watershed to minimize the volume of runoff and total suspended solids and other chemicals that overflow into the proposed drainage channel. This will ensure that any overflow that does occur does not contain dangerous pollutants.~~

~~4.7 NATURAL HAZARDS~~

~~4.7.1 FLOOD ZONES~~

The NPDES Construction Stormwater Permit application requires that a separate BMPs Plan must be prepared for each permit application that is filed. This is a DOH requirement that applies to all projects and developments in the State of Hawaii when there is construction related ground disturbance on an area 1 acre or more in size.

The following are BMP measures that would be applied to the subject project to address NPDES Construction Stormwater Permit requirements:

Before Construction

1. Existing ground cover will not be destroyed, removed or disturbed more than 20 calendar days prior to start of construction.
2. Erosion and sediment control measures will be in place and functional before earthwork may begin, and will be maintained throughout the construction period. Temporary measures may be removed at the beginning of the work day, but shall be replaced at the end of the work day.

During Construction

1. Clearing shall be held to the minimum necessary for grading, equipment operation, and site work.
2. Construction shall be sequenced to minimize the exposure time of cleared surface areas. Areas of one phase shall be stabilized before another phase can be initiated. Stabilization shall be accomplished by protecting areas of disturbed soils from rainfall and runoff by use of structural controls such as PVC sheets, geotextile filter

fabric, berms or sediment basins, or vegetative controls such as grass seedling or hydromulch.

3. Temporary soil stabilization with appropriate vegetation shall be applied on areas that remain unfinished for more than 30 calendar days, and permanent soil stabilization using vegetative controls shall be applied as soon as practicable after final grading.

4. All control measures shall be checked and repaired as necessary, e.g., weekly in dry periods and within 24 hours after any heavy rainfall event. During periods of prolonged rainfall, daily checking should be conducted.

5 Maintenance and fueling of construction equipment and vehicles shall be performed only in designated areas protected by a containment berm to control potential spillage or fuel, lubricants or hydrocarbon based constituents. Sorbent and cleanup materials shall be placed in a conspicuous location to facilitate cleanup in the event of inadvertent leaks or spills. Refueling and maintenance of vehicles and equipment shall not be permitted outside of designated refueling areas.

6. All liquid materials including petroleum, oils, and lubricants (POLs), solvents, and cleaners, shall be stored in sealable containers. No open containers for the storage of such materials will be permitted.

7. Vehicle washing may only be performed in a designated area protected by appropriate controls such as a containment berm.

After Construction

Following construction, all equipment no longer necessary to the site will be removed. Construction debris and refuse will be disposed of at an approved facility that accepts construction and demolition debris waste by the contractor.

There is no practicable way to eliminate through mitigation the effects of the discharge once it has occurred. The focus is therefore on using BMPs throughout the watershed to minimize the volume of runoff and total suspended solids and other chemicals that overflow into the proposed drainage channel. This will ensure that any overflow that does occur does not contain dangerous pollutants.

Providing retention/detention facilities upstream of the proposed project site (outside the scope of the proposed project) that allow silt to settle out will have mitigating impacts of storm water discharge into coastal waters.

4.7 NATURAL HAZARDS

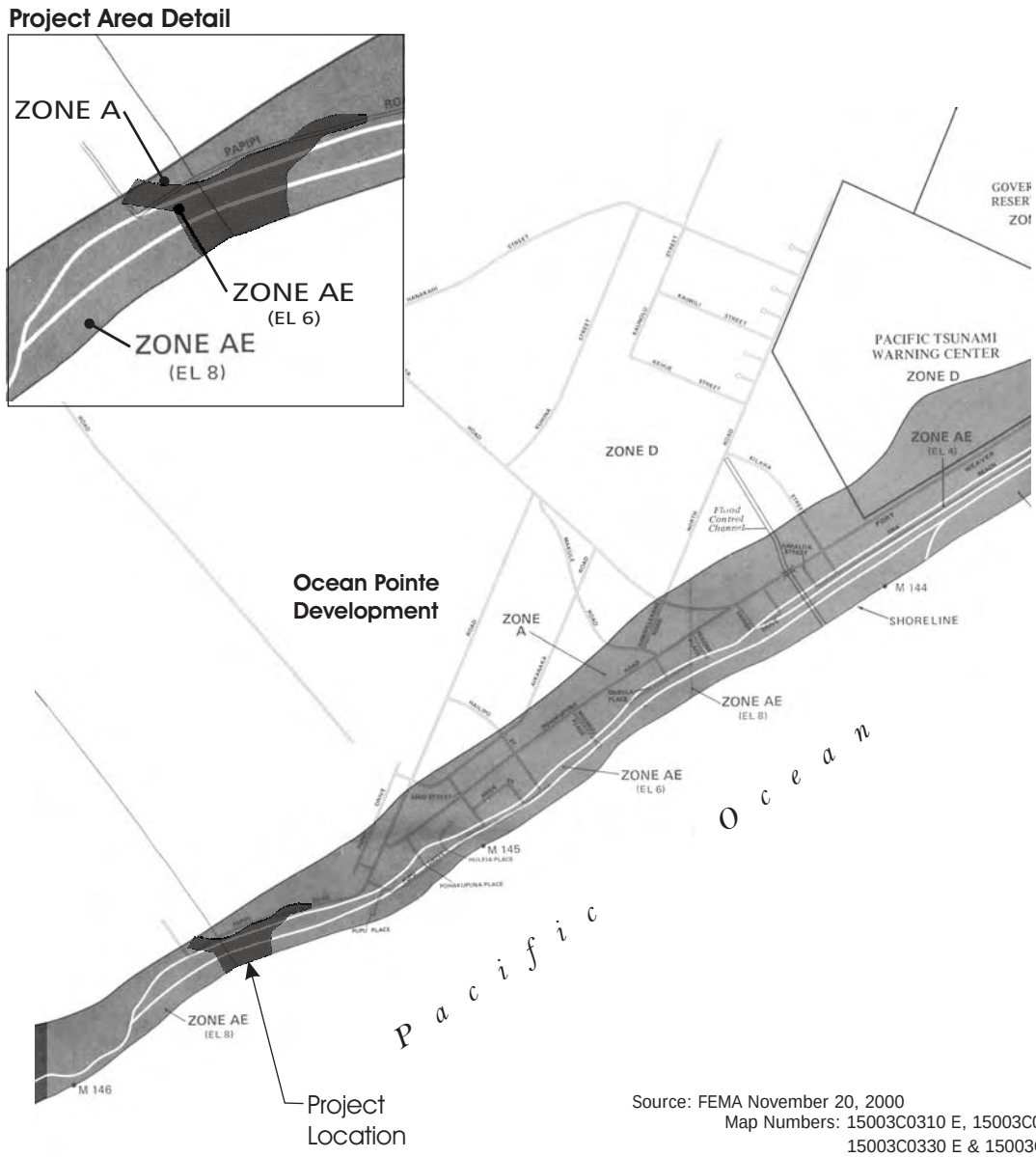
4.7.1 Flood Zones

According to the Federal Emergency Management Agency's Flood Insurance Rate Map (FIRM) 1-5001 0135 C, the project area is within Flood Zones A and AE. (See **Figure 4-7**~~:~~[2].) These flood zones are designated as special flood hazard areas with base flood elevations of 6 to 8 feet (FEMA, ~~1990~~2000). The existing ground elevation at the site of the proposed channel improvements is approximately at the base flood elevation.

The flood hazards in Zones A and AE are associated with rising seas during tsunami rather than with storm~~-~~water runoff. Unlike some coastal areas, a tsunami striking the shoreline at the project site is not expected to generate fast moving water.

Rather, the tsunami phenomenon in this area would be attributed to rapidly rising and declining sea levels. Hence, while a tsunami could result in water entering the bottom of the channel, it would not be expected to strike with sufficient force to damage the

[2] FIRM Map Panel Number has been revised to 15003C0320F (Map Revised September 30, 2004). Base flood location and elevations referenced from FEMA, 2000, are unchanged in the 2004 map revision.



Source: FEMA November 20, 2000
Map Numbers: 15003C0310 E, 15003C0320 E,
15003C0330 E & 15003C0340 E

Zone A
Zone A is the flood insurance rate zone that corresponds to the 1-percent annual chance floodplains that are determined in the Flood Insurance Study by approximate methods of analysis. Because detailed hydraulic analyses are not performed for such areas, no Base Flood Elevations or depths are shown within this zone. Mandatory flood insurance purchase requirements apply.

Zone AE
Zone AE is the flood insurance rate zone that corresponds to the 1-percent annual chance floodplains that are determined in the Flood Insurance Study by detailed methods of analysis. In most instances, Base Flood Elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone. Mandatory flood insurance purchase requirements apply (FEMA, 2000).

FIGURE 4-7
FLOOD ZONE MAP
Kaloi Gulch Drainageway
Improvements at Oneula Beach Park
HASEKO (Ewa), Inc., Ewa, Oahu, Hawaii

0 2000 Feet 4000

R. M. TOWILL CORPORATION June 2005

channel. This is because the ocean outlet for the Kaloi drainageway does not directly contact ocean seawater nor is it tidally influenced. Tidally influenced in this situation means that under the normal rise and fall of the tide that seawater will not rise high enough to enter the Kaloi drainage channel through the ocean outlet or from groundwater seepage (in the form of brackish groundwater).

A tsunami-generated wave at the proposed project site would have to first breach the normally dry ocean outlet and then move inland. The distance the wave travels will depend on the force of the wave. Because the channel will be at an elevation of 4 feet msl at the shoreline, the tsunami phenomenon would not be expected to push seawater inland with the same force and velocity as it would along a deeper, tidally influenced stream or river channel. Instead, the majority of the wave's tidal forces will be directed against the coastline, moving inland onto dry land according to the force of the wave.

Impacts and Mitigation Measures

The proposed channel is consistent with the flood designation of the area. Consequently, no adverse impacts are anticipated as a result of construction.

The presence of the channel embankments is likely to lessen the potential for flooding of adjacent areas. This is based on the drainage channel banks BEING built up to an elevation of 10 feet msl. These banks will serve as levees during times of extreme high flows helping to contain flood flows within the channel. The containment of flood flows from the Kaloi watershed will help to protect the 'Ewa Beach area to the east (Papipi Road area) and the Oneula Beach Park to the west.

No habitable structures are proposed as part of the project which will avoid the potential for danger to such structures. The portion of Oneula Beach Park that will be within the completed project area will be clearly marked with signage identifying the area subject to flooding. The use of concrete instead of AC across

the drainageway will help to delineate its limits. Because the park access road would be flooded during the infrequent periods when runoff exceeds the capacity of upstream retention areas, proper signage on the roadway warning users of potential hazards will be installed.

~~4.7.2 SEISMIC ACTIVITY (EARTHQUAKES)~~

4.7.2 Seismic Activity (Earthquakes)

The Uniform Building Code (UBC) establishes minimum design criteria for structures to address the potential for damages due to seismic disturbances. The scale is from Seismic Zone 0 through Zone 4, with 0 being the lowest level for potential seismic induced ground movement. Like all of Oahu, the project area is designated Seismic Zone 2a (United States Geological Survey, 1997).

Impacts and Mitigation Measures

The proposed action does not involve the construction of structures that are susceptible to damage from seismic disturbances. No mitigation measures are therefore proposed.

4.7.3 ~~HURRICANES~~Hurricanes

The Hawaiian Islands are seasonally affected by Pacific hurricanes from the late summer to early winter months. Oahu's 'Ewa Coastal Plain is infrequently hit by severe storm events. It is difficult to predict these natural occurrences, but it is reasonable to assume that future events will occur.

Impacts and Mitigation Measures

The embankments and other solid features within the channel are not likely to be susceptible to damage by hurricane force winds. The landscaping that would be developed within the project area consists of low species that tend to resist

damage by high wind speeds. The effect of runoff that could occur as a result of the passage of hurricanes is addressed in Sections 4.5 and 4.6 of this report.

4.7.4 ~~TSUNAMI~~Tsunami

The entirety of Oneula Beach Park, which includes the subject project site, is subject to inundation by a tsunami. According to the Hawaii Civil Defense Agency, Tsunami Evaluation Oahu Map 18: ‘Ewa Beach to Airport, the designated evacuation shelters for this area are located at Ilima Intermediate School, 91-884 Fort Weaver Road, and Campbell High School, 91-980 North Road.

Impacts and Mitigation Measures

The proposed project is not expected to have any adverse impacts as a result of a tsunami induced event. During a tsunami it is possible for the sea level to rise to inundate the entire coastal area. This condition could occur regardless of whether or not the proposed drainage improvement project is constructed. While the project is designed to handle inland generated stormflows, the drainage channel, however, can be expected to facilitate the drainage of seawater following the recession of a tsunami generated tide.

4.8 VISUAL RESOURCES

The project site includes an area adjacent to the shoreline with views of the Pacific Ocean to the south, and views of open space with the backdrop of the distant Waianae Mountains to the north. The open space provided by Oneula Beach Park is immediately to the west, and a low vegetated embankment that separates the drainageway from the adjacent property provides visual closure to the east. Within these limits, the project area consists mostly of level open space. The exception to this is a slight rise where the Oneula Beach Park access road rises as it crosses the eastern bank of the drainageway.

Impacts and Mitigation Measures

Construction activities will result in views of machinery, equipment, and personnel within the drainageway. Some scrub vegetation will also be cleared. A nearshore berm along the shoreline may be modified to facilitate construction of the improvements, but natural shoreline processes are likely to return the sandy berm to its original condition.

~~The proposed drainageway is integrated into the overall Oneula Beach Park Master Plan. It will be grassed and landscaped with some low shrubs. However, the drainageway will be kept clear of large trees and other features that could impede the flow of water during the rare occasions when discharge occurs. To offset the slight decrease in landscaping within the drainageway, larger plantings may be placed on the level ground immediately outside the drainageway.~~

~~Periodic stormwater discharges have the potential to bring silt, and possibly some other debris, into Oneula Beach Park. The City Department of Parks and Recreation (June 10, 2004), and Department of Facility Maintenance (June 9, 2004) have preliminarily indicated that they will not be responsible for maintenance of the channel. It is planned that a maintenance agreement will be developed whereby maintenance may either be by the golf course operator, by an entity designated by HASEKO.~~

Views from within the channel will be slightly affected by the height of the channel banks. At the mauka end of the project (near the park access road), the bottom of the channel will be at an elevation of 4.5 feet above msl and the top of both banks will be at an elevation of 10 feet msl for a maximum height difference of approximately 5.5 feet. Near the makai end of the channel, the bottom of the channel will be at an elevation of 4 feet above msl and the banks will be approximately 6 feet above msl for a height difference of 2 feet. The maximum grade difference between the channel bottom (4 feet) and the top of

the bank (10 feet) is 6 feet. Trees along the channel banks may also obstruct views looking out from inside the channel.

The proposed drainageway is integrated into the overall Oneula Beach Park Master Plan. It will be landscaped consistent with the remainder of the park. The drainageway will be kept clear of large trees and other features that could impede the flow of water during the rare occasions when discharge occurs. To offset the slight decrease in landscaping within the drainageway, larger plantings may be placed on the level ground immediately outside the drainageway.

4.9 AIR QUALITY

Air quality at Oneula Beach Park is excellent overall due to the absence of nearby emission sources and the strength of the prevailing northeast trade winds. The nearby Kapolei Air Quality Monitoring Station, which measures pollution constituents of carbon monoxide, sulfur oxides, nitrogen oxide and particulates, provides longitudinal data indicating that air quality is consistently within State and Federal regulatory limits. Localized sources of air pollution at Oneula Beach Park include emissions from private vehicles and park maintenance equipment.

Impacts and Mitigation Measures

Construction activity will generate fugitive dust and release sediments in stormwater runoff into coastal waters. These impacts will be limited to periods when excavation, temporary stockpiling, and grading and filling to contour the site to design specifications is underway.

Fugitive dust emissions during the construction period will be mitigated by spraying water from a stationary source or tanker truck on an as-needed basis. Non-potable water for dust control may be provided from wells located at the Ocean Pointe Project site, adjacent to Oneula Beach Park. Stockpiled materials

that can also be a source of dust will be stabilized with a daily top cover of aggregate, crushed rock, or other material to limit the release of windborne dust.

Some short-term impacts on air quality will occur either directly or indirectly as a consequence of construction activities. The operation of vehicles, heavy equipment, and generators at the project site will result in some fugitive dust and pollution emissions. Adjacent areas may be temporarily affected during the construction period by dust and pollution. However, these impacts will be temporary and will cease when construction is completed.

All project actions will comply with DOH Administrative Rules Title 11, Chapters 59 and 60, regarding Air Pollution Control. For example, ~~state~~State air pollution control regulations require that there be no visible fugitive dust emissions at the construction site boundary. A dust control plan will be implemented by the project contractor to ensure compliance with ~~state~~State regulations. Fugitive dust emissions can be controlled to a large extent by watering active work areas, using wind screens, keeping adjacent paved roads clean, and by covering open-bodied trucks. In addition, construction-related exhaust emissions will be mitigated by ensuring that project contractors properly maintain their internal combustion engines.

Fugitive dust emissions from the project site will ~~generally be lower than they are at~~ return to present conditions after construction work has ended~~ and a grass cover has been re-established on the sides and bottom of the proposed overflow channel~~. A possible exception to this will occur immediately following the rare instances when water actually flows through the channel. Such events will deposit sediment within the channel as the flood waters recede. Small overflow events will leave only modest amounts of sediment, and the grass cover is likely to limit the proportion of sediment~~ that becomes airborne~~. Larger events will deposit thicker layers of sediment~~, in some cases completely covering the grass~~.

Normal winds will cause some of this sediment to become airborne as it dries out. ~~This~~Depending on the amount of sediment, this can be mitigated ~~in the short term~~ by watering the area~~. Over the long term, reestablishing the groundcover will return the area to pre-overflow dust emission rates.~~ or mechanical removal of the sediment.

4.10 NOISE

The project area is currently in passive park use. Noise levels at the project site are presently low. The most significant existing noise sources are waves breaking along the shoreline, vehicles on the Oneula Beach Park access road, and aircraft.

Oneula Beach Park is approximately 1 mile from the end of the nearest runway at Kalaeloa Airport (formerly Barbers Point Naval Air Station). It is a short distance seaward of one of the approach paths for Honolulu International Airport. The Final Environmental Impact Statement for the Disposal and Reuse of Naval Air Station Barbers Point, Hawaii, dated February 1999, evaluated the potential environmental impacts of the proposed decommissioning and subsequent reuse of Naval Air Station Barbers Point. It concluded that aircraft noise levels would continue to be compatible with continued recreational use of the park.

Impacts and Mitigation Measures

The primary project impact will involve noise generated during construction activities, which may be a source of nuisance to park users who choose to remain in the immediate work area. Earth moving equipment will probably be the noisiest equipment used during construction. The generation of noise will be temporary and will cease when construction is complete.

All work that may be a source of noise will comply with the State ~~Department of Health's~~DOH Administrative Rules, Title 11, Chapter 46, Community Noise Control. Adverse impacts from construction noise are not expected to pose a

hazard to public health and welfare due to the temporary nature of the work, the absence of sensitive land uses in the immediate surrounding area, and mitigation measures that will be employed to minimize noise impacts. It is also expected that sufficient locations are available in other areas of Oneula Beach Park~~,~~ where users may continue to enjoy the park while construction activity is occurring.

No significant long-term noise impacts are expected as a result of the proposed action. ~~Mowing of grass that grows in the generally dry conditions of the coral shelf on which the channel will be located will be done by the golf course operator or other entity designated by HASEKO.~~Noise associated with mechanical equipment utilized in regular maintenance of the channel area, such as mowing of grass, will be no different from noise produced in maintaining the rest of the park. Depending upon the nature of an overflow event that has occurred, cleanup may require the use of larger mechanical equipment, and, therefore, result in increased equipment noise. Cleanup activities involving use of mechanical equipment, however, are expected to be temporary, lasting no more than approximately a few days to a week.

4.11 TERRESTRIAL FLORA

Char & Associates (Char 2004) conducted a botanical resource assessment study for the proposed project. The purpose was to identify the vegetation that is present, determine if any threatened or endangered species, or other species of concern, are present, and to identify appropriate mitigation measures (if any). The report is attached as **Appendix C**.

The project site already supports an existing ~~drainageway~~temporary emergency drainage channel and a beach park. The soil surface of the area is characterized by large, barren, open areas of brownish-red soil and sand. Vegetation within the ~~drainageway~~temporary emergency drainage channel consists of scattered patches of weedy plants such as pickleweed, swollen fingergrass, saltbush, Bermuda grass, kipukai, golden crown-beard, and *Sporobolus pyramidatus*. Low thickets of kiawe and Indian pluchea are found in scattered areas. The park area is primarily in open space with a grassy lawn that is periodically mowed. A row of coconut trees lines the ~~mauka~~makai side of the park, while a narrow band of kiawe trees and scrub is found on the mauka side next to the access road.

Almost all of the vegetation on the project site is composed of introduced or alien species. Three plants are originally of Polynesian introduction and include the coconut, milo *(Thespesia populnea)*, and ‘ape. Three species are native and include the kipukai, pohuehue, and ‘aki-‘aki. These plants are indigenous to the Hawaiian Islands and elsewhere in the Pacific.

None of the plants observed on the project site is a threatened and endangered species or a species of concern (U.S. Fish and Wildlife Service, 1999a, 1999b; Wagner et al. 1999). A prior botanical study along the adjoining Ocean Pointe Development conducted for environmental documentation also concluded that there were no threatened or endangered plant species in the area (Char & Associates, 1989).

Impacts and Mitigation Measures

None of the plants observed at the site are threatened or endangered; neither are they a species of concern. The area will be revegetated, consistent with the remainder of the park, following the end of construction~~, and the introduced vegetation will be maintained~~. In view of the foregoing, the proposed drainage improvements would not have a significant negative impact on botanical resources.

During grading and ~~construction and~~ following construction of the Kaloi Gulch drainageway improvements, the removal of existing vegetation will be followed by replanting ~~botanical species suitable for the expected dry and relatively arid conditions of the site.~~. However, whenever possible, trees will be left in place to provide shade, visual relief, and public enjoyment. Trees located within the drainage channel, however, will require removal to ensure against debris lodging against them when stormwater is present.

The selection of grass and plant materials used will be based on the existing dry and windy conditions of the site. Accordingly, species that are tolerant of drought and salty and windy conditions will be selected. Species that require heavy staking, protection from the wind, or excessive irrigation for establishment and future survival would not be appropriate for use. If trees are planted they will be planted in groups as much as practicable to work together in shielding some of the force of the wind. Use of native species appropriate for these conditions will be considered.

4.12 TERRESTRIAL FAUNA AND AVIFAUNA

Terrestrial mammal species that may be found at the project site probably include mice, rats, mongoose, and feral cats. None of these species are threatened, endangered, or considered a species of concern.

Avifauna recorded at the project site and vicinity included 11 species of birds during a field survey conducted by Rana Productions, Ltd., in June 2004 (David, 2004). (See **Appendix D**.) Although not encountered, it is possible that the endangered Black-necked Stilt *(Himantopus mexicanus knudseni)*, may use resources within some low-lying portions of the project site when water ponds there during heavy rains. This species is found in many locations throughout the ‘Ewa Plain and is opportunistic, rapidly prospecting locations with standing water.

Impacts and Mitigation Measures

There is nothing unique about the habitat present within the proposed project site. None of the 11 species observed at the site are threatened or endangered, or a species of concern.

Construction activities will temporarily displace some common exotic avifauna species. Because the area will be revegetated following construction, no loss of permanent habitat is anticipated.

The areas within the drainageway that will be grassed will be an attraction to numerous individuals of any number of the approximately more than 40 species of migratory and extralimital shorebird species that have been recorded in Hawaii. No significant adverse impacts on seabirds are anticipated. The temporary and limited nature of the project's construction phase will not directly affect the shoreline frequented by these species.

~~Although not observed, the~~The potential for negative impacts to the Black-necked Stilt are not anticipated. Wetland habitat suitable for this species ~~is~~and others such as the Hawaiian Coot, Hawaiian Stilt, and/or Kolea are located nearby on 22 acres of coastal marsh habitat which have been set aside by HASEKO. This area will remain undisturbed to protect any ~~stilt~~threatened or

endangered species that rest, forage, and possibly nest in the marsh wetland (HASEKO, June 2001).

4.13 MARINE BIOLOGY

Work at the seaward end of the drainage outlet will be limited to a narrow strip across the mouth of the channel. At its lowest point, the channel bottom at this location will be approximately 4 feet above sea level, or above the wash of the waves. Construction ~~Best Management Practices~~BMPs will be used in compliance with ~~state~~State regulations for the appropriate treatment and handling of stormwater runoff[3]. Potential for construction to negatively affect marine biota, therefore, is not anticipated.

Even on those rare occasions when stormwater runoff does reach the ocean through the proposed outlet, no negative impacts to marine biota are anticipated. ~~Species that would be of concern in the Hawaiian Islands include the threatened Green Sea Turtle (*Chelonia mydas*), Hawaiian Monk Seal *(Monachus schauinslandi),* various species of whales including the Humpback Whale *(Megaptera novaeangliae),* and various species of limu, which~~

A description characterizing the marine species in the vicinity of the project site include benthic invertebrate communities; benthic algal assemblages; and reef fish assemblages. These species are discussed in the following.

Benthic Invertebrate Communities

Marine Research Consultants (1991) characterized the benthic invertebrate communities in the vicinity of the Ewa Marina project site. The study site is located less than

[3] Hawaii Administrative Rules, Chapter 11-54, Water Quality Standards, and Chapter 11-55, Water Pollution Control.

approximately one-half mile from the proposed Kaloi drainageway outlet and comprises similar if not identical biological communities along this stretch of 'Ewa coastline.

The study concludes that relatively few macroinvertebrates are present within the coastal waters. It hypothesized that this is due to the fact that the smooth limestone bottom affords little shelter, the near constant abrasion from shifting sand, and the concussive force of breaking waves that impact the broad nearshore platform. Among species that are present, reef-building corals were the most abundant. Other macroinvertebrates noted include the colonial soft corals *Palythoa tuberculosa* and *Anthelia edmondsoni*. Various species of encrusting sponges were also present throughout the reef zones.

Few motile macroinvertebrates were observed by the Marine Research Consultants survey. Several species of sea cucumber (*Actinopyga mauritiana, Holothuria atra, and H. nobilis*) were seen on deeper portions of the reef platform where the wave action is least intense. Sea urchins were also generally scarce. The most common were species that inhabit interstitial spaces within the carbonate reef framework (*Echinometra mathei, E. oblonga, and E. aciculatus*). Larger species that inhabit the surface of the reef zones included *Tripneustes gratilla, Echinothix spp.* and *Heterocentrotus mammilatus*.

Coral cover was relatively low, possibly because of the high wave energy and scouring. A total of 11 different species of coral were observed in the study area. The dominant species on all transects was *Porites lobata*, which accounted for about 64 percent of total coral cover. The second most abundant species, *Pocillopora meandrina*, accounted for another 27 percent of the corals. The remaining nine species accounted for only 9 percent of the total coral cover. No corals were observed in the shallow intertidal areas. Coral cover on transects between depths of 15 and 30 feet averaged 4.6% of the bottom cover, very similar to the 3.7 percent cover reported by Dames and Moore

(1986) on nine transects located between depths of 6 and 20 feet. Coral cover in shallower depths was less than one percent. The average coral cover for the area in the vicinity of the proposed channel alignment was calculated at 4 percent.

Benthic Algal Assemblages

Marine Research Consultants found algal abundance greatest in the nearshore intertidal regions, decreasing with distance from the shoreline and increasing depth. The algal biomass was relatively high, particularly in the intertidal area, but the species diversity was found to be relatively low. This finding was similar to that of a previous study by Dames and Moore (1986). The dominant algal species varies by zone. *Chaetomorpha antennina* dominates the intertidal zone.

The dominant algae in the shallow water zone were *Hypnea spp.*, which forms thick carpets on the bottom in some areas. Other common species in the intertidal zone are *Acanthophora specifera, Caulerpa racemosa, C. settularoides,* and *Halimeda discoidea*. Dominant algal species in water depths of 15 to 30 feet are *Caulerpa spp., Halimeda spp., Asparagopsis taxiformis, Acanthophora specifera* and *Lyngbya majuscula*. Algal abundance in the deep zone (60 feet) is low compared to the shallower zones. *Asparagopsis taxiformis* and *Lyngbya majuscula* are the dominant frondose forms (Marine Research Consultants, 1991) in the deep zone.

Because algae constitutes a potential food source for sea turtles, AECOS (1991) conducted additional algal surveys in the nearshore zone in June and September 1991. *Chaetomorpha antennina, Dictyosphaeria versluysii*, and *Acanthophora spicifera* were the most abundant species in the intertidal zone with *Hypnea musciformis, Acanthophora specifera, Porolithon onkodes, Laurencia spp.*, and *Pteocadia capillacea* the most abundant on the lower part of the coralline bench. AECOS concluded that the algae was a food source for green sea turtles (*Chelonia mydas*) that rested in a protected area off the former Barbers Point Naval Air Station. AECOS also suggested that drifting algal thalli, especially of *Hypnea musciformis*, were "...so abundant in the

water that the distribution of foraging turtles need not be much affected by the actual sites of algal growth."

Reef Fish Assemblages

The fish assemblage off Ewa was typical of areas around Oahu in that the number and diversity of fish were related to the physical structure of the bottom. Areas with little structural relief (e.g., such as within the project vicinity) had few individual fish; the most common were triggerfish (*Balistidae*) and hawkfish (*Cirrhitidae*), which often inhabit barren areas and take shelter in small crevices in the reef platform or in isolated coral colonies. Juvenile surgeon fish (*Acanthuridae*), some wrasses (*Labridae*), goatfish (*Mullidae*), and butterfly fish (*Chaetodontidae*) were commonly observed in small numbers. Only a few "food fish" were observed during the survey. These included a school of about 50 blue-lined snapper (*Lutjanus kasmira*) and a large blue-spotted grouper. The number of fishermen in the area suggest that heavy fishing pressure possibly limits the "food fish" population. (See Marine Research Consultants, Ewa Marina Ocean/Marina Monitoring Program, Reef Community Structure: Report No. 1, January 15, 1991.)

Threatened and endangered species that would be of concern in the Hawaiian Islands from the proposed project include the threatened Green Sea Turtle (*Chelonia mydas*), Hawaiian Monk Seal *(Monachus schauinslandi),* and various species of whales including the Humpback Whale *(Megaptera novaeangliae).* Various species of limu are harvested for food along coastal areas of Oahu, including 'Ewa, and are also of concern. Potential effects on these species (and in the case of limu on its continued availability as a food resource) are discussed below.

Hawaiian Monk Seal

The Hawaiian Monk Seal has not been observed at the project site and is not known to inhabit or frequent waters in the vicinity of Oneula Beach Park. A possible explanation for this may involve the regular presence of humans along the shoreline involved in

surfing, swimming, fishing, and picnicking which would serve as a deterrent to use of the area by seals. The regular transit of vessels from the Pearl Harbor Naval Base may also influence the seals to stay clear of the area.

Green Sea Turtle

The Green Sea Turtle is regularly present in coastal waters near the project site and is of concern because it uses the beach and coastal waters.

HASEKO (ʻEwa), Inc., has commissioned a series of surveys of turtles in the coastal area near the Ocean Pointe project for over a decade. The results of the surveys, which were conducted by Marine Research Consultants, are summarized in **Table 4-2** and **Figure 4-8**.

The survey results show that turtles are present throughout the year, with variations in the number of individuals present at any single monitoring period. The highest turtle counts obtained were 22 individuals noted on July 7, 1991 and May 28, 2002. The lowest counts were 6 individuals noted on September 21, 1991, October 14, 1991, and June 27, 1992. The mean number of turtles over the period of monitoring is 12.7 individuals.

The consistent presence of the Green Sea Turtle suggests there are no adverse environmental conditions influencing the overall population within the timeframe of the monitoring period.

The greatest concentration of turtles is in an offshore area of substantial vertical relief fronting the former Barbers Point Naval Air Station. Extensive excavation of the soft limestone substratum suggests that turtles have used the area for a considerable period of time. Most of the turtles are mature individuals. One (1) or 2 turtles have been seen on occasion east of Oneula Beach Park, where a sunken barge provides sheltered habitat in depths of approximately 30 feet. No turtle nesting is known or expected to

Table 4-2

Results of Sea Turtle Surveys

Survey	Date	Total Turtles	Male	Female	Sex Unknown	>50 cm	<50 cm
1	9/22/1990	0					
2	11/25/1990	13	3	9	1	13	0
3	1/6/1991	13	3	5	5	13	0
4	5/5/1991	12	2	6	4	11	1
5	6/17/1991	12	3	7	2	11	1
6	7/7/1991	22	6	12	4	20	2
7	8/17/1991	10	3	2	5	10	0
8	9/21/1991	6	2	1	3	5	1
9	10/14/1991	6	1	4	1	5	1
10	1/24/1992	14	4	10	0	14	0
11	4/18/1992	12	2	9	1	11	1
12	6/27/1992	6	4	2	0	6	0
13	9/6/1992	12	0	12	0	12	0
14	11/8/1992	17	2	9	6	16	1
15	12/23/1993	18	3	9	6	17	1
16	4/2/1994	14	2	7	5	12	2
17	10/30/1994	13	2	9	2	11	2
18	3/26/1995	10	1	7	2	9	1
19	10/28/1996	14	2	9	3	13	1
20	5/3/1996	17	2	9	6	16	2
21	10/6/1996	16	3	11	2	14	2
22	8/10/1997	14	1	7	6	10	4
23	7/26/1998	14	2	10	2	12	2
24	7/5/1999	17	0	17	0	15	2
25	12/19/1999	11	1	10	0	10	1
26	9/9/2000	16	4	12	0	13	3
27	12/24/2000	9	1	8	0	9	0
28	6/9/2001	13	0	11	2	13	0
29	12/31/2001	14	2	12	0	14	0
30	5/28/2002	22	2	20	0	22	0
31	11/19/2002	12	0	12	0	12	0
32	3/16/2003	12	1	11	0	10	2
33	12/13/2003	8	1	7	0	8	0
	TOTALS	**419**	**65**	**286**	**68**	**387**	**33**

Survey	Date	Total Turtles	Male	Female	Sex Unknown	>50 cm	<50 cm
1	9/22/1990	0					
2	11/25/1990	13	3	9	1	13	0
3	1/6/1991	13	3	5	5	13	0
4	5/5/1991	12	2	6	4	11	1
5	6/17/1991	12	3	7	2	11	1
6	7/7/1991	22	6	12	4	20	2
7	8/17/1991	10	3	2	5	10	0
8	9/21/1991	6	2	1	3	5	1
9	10/14/1991	6	1	4	1	5	1
10	1/24/1992	14	4	10	0	14	0
11	4/18/1992	12	2	9	1	11	1
12	6/27/1992	6	4	2	0	6	0
13	9/6/1992	12	0	12	0	12	0
14	11/8/1992	17	2	9	6	16	1
15	12/23/1993	18	3	9	6	17	1
16	4/2/1994	14	2	7	5	12	2
17	10/30/1994	13	2	9	2	11	2
18	3/26/1995	10	1	7	2	9	1
19	10/28/1996	14	2	9	3	13	1
20	5/3/1996	17	2	9	6	16	2
21	10/6/1996	16	3	11	2	14	2
22	8/10/1997	14	1	7	6	10	4
23	7/26/1998	14	2	10	2	12	2
24	7/5/1999	17	0	17	0	15	2
25	12/19/1999	11	1	10	0	10	1
26	9/9/2000	16	4	12	0	13	3
27	12/24/2000	9	1	8	0	9	0
28	6/9/2001	13	0	11	2	13	0
29	12/31/2001	14	2	12	0	14	0
30	5/28/2002	22	2	20	0	22	0
31	11/19/2002	12	0	12	0	12	0
32	3/16/2003	12	1	11	0	10	2
33	12/13/2003	8	1	7	0	8	0
	TOTALS	**419**	**65**	**286**	**68**	**387**	**33**



Map showing location of proposed Project Location and Ewa Marina Channel alignment off of Ewa Beach. Also shown (dashed lines) are approximate tracks of tows conducted to estimate abundance of turtles off the Ewa Marina site. Site 1 is the location of an area of substantial vertical relief (Turtle House) where the majority of turtles were sighted. Site 2 is the location of a sunken barge.

Source: Marine Research Consultants/Planning Solutions, Inc., 2004

FIGURE 4-8
TURTLE SURVEY LOCATIONS
Kaloi Gulch Drainageway
Improvements at Oneula Beach Park
HASEKO (Ewa), Inc., Ewa, Oahu, Hawaii

0 0.5 1.0 Kilometers 2.0

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occur at Oneula Beach Park or on the surrounding coastline, given an increase in human activity in the area associated with urbanization of the 'Ewa Coastal Plain. ~~The population has resided in the area for a considerable time, and the turtles' abundance suggests they are utilizing locally available food sources. The species is not known to use the shoreline or coastal areas for nesting, breeding, or other purposes.~~ The population has resided in the area for a considerable time, and the turtles' abundance suggests they are utilizing locally available food sources. The species is not known to use the shoreline or coastal areas for nesting, breeding, or other purposes.

Previous surveys of the turtle's favored food sources (algae) were reviewed to assess the extent to which the proposed project might affect them. The results of this review indicate that the macroalgal species preferred by the turtle make up approximately three-quarters of the algal community biomass found in the vicinity of the Ocean Pointe site. One (1) of the favored species, *Pterocladia capillacea,* occurs in greatest abundance on the frontal slope of the marine bench in two places; 1 of them is close to the proposed channel.

The water quality impact modeling described in Section 4.6 shows that the infrequent discharges that are anticipated would produce plumes of altered water quality that would extend far from the discharge point. But because the plumes would consist of fresh water, most of the salinity change would occur in the surface layer, limiting the ability to adversely affect benthic algae. Because upstream retention basins would remove nearly all of the larger material from the discharge, sedimentation rates would be low and of a limited duration which is unlikely to have a substantial long-term effect on algae.

Humpback Whales

The Humpback Whale is not known to frequent coastal waters in proximity to the project site. According to prior research on whales in waters surrounding Oahu, the only

area significantly used by the whale is the subregion adjoining the northwest coast of the island, from Kaena Point to Kahuku (Behavioral Research Consultants, 1992).

Availability of Limu as a Human Food Source

Limu refers to any of the various species of marine algae harvested along the coastline for food. Several species are present along the shoreline near the proposed drainage outlet, and these are harvested by Native Hawaiians and others. The proposed project will not physically disturb the areas where limu grows. For reasons already presented in the discussion of potential effects on sea turtles, the proposed project does not have the potential to significantly affect this resource.

Impacts and Mitigation Measures

The proposed project will not affect shoreline processes and will not require construction activities which would directly impact the marine biology of the area~~.~~ including benthic invertebrate communities, benthic algal (limu) assemblages, reef fish assemblages, and the species Hawaiian Monk Seal, Green Sea Turtle and Humpback Whale.

The only source of concern would involve the potential for indirect impacts following construction of the proposed project and only during infrequent storm water discharge events. When potential discharges do occur, the distribution of a fresh water and sediment plume is expected to be limited and of short duration with salinity returning to ambient or existing conditions in approximately 12 hours, and dissipation of the sediment plume within approximately a day.

Potential for indirect impacts to macroinvertebrates including corals is possible if enough fresh water is discharged in the immediate vicinity of the ocean outlet by reducing salinity levels or increasing peak concentrations of suspended sediments. However, the proposed project is designed to minimize this potential through use of a natural drainage system that (1) reduces the frequency of

discharge to an estimated one in ten year storm; and (2) promotes infiltration, evaporation and evapotranspiration so that any discharges that do occur have been treated through the removal of sediments to the extent possible.

In addition, and as noted in the Marine Research Consultants study:

- There are few macroinvertebrates present which could be potentially impacted. The existing conditions of the site involve little existing cover available for habitat, constant abrasion from shifting sand, and the concussive force of breaking waves; and
- Existing coral cover is relatively low and may be the result of high wave energy and scouring.

Potential for indirect impacts to reef fishes are not expected because of their mobile nature. In addition, it is noted that fishes along the Ewa coastline that are likely to encounter stormwater discharges from the proposed project (a one in ten year storm) will be exposed to storm water discharges on a far more frequent basis from other discharge locations that do not have the same level of treatment design as provided by this project.

Potential for negative impacts on the Green Sea Turtle and Hawaiian Monk Seal are similarly not anticipated. Discharges of stormwater associated with the project have been assessed and were found to result in little to no potential for negative adverse impacts. Water quality changes as a result of storm flows are expected to rapidly disperse even under the worse case scenario. Further, such discharges will have little opportunity to affect algal food resources.

The number of recorded sightings of the Hawaiian Monk Seal are limited or rare. The species would typically not be found in the region because of the presence of humans and human related activities along the coastline. If the Hawaiian Monk Seal is in the vicinity of the project site during a storm water event, the

highly mobile nature of the species would enable it to transit to other more favorable locations for foraging or resting. Upon a return to pre-existing non-storm water discharge conditions, the area would return to normal and would not itself contribute to a short or long-term impact.

Potential negative impacts to the Humpback Whale are not expected. This is because of limited presence of the species, the nature of the storm water discharge which is expected to be comprised of fresh water and limited amounts of suspended sediments, and the distances from shore where such species would normally be found.

Potential for negative impacts to algal resources including limu are not expected. This is also due to the limited and infrequent period during which storm-water discharges are anticipated. The discharge will include fresh water and limited amounts of fine suspended sediments. Based on the results of modeling of the discharge, there will be few to no opportunities for prolonged contact of limu or algal species with sediments within the relatively energetic wave regime of the area.

CHAPTER 5
PUBLIC SERVICES
POTENTIAL IMPACTS AND MITIGATION MEASURES

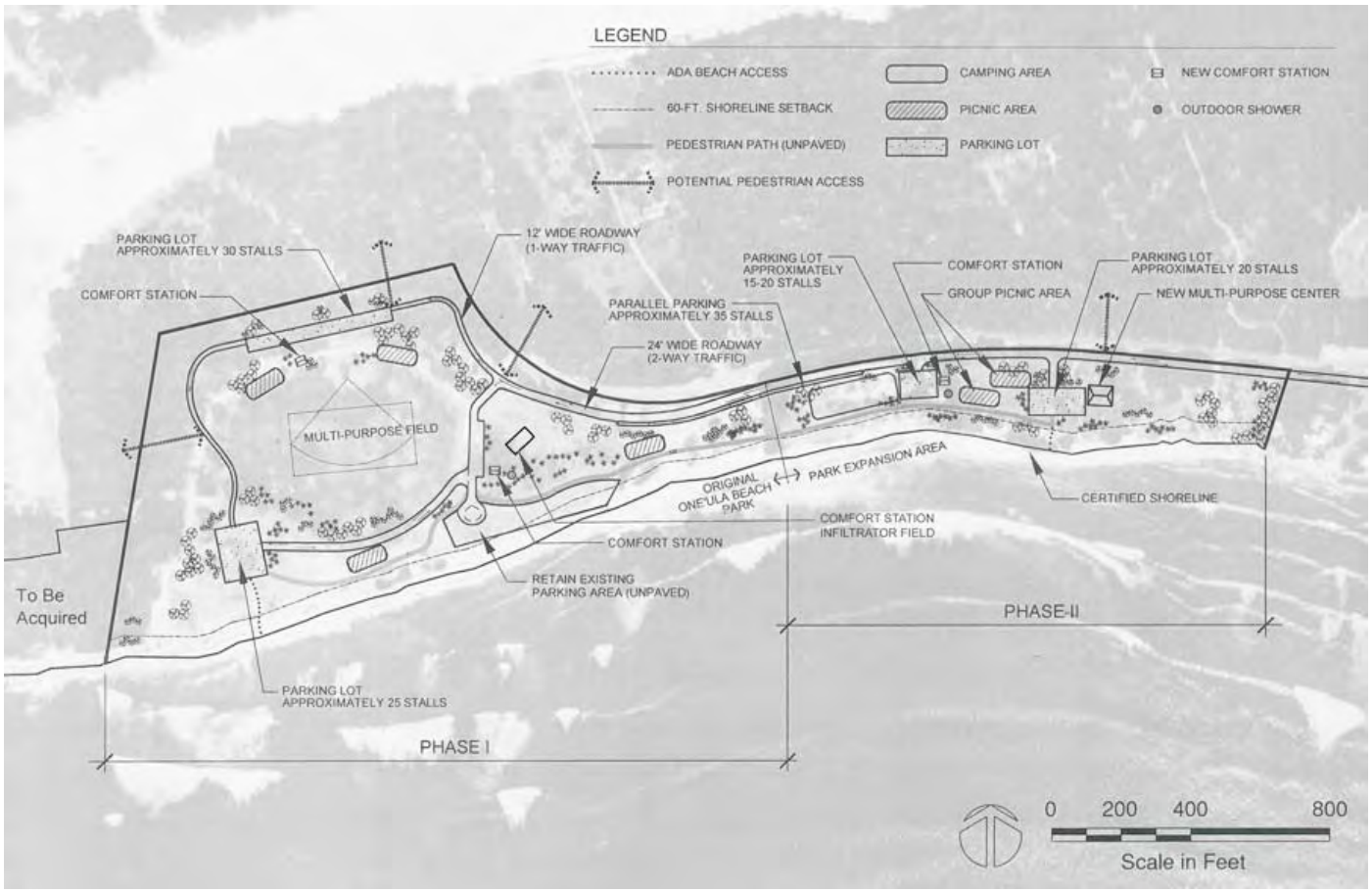
The following is a description of the public services that could be potentially impacted by the proposed project. This chapter discusses potential short-term and long-term impacts on public services and proposes measures to mitigate those impacts.

5.1 TRAFFIC AND ROADWAYS

Papipi Road is an east-west collector that originates at its intersection with Fort Weaver Road and terminates at the Oneula Beach Park access road west of the Pupu Street intersection. Future plans for regional transportation improvements will involve widening Fort Weaver Road from 4 to 6 lanes between Farrington Highway and Geiger Road. Improvements to the Kapolei Parkway are also planned in the near future to improve regional vehicular access and circulation.

A Finding of No Significant Impact for the Oneula Beach Park Master Plan was issued to the Department of Parks and Recreation (DPR) in March 2001 (DDC, 2001). The master plan includes improvements to the existing park and describes the planned uses for the 9.365-acre extension (**Figure 5-1**). According to the Oneula Beach Park Master Plan, access to the project site is via a roadway easement that extends from Papipi Road off of Fort Weaver Road. The roadway easement is on land owned by HASEKO. Park related traffic is not expected during the peak morning and afternoon traffic periods (DDC, 2001).

HASEKO is in the process of conveying ownership of the 9.365 acres ~~of land to the east of the project area~~ to the City and County of Honolulu. The Oneula Beach Park Master Plan states that: "...the roadway easement [Papipi Road and the park access road, currently the sole access to the beach ~~currently the sole access to the beach~~ park] will



SOURCE: Oneula Beach Park Master Plan, Dept. Of Design ad Construction,
Prepared by Wilson Okamoto & Assoc., Inc., March 2001, updated June 2005.

FIGURE 5-1
ONEULA BEACH PARK MASTER PLAN
Kaloi Gulch Drainageway
Improvements at Oneula Beach Park
HASEKO (Ewa), Inc., Ewa, Oahu, Hawaii

0 400 Feet 800

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be realigned makai or southward of its present alignment to lie completely within the park boundary. The single access road will be developed to allow better control over vehicular access [to the park] for security purposes" (DDC, 2001).

~~The proposed project will require the modification of the access road to meet the design requirements of the drainageway improvements. The modification of the access road will be coordinated with the Department of Parks and Recreation~~The park access road, as it extends through the 500-foot-wide drainageway, will be realigned to meet the requirements of the proposed project and the Oneula Beach Park Master Plan to maintain access. Roadway improvements from the Diamond Head boundary along Papipi Road, for the 9.365 acres which will be dedicated to the City for park use by HASEKO, will also be accomplished at a later date in accordance with Condition 3.e.7 of 20031PDH-3, which requires the construction of roadway improvements. Both the access road and the section of road along the 9.365 acres will be dedicated to the City for park use at a cost to be borne by HASEKO.

The proposed project will require the modification of the access road to meet the design requirements of the drainageway improvements. The modification of the access road will be coordinated with DPR to mitigate any negative impacts on park users. The general public will be advised of the modifications to the access road through the provision of appropriate signage.

Impacts and Mitigation Measures

~~The existing Oneula Beach Park access road, as it extends through the 500-foot-wide drainageway, will be realigned in accordance with the Oneula Beach Park Master Plan.~~ The access road will be slightly lowered with the surrounding terrain to an elevation of approximately 4.5 feet above msl as prescribed by the Ocean Pointe Drainage Master Plan. ~~The road will be raised slightly in relation to the elevation of the completed drainageway to permit drainage from smaller storms~~

~~to flow over the road. This is expected to occur the majority of the time from smaller and more frequent storm events.~~

The road will be designed to operate as a ford during the design storm ~~in order~~ to permit the passage of flood flows (HASEKO (Ewa), Inc., 2004). Mitigation measures to ensure the safety of the public and community will include:

- The drainageway has been designed with a widened channel to reduce the velocity of stormflows passing over the roadway ford. In addition, concrete will be used to further reduce the potential for scour of the roadbed. The use of concrete material across the drainageway will also help to delineate the limits of the drainageway.

- Appropriate signage will be prepared by HASEKO in consultation with DPR and the City Departments of ~~Parks and Recreation,~~ Facility Maintenance~~,~~ ~~and~~ (DFM); Planning and Permitting ~~to provide appropriate signage~~(DPP); and Design and Construction (DDC), to advise the public of the presence of the drainageway and to exercise caution during periods of heavy rainfall in the region. The signs will be posted on either side of the proposed ford crossing to warn the public that they are crossing a flood prone area. Signs will also be installed that contain both words and pictorial warnings of the flood danger.

~~• HASEKO will provide a temporary detour road to permit entrance to and exit from the Oneula Beach parking lot during construction.~~

Because of the slow movement of runoff through the watershed, there is no possibility of unexpected floods occurring at this location. Consequently, DPR will be able to monitor storm advisories issued by the National Weather Service and decide when to close the road as a precaution. Because there would be flow in

the drainageway only as a result of very large storm events (estimated as once in 10 years), the temporary road closures would occur only during very stormy conditions when beach park usage would be very low.

- HASEKO will provide ~~a secondary park access road for emergency ingress~~temporary detour roads to permit entrance to and ~~egress~~exit from the ~~western portion of~~ Oneula Beach Park~~. It would be used~~ during ~~major storm events that force closure of the primary park access road.~~construction.

- The location of the secondary access road is currently in the planning stage. A location at the north~~western~~ end of the beach park~~, adjacent to or nearby the parking area,~~ is being considered. See **Appendix G**, for a plan showing the preliminary location of the secondary access road and the connection with the existing roadway system. The final location of the roadway will be determined after consulting with ~~the Department of Parks and Recreation~~DPR and other appropriate agencies. Until ~~a~~ the permanent secondary access roadway can be implemented, other provisions for temporary second access will be provided through coordination with the City during design and construction.

- The construction of the permanent secondary access road by HASEKO is expected to connect with a future road to be dedicated to the City. Because the permanent secondary access road to Oneula Beach Park will access a public road, the hours that the access road will be opened will need to be determined by DPR.

- In the long term, Papipi Road and the proposed realigned Oneula Beach Park access road will link to the larger Ocean Pointe roadway network. Since no realignment or widening of Papipi Road is proposed, the project

is not anticipated to impact either the surrounding roadway network or the future roadway requirements of the ‘Ewa Beach Area.

Construction activities involving use of Papipi Road and Fort Weaver Road to mobilize equipment, machinery and personnel to the project site may temporarily affect traffic. Potential for increased traffic however, will be limited to the 6 to 12 month duration of the project to establish the drainageway, access roads, utilities, and appurtenant features. Measures to minimize traffic congestion will include: (1) if the use of Papipi Road and Fort Weaver Road cannot be avoided, the scheduling of heavy truck traffic will be arranged to avoid peak morning and afternoon traffic hours; and (2) the contractor may also arrange to access Oneula Beach Park from the adjoining Ocean Pointe property. This will allow the movement of heavy equipment and machinery so that local roads such as Papipi Road are not adversely affected.

Upon completion of the project, all construction related machinery, equipment and vehicles will be removed with no further impacts to local area traffic.

5.2 WASTEWATER

The ‘Ewa Coastal Plain is served by the Honouliuli Wastewater Treatment Plant, which is operated by the City ~~and County of Honolulu~~, Department of Environmental Services (ENV). The Honouliuli Wastewater Treatment Plant Sewer Outfall extends in a north-south direction through the Ocean Pointe Development in the vicinity of the golf course and Kaloi Gulch (**Figure 5-2**). The outfall line transmits treated sewage from the plant to the ocean through the Barbers Point Ocean Outfall System. An existing 50-foot-wide

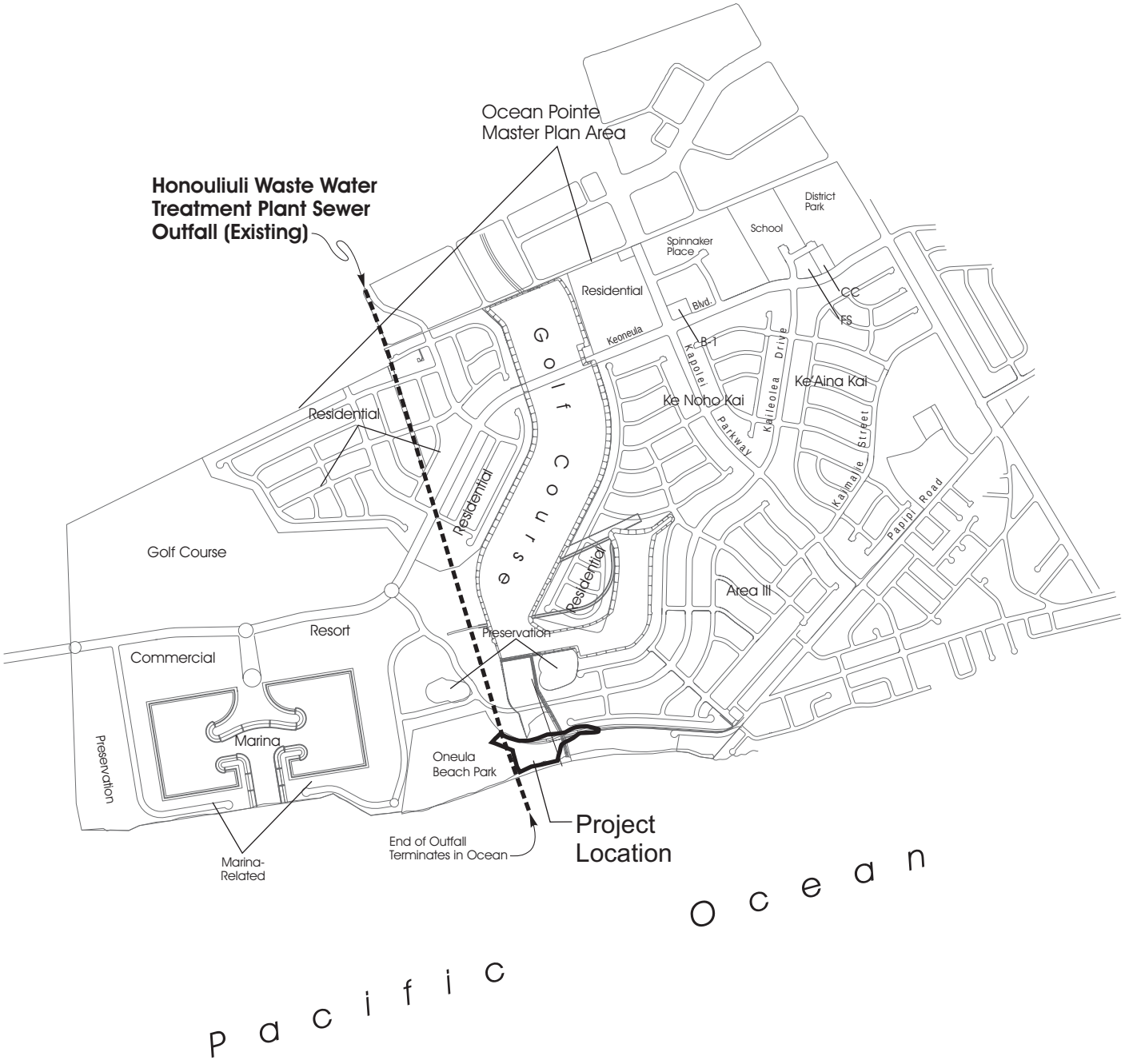


FIGURE 5-2
HONOULIULI WASTEWATER
TREATMENT PLANT SEWER OUTFALL
Kaloi Gulch Drainageway
Improvements at Oneula Beach Park
HASEKO (Ewa), Inc., Ewa, Oahu, Hawaii

0 1600 Feet 3200

R. M. TOWILL CORPORATION June 2005

easement roughly follows the path of Kaloi Gulch and passes directly to the west of the project site. The sewer outfall extends into the Pacific Ocean, where it terminates offshore.

~~According to~~The Final Environmental Assessment for the Oneula Beach Park Master Plan~~,~~ provides the following discussion:

> "2.3.2 Wastewater System
>
> Currently there are no sewer facilities ~~are~~ in the area readily available for ~~hookup to support park development.~~connection. A 24-inch sewer line is located along the existing ~~Papipi Road~~roadway easement and conveys wastewater through the municipal wastewater system to be treated and disposed of at the City's Honouliuli ~~Municipal System. The design to accommodate the Oneula Beach Park Master Plan will include appropriate lines for sewer connection, sewer manholes, and clean-outs (DDC, 2001).~~Wastewater Treatment Plant.
>
> Impacts and Mitigation Measures
>
> The existing sewer line is expected to be adequate to accommodate the additional flows from the park. Appropriate sewer lines for collection, sewer manholes, and clean-outs will be incorporated in the design phase of the project."

The Oneula Beach Park Master Plan indicates that in Phase I of the master plan development the existing comfort station will be demolished and new comfort stations will be built. A comfort station and outdoor shower are also planned for Phase II.

> Impacts and Mitigation Measures
>
> The proposed project is not expected to result in adverse impacts to wastewater resources in the area.

- The primary reason for selecting this alternative is because it avoids impact to the existing Honouliuli Wastewater Treatment Plant Sewer Outfall. This outfall is located to the west of the drainageway channel and represents a potential concern due to the environmental sensitivity and operational importance of the facility.

The drainage improvements will not ~~affect~~ alter the existing sewer outfall and is not anticipated to affect other wastewater facilities.

- The project will have a negligible impact on demand for wastewater service. Construction work crews will be provided with portable sanitary toilets during the construction phase, as required. Maintenance of the portable toilets will be done off-site and in accordance with regulatory requirements.

~~Sewer requirements for completion of the Oneula Beach Park Master Plan will require coordination between the City Departments of Environmental Services and Parks and Recreation to complete installation of a sewer connection line. Specifically, the sewer line will have to be constructed to ensure that the invert depth is consistent with the proposed improvements to the Kaloi Gulch Ocean Outlet. The schedule will also require coordination to determine the possibility of completing the installation of the beach park sewer line during construction of the proposed drainage outlet improvements.~~The proposed project will have no impact on the Oneula Beach Park Master Plan with respect to wastewater facilities.

5.3 POTABLE WATER

The project area is served by the Honolulu Board of Water Supply (BWS). BWS ~~Wells~~wells at Kunia and Hoaeae provide water to Oneula Beach Park via water mains located along Fort Weaver Road (USACOE, 1993).

Impacts and Mitigation Measures

The proposed action will involve relocation of the existing main supplying potable water supply for the park to be set beneath the new channel bottom. The existing main will be removed along with removal of the existing park access road. The new main that will serve the Oneula Beach Park is indicated in **Appendix G**.

The final design of the water main (size and alignment) will be coordinated with BWS, DPP, DDC, and DPR. Provisions for temporary reconnections to the existing line will be included as necessary to maintain service until permanent segments are installed in the existing and future beach park areas.

During construction, it is expected that potable water will be used for daily consumption by work crews for drinking purposes. As feasible, non-potable water for dust control and irrigation to establish planted vegetation during construction may be provided from the adjoining Ocean Pointe Development.

The use of potable water for work crews, and possible use for dust control and irrigation, is expected to be negligible, and no long-term impacts to the potable water supply are expected. This is due to the relatively small scope and scale of the project. No mitigation measures are proposed.

5.4 NON-POTABLE WATER

There are no non-potable wells located at the project site. The Oneula Beach Park Master Plan (March 2001) states that the park's water system will be designed to facilitate future conversion to a dual water system. This will enable non-potable water to be used for irrigation purposes when non-potable service to the park becomes available.

Impacts and Mitigation Measures

No impacts to non-potable water resources are expected ~~as no such resources are present~~. Non-potable water from the Ocean Pointe Project site may be used for dust control and to irrigate planted vegetation. No mitigation measures are proposed or required.

5.5 POWER AND COMMUNICATION

Electrical power is provided to Oneula Beach Park by the Hawaiian Electric Company. Telephone facilities owned by ~~Verizon Hawaii~~Hawaiian Telcom serve the beach park and nearby residential neighborhoods. The location of power and communication utilities in provided in **Appendix G**.

Impacts and Mitigation Measures

The proposed drainageway will not in itself require electrical or communications hook-ups during the project construction or implementation phases. ~~Construction will be coordinated with the Department of Parks and Recreation as required to address potential conflicts or impacts to the Oneula Beach Park.~~ However, existing overhead electrical power and communications lines will be relocated to an underground concrete-encased conduit system across the drainage channel.

Provision for temporary reconnections to the existing overhead electrical and communication lines will be provided as needed to maintain service until the permanent lines are installed in the existing and future beach park area.

Construction will be coordinated with DPR as required to address potential conflicts or impacts to Oneula Beach Park.

5.6 POLICE AND FIRE PROTECTION

The Honolulu Police Department serves the project area through its Leeward District 8 facilities located at the Kapolei Police Station (1100 Kamokila Boulevard, Kapolei). The

project site is also served by the Honolulu Fire Department's 'Ewa Beach Station No. 24. This station is located about 1 mile east of the project site (91-832 Pohakupuna Road, 'Ewa Beach). The 'Ewa Development Plan indicates that the current fire station will eventually be replaced by a new station on Fort Weaver Road (DDC, 2001).

Impacts and Mitigation Measures

In the short--term, no impacts on police protection resources are expected from construction. In addition, the project will contain no structures that would be susceptible to fire.

On July 2, 2004, the Honolulu Police Department stated that the proposed project is not expected to have a significant impact on police services. Therefore, no mitigation measures concerning police services are proposed.

On June 22, 2004, the Honolulu Fire Department stated that the following would be required for the duration of the project:

1. Maintain fire apparatus access throughout the construction site; and,
2. Notify the Fire Communication Center regarding any interruption of the existing fire hydrant system.

HASEKO will ensure that construction contractors comply with the requirements of the Honolulu Fire Department.

5.7 HEALTH CARE AND EMERGENCY SERVICES

The St. Francis West Medical Center (SFW) is the closest major health care facility to the project area. SFW is located on Fort Weaver Road, which is an approximately 15-minute drive from the project site. SFW is a full-service hospital providing emergency care and a heliport for medivac transport. Other medical facilities located within a 30-minute drive of the project site are the Kaiser Permanente Punawai Clinic in Waipahu

and Kapiolani Medical Center at Pali Momi in Pearl Ridge (DDC, 2001).

Impacts and Mitigation Measures

In the short~~—~~-term, the only possible impact on health care and emergency services would be a construction-related accident requiring emergency care. The proposed project will have no long-term impact on health care and emergency services.

5.8 EDUCATION AND LIBRARY SERVICES

The immediately surrounding community is served by ‘Ewa Beach School and Library. A proposed new elementary school will be constructed as part of the Ocean Pointe Project. The existing ‘Ewa Beach School and Library facilities are operated by the State ~~of Hawaii,~~ Department of Education.

Impacts and Mitigation Measures

Since the project is limited to drainageway improvements, it will have no impact on education and library services of the ‘Ewa District or the ‘Ewa Beach community. No mitigation measures are required or proposed.

5.9 PARKS AND RECREATION

The project is located entirely within the existing Oneula Beach Park, which is owned and operated by the City ~~and County of Honolulu, Department of Parks and Recreation.~~DPR. Land uses within the park include ocean recreation, picnicking and use of a multi-purpose field. ~~The master plan calls for the following~~

Following a series of community meetings, the Oneula Beach Park Master Plan was prepared by the Department of Design and Construction (DDC) in 2001 to guide future park development, address anticipated recreational demand, and to plan the future expansion of the park. A Final Environmental Assessment was prepared for the master

plan and a Finding of No Significant Impact was issued. The City Council approved the master plan by issuing a Special Management Area Use Permit that allows for the implementation of the master plan (Resolution No. 01-228). The master plan calls for improvements to be developed in two phases.

As part of the first phase, the access roadway to Oneula Beach Park will be relocated. Presently, access to Oneula Beach Park is from Fort Weaver Road, over Papipi Road, and via a roadway easement extending from Papipi Road to the park. The roadway easement is currently located entirely on HASEKO's property. Upon conveyance by HASEKO of the 9.365-acre expansion area, the roadway will have to be relocated makai or southward of its present alignment to lie within the park boundary. A short segment of the roadway, between the beach park expansion area and Papipi Road, will be within HASEKO property, over which the City will have an easement. HASEKO is obligated to construct this short segment of the access road pursuant to Condition 3.e.7 of 2003/PDH-3 (Planned Development – Housing Permit for Ocean Pointe residential Area III). This segment of the access road will be constructed in conformance with the realigned access road through the current and expanded Oneula Beach Park.

Other improvements include:

Phase I – This phase includes work on the existing 28 acres of the park:

- Relocate the existing multipurpose field and provide irrigation improvements;
- Construct a new comfort station and parking lot to service the multipurpose field;
- Resize the existing parking lot;
- Relocate the existing comfort station and outdoor shower closer to the unpaved parking area;
- Develop new picnic areas;
- Develop an Americans with Disability Act (ADA) beach access; and

- Develop an unpaved pedestrian path along the shoreline.

Phase II – This phase will include work on the 9.365-acre expansion area:

- Construct a new multipurpose community/recreation center and parking lot;
- Construct new group picnic areas;
- Develop new individual camping sites;
- Construct a new parking lot;
- Construct a new comfort station and outdoor shower;
- Provide additional ADA beach access;
- Continue with further work on the unpaved pedestrian access; and
- Provide landscaping.

The actual construction schedule for the proposed improvements has not been developed by ~~the Department of Parks and Recreation~~DPR and is subject to funding by the City Council.

Impacts and Mitigation Measures

~~Oneula Beach Park operations will be disrupted during construction of the proposed improvements and modifications to the Papipi Road/beach park access road. Existing vegetation within~~The proposed drainage improvements will be designed to minimize the potential for impacts to the Oneula Beach Park Master Plan. In particular, the ~~channel~~drainage improvements will ~~be removed and later replaced after grading is completed. Work to modify~~involve construction only at the easternmost end of the existing ~~beach~~park boundary (**Figure 2-3, Oneula Beach Park Existing Land Uses**), roughly between the existing park ~~access road will be coordinated with~~and the ~~City Department~~area of ~~Parks and Recreation to maintain~~ park ~~access and to ensure consistency with the Oneula Beach Park Master Plan. As required, this will include construction of a temporary detour road to allow vehicular traffic into and out of the park. It is expected that~~

~~use of the detour road will be for a limited period and would only be required for: (1) the construction period; or (2) during infrequent periods of heavy storm flows which would prevent access to or exit from the access road~~expansion.

~~The existing drainageway is subject to stormwater runoff during periods of heavy rainfall. This condition is expected to continue with completion of the proposed project, which will use the drainageway for the purpose of conveying stormflows. Recreational activities at Oneula Beach Park during these periods can be expected to be curtailed because of inclement weather. In the event that the access road must operate as a ford, the mitigation measures outlined in Chapter 2, Project Description, and Section 5.1, Traffic and Roadways, will be implemented~~The drainage channel will be located in an area where the Master Plan calls for landscaping and a group picnic area, consisting of picnic tables and benches (**Figure 2-4, Project Relationship to Oneula Beach Park Master Plan**). It is proposed that the picnic area be moved away from the drainage channel to a more appropriate location further to the west where there is sufficient open space to accommodate this use.

HASEKO will coordinate work required for the subject project with DPP, DPR, and DDC regarding changes to the Oneula Beach Park Master Plan, and construction schedule for the project and park improvements, with the goal of minimizing any disruption to park users. The implementation of the drainage channel will be coordinated with development of the Oneula Beach Park improvements, both within the existing park as well as within the future park expansion area (east of the existing park).

The permanent improvements installed within the channel area (grading, grassing, access road, utilities and signage) will include, if necessary, temporary provisions and reconnections for maintaining public access and utility services.

The specific construction scheduling details will be developed following completion of the EIS and plan review processes. This will involve the review of construction drawings, environmental permits, design details to meet State and City and County of Honolulu regulations and requirements (including the permanent and any temporary provisions for maintenance of public access and services to the park), and construction schedules.

The modification of the park access road to a location further makai of the present location will be designed to be consistent with the park master plan. No significant change or impact is expected because: (1) the road will remain in the same alignment as shown in the Oneula Beach Park Master Plan; and (2) work on the road will be undertaken by HASEKO as part of the drainage system improvement project.

The unpaved pedestrian path will need to meander slightly to go around the two outer banks of the drainageway at 5 percent slopes. The unpaved pedestrian path is planned to be designed and graded as part of the proposed drainageway improvements project.

The use of park lands, golf courses and open spaces for drainage purposes is a common practice (e.g., Hilo Municipal Park, West Loch Golf Course). Although public safety may be addressed using the same practices as normally applied to such facilities, it is important to note that use of Oneula Beach Park during storm conditions sufficient to cause stormwater to flow in the drainage channel would be expected to be very low to none at all.

On a long-term basis, the drainage channel mouth at the ocean will be set at an elevation of 4 feet msl to maintain shoreline access adjacent to Oneula Beach Park. No structures are proposed for the project area. The project site will remain in open space and will continue to be available for beach-oriented

recreational purposes the vast majority of the time. The only time the project area would not be available for recreational uses would be during a major storm event, when flood flows would be discharging to the ocean through the drainage channel. This is expected to happen only once in every 10 years. No long-term land use conflicts are expected between park use and the proposed project.

CHAPTER 6
SOCIO-ECONOMIC ENVIRONMENT, POTENTIAL IMPACTS AND MITIGATION MEASURES

6.1 SOCIO-ECONOMIC CONTEXT OF THE PROJECT

The project site is located within the ‘Ewa District, which encompasses all of the communities on the ‘Ewa Plain as well as Campbell Industrial Park, Kalaeloa, Makakilo, Ko Olina, and Honokai Hale. The project site is also in the ~~City and County of Honolulu's~~City’s ‘Ewa Development Plan (DP) Area, a region which is a major focus of new development on Oahu. Kapolei and its surroundings include residential, commercial, resort, and industrial areas. From 1990 through 2001, an average of approximately 975 new homes ~~were~~was built each year in the ‘Ewa DP Area. About half of these homes are in the Kapolei Area. Development of the Ko Olina Resort Area at the western end of the ‘Ewa DP Area slowed during the 1990s but is now increasing. While population growth has been slowing islandwide over the last two decades, it has increased in ‘Ewa (SMS, 2002).

‘Ewa communities are characterized by young families with above-average incomes. New development in ‘Ewa could accelerate in the next few years. The State Department of Hawaiian Home Lands (DHHL) and a private developer are taking over remnant lands at Barbers Point from the U.S. Navy, and may seek to produce new housing quickly for DHHL beneficiaries.

Within the Kaloi Gulch drainage basin, there currently exist more than 7,000 homes within the Ewa by Gentry and Ewa Villages developments. The City has approved the development of 4,850 residential units at Ocean Pointe~~. As the average household size is 2.5 persons, this means that,~~ approximately ~~12,125 new residents will eventually live in the Ocean Pointe Project~~one-third of which have already been built. Future developments include housing and possibly the West Oahu campus of the University of

Hawaii on 1,300 acres owned by the University and DHHL just mauka of Ewa Villages, and the residential Ewa Makai-West project just mauka of Ocean Pointe.

Impacts and Mitigation Measures

The proposed project is not anticipated to add to the projected population growth or adversely impact the economy of the ‘Ewa Region.

6.2 POPULATION AND ECONOMY

As shown in **Table 6-1**, Oahu’s population growth has been slowing over recent decades. As a major site for housing development, the ‘Ewa Area saw higher growth in the 1970s and the 1990s than did the rest of Oahu (SMS, December 2002).

The regional median household income for ‘Ewa is 115 percent of the island median. The Ko Olina/–Honokai Hale Area has a median household income level much higher than other communities in the ‘Ewa Region. Workers living in the ‘Ewa DP Area have diverse occupations, and fewer are employed in the agricultural sector than on the rest of Oahu. Commuting times for ‘Ewa residents are long, and a third of the workforce normally drives over 45 minutes to work (SMS, 2002).

Population growth projections prepared by the ~~City and County of Honolulu, Department of Planning and Permitting,~~DPP for the ‘Ewa Development Plan Area forecast a population increase of 190 percent by 2020. This represents an increase from approximately 43,000 to 125,000 residents in the 30 years between 1990 and 2020 (DDC, 2001).

Impacts and Mitigation Measures

The proposed drainageway will not adversely impact the population or economy of the ‘Ewa Region. Construction jobs will represent a temporary increase in employment, although not necessarily for the adjacent area or ‘Ewa Region.

Table 6-1
Population Growth: Oahu and 'Ewa Development Plan Area

Population	1960	1970	1980	1990	2000
City and County of Honolulu	500,409	630,528	762,565	936,255	876,156
Ewa DP Area	NA	24,235	35,585	42,983	68,728
Average Annual Rate of Growth		1960-70	1970-80	1980-90	1990-2000
City and County of Honolulu		2.3%	1.9%	0.9%	0.5%
Ewa DP Area			3.9%	1.9%	4.8%

Source: SMS, 2002

6.3 LAND USE AND OWNERSHIP

The project site is located on land owned by the City ~~and County of Honolulu, Department of Parks and Recreation~~, DPR, and used as Oneula Beach Park. Land uses within the park include ocean recreation, picnicking and use of a multi-purpose field. On May 12, 2004, DPR authorized HASEKO ~~(Ewa) Inc.~~, to process and obtain the environmental permits necessary for the proposed project.

DPR subsequently reviewed the project EIS Preparation Notice. On June 10, 2004, DPR issued a letter stating it had no objection to the proposed project, provided that ~~the Department of Parks and Recreation will~~DPR would not be responsible for maintaining the drainage channel or channel banks.

Impacts and Mitigation Measures

The applicant, HASEKO ~~(Ewa), Inc.,~~ will coordinate all work with the owner, the City ~~and County of Honolulu~~, DPR, to modify open space within the existing beach park for construction of the planned improvements. This arrangement will be reviewed and approved by DPR before construction can commence.

~~Responsibility for maintenance of the drainage channel and channel banks will be by the golf course operator or other entity designated by HASEKO.~~

~~6.4 PROPERTIES WITHIN PROXIMITY TO THE PROPOSED PROJECT~~

~~The majority of privately-held land in the subject area is owned by the applicant, HASEKO (Ewa), Inc., and planned for development as part of the Ocean Pointe Master Planned Community (**Figure 6-1**). An established single-family residential neighborhood is located to the east between the subject property and Fort Weaver Road. Lots comprising an area of 9.365 acres are planned for transfer from HASEKO (Ewa), Inc., to the City and County of Honolulu for use as an extension to the Oneula Beach Park.~~ HASEKO has been working, and will continue to work, with the appropriate City Departments and other landowners and developers in the Kaloi drainage basin to legally define the maintenance obligations for the drainageway area. Although the details and the form of memorializing the maintenance obligations have not yet been worked out, HASEKO is committed to ensuring that the drainage channel through Oneula Beach Park is kept free of large debris that may impede storm water flows through the channel, silt and other debris are removed from the channel following storm events, and the shoreline berm is maintained at an elevation that enables it to function adequately as a storm drainage outlet.

6.4 PROPERTIES IMPACTED BY THE PROPOSED PROJECT

The proposed project will serve as the storm drainage ocean outlet for much of the Kaloi Gulch drainage basin. Existing and planned developments in the Kaloi Gulch drainage basin that will benefit from this proposed project include Ocean Pointe, Ewa Makai-West, Ewa by Gentry, Ewa Villages, DHHL housing projects, other housing projects on lands owned by the University of Hawaii, and the University of Hawaii's West Oahu Campus.

The Ocean Pointe development lies in immediate proximity to the location of the proposed project. Additionally, an older, established single-family residential neighborhood is located to the east between the subject property and Fort Weaver Road. Lots comprising an area of 9.365 acres are planned for transfer from HASEKO to the City for use as an extension to the Oneula Beach Park. (See ~~Figure~~**Figures 1-2** and **1-3**~~.~~.)

Impacts and Mitigation Measures

Need for the proposed project is the result of all of the existing and future developments within the Kaloi Gulch drainage basin. Development of an ocean outlet for regional storm drainage significantly affects development plans and schedules for future projects planned within the drainage basin, such as the University of Hawaii's West Oahu campus, housing projects on lands owned by DHHL, other housing projects on University-owned lands, and the Ewa Makai-West residential development project.

The Ocean Pointe development will be affected by the proposed project because of land use changes that will be required for previously zoned land that will need to be reconfigured to accommodate the drainage improvements. But the reconfiguration will not change the previously approved number of housing units (4,850) or visitor units (950) for Ocean Pointe. Therefore, no mitigation measures are proposed.

The single-family residential neighborhood to the east may be affected by construction-generated dust and noise. All work activities will comply with legal requirements of the State ~~of Hawaii~~ and City~~ and County of Honolulu~~. As required, use of water and cover material, including aggregate, will be applied to areas subject to dust generation. Construction vehicles and equipment will be equipped with mufflers to reduce noise impacts. All work will be conducted

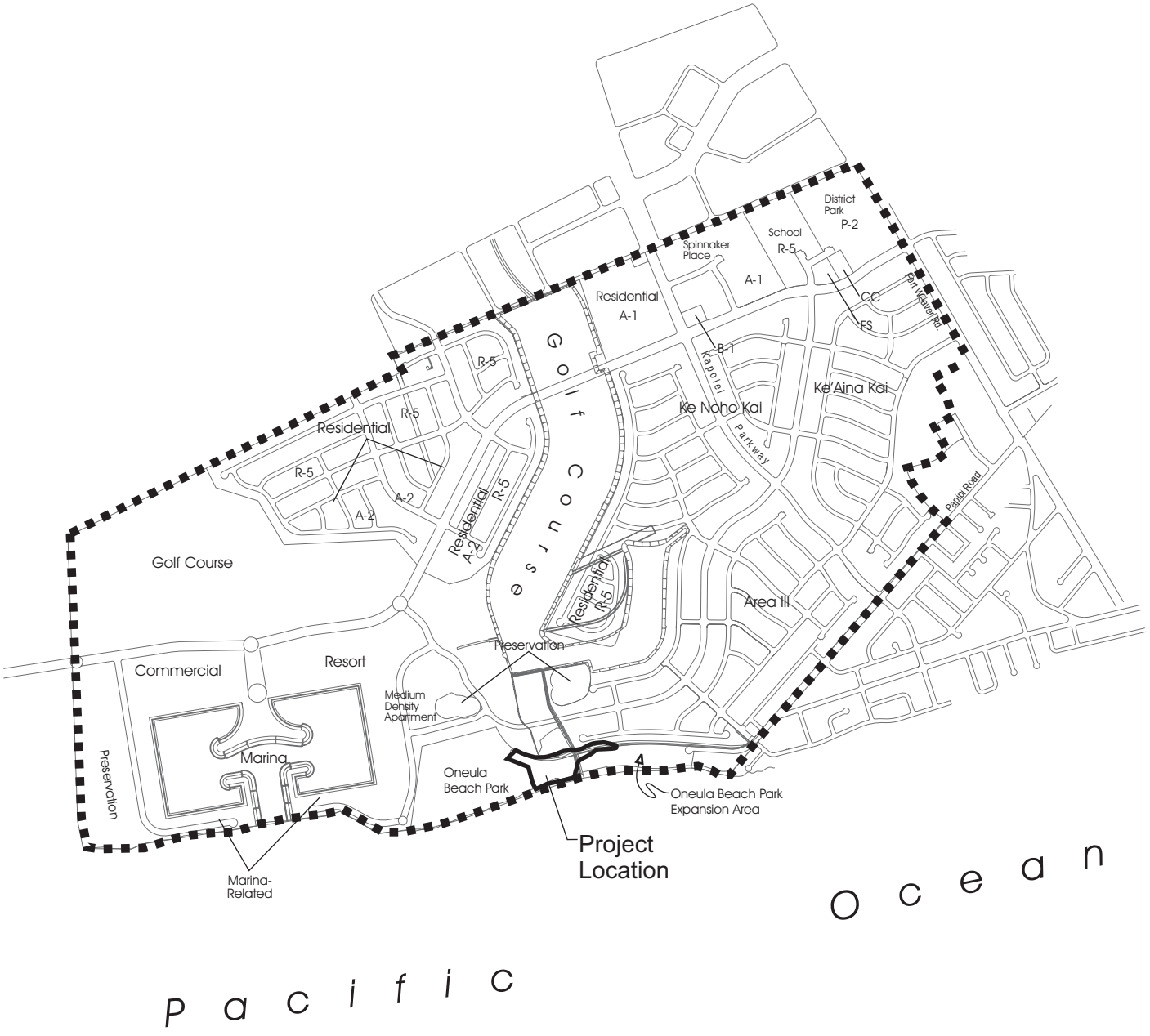
within prescribed work hours established by the State ~~Department of Health.~~DOH. As required, other mitigation measures will be employed to ensure against negative impacts to the nearby ‘Ewa residential neighborhood.

6.5 HISTORIC AND ARCHAEOLOGICAL RESOURCES

The project site is located within the Oneula Archaeological District (Site No. 80-13-2873; see **Figure 6-~~2~~1**), which has been determined to be eligible for listing on the National Register of Historic Places. Archaeologists have conducted intensive archaeological inventory and data recovery work in the project area immediately ~~above~~mauka of the project site. The State Historic Preservation Division (SHPD) has reviewed and accepted the final Data Recovery Report and Site Preservation Plan for the approved Archaeological Mitigation Program. SHPD has also determined that the park improvements called for in the Oneula Beach Park Master Plan will have “no effect” on significant historic sites (DDC, 2001).

In addition to this previous work, HASEKO in 2004 commissioned a Supplemental Archaeological Survey by PHRI to assess the potential to find human skeletal and cultural remains buried in the sand deposits that make up the makai portion of the project area (as well as at a nearby location associated with the Ocean Pointe Marina; see **Appendix E**). This portion of the proposed drainage channel consists primarily of sand accumulations overlying limestone formations. The sand deposits are deeper and more extensive than they are at most other locations along this stretch of shoreline.

The most recent survey addresses the historic preservation requirements of SHPD as contained in ~~Hawaii Administrative Rules~~HAR, Title 13, Subtitle 13 (see also Sections 6E-7 and 6E-8, HRS). The survey also addresses the requirements of the City ~~Department of Planning and Permitting~~DPP relating to the land use permits required for the proposed action. Fieldwork was conducted on March 13 and 31, 2004, and on April 1~~-~~ through 3, 2004.



LEGEND

■ ■ ■ ■ Boundary of Oneula Archaeological District

Source: Ewa Development Plan, Exhibit 3.2-Map of Natural, Historic and Scenic Resources in the Ewa Development Plan Area.

FIGURE 6-1
ONEULA ARCHAEOLOGICAL DISTRICT
Kaloi Gulch Drainageway
Improvements at Oneula Beach Park
HASEKO (Ewa), Inc., Ewa, Oahu, Hawaii

0 1600 Feet 3200

R. M. TOWILL CORPORATION June 2005

A backhoe excavated 27 trenches. Despite the intensive search, no human skeletal remains or prehistoric cultural materials were found or identified. The subsurface of the site was found to be greatly disturbed, as evidenced by the presence of large amounts of modern trash in the excavations. This included paper, glass, metal and plastic fragments, bottle glass, rubber tubing, fragments of rope and cloth, aluminum cans, and fragments of wood (recent charcoal and burnt wood). Although a number of pieces of bone were recovered, none of them were human. Most of the bone that was found was machine cut and probably from recent barbeques.

Culturally, the survey found little evidence of prehistoric use in the area of the Kaloi drainage channel. This is probably due to the heavy post-prehistoric use of the shoreline for recreational purposes.

Impacts and Mitigation Measures

None of the surveys that have been conducted, including the most recent excavations in the area that would be disturbed by the proposed project, have identified historically or culturally significant sites or remains. But it is possible that subsurface human remains may be encountered during construction. Work crews will therefore be instructed to stop work in the event of a find and to notify SHPD immediately. HASEKO ~~(Ewa), Inc.,~~ will ensure that archaeological and historic preservation actions are carried out as approved by SHPD.

6.6 TRADITIONAL CULTURAL PRACTICES

6.6.1 Introduction

The purpose of assessing traditional cultural practices is to consider the effect of the proposed project on traditional cultural practices. Information related to this assessment includes data from archaeological investigations, which includes historical documentation on prior uses of the site and kamaaina interviews.

The ‘Ewa area has historically been used for gathering marine resources, especially limu (seaweed). Limu is culturally important to Native Hawaiians, both as a food source and as a medicinal/healing agent.

The proposed drainage channel will not affect either the ability to gather limu or the limu itself. Shoreline access in the project area will be provided both during and after construction. Further, storm flows from the channel are projected to enter the ocean only once in every 10 years, and the discharge is expected to last for only 3 hours. The stormwater discharge plume is anticipated to disperse relatively rapidly after it enters the ocean, or in 12 hours or less. The stormwater plume will thus have little or no opportunity to have contact with marine resources, such as limu (see Section 4.6.3).

6.6.2 Historical Documentation

Historical documentation outlining the use of the region, including the area of the project site, is contained in the Supplemental Archaeological Survey: Subsurface Testing of Beach Areas at Marina Channel and Kaloi Drainage Channel, Ocean Pointe Project, PHRI, 2004 (**Appendix E**).

In brief, the historical documentation shows that pre-contact Honouliuli, or the largest and westernmost ahupua‘a in the ‘Ewa District of Oahu, contained all the resource zones necessary for a full economic existence in Ancient Hawaii: uka (mountain); waena (middle); and kahakai (shoreline). The shoreline in the area contained many important marine resources, including fishponds, shellfish resources, and areas for salt drying.

The first artesian well in Hawaii was drilled in ‘Ewa in 1879. The water obtained from this and other new wells brought large-scale agricultural operations to the ‘Ewa Plain. One of these operations was the ‘Ewa Plantation, which in the early ~~Twentieth Century~~twentieth century was said to be the "richest sugar plantation in the world."

Sugar operations continued in the ‘Ewa Area until the 1990s. Other agricultural activities in ‘Ewa have included cattle ranching, taro farming, sisal production and the harvesting of marine resources.

The U.S. Navy acquired land from ~~the~~ Campbell Estate in 1939 and 1940 and constructed the first military installation in Honouliuli. This facility, which came to be known as the Barbers Point Naval Air Station, closed in the late 1990s. Today, land uses in the ‘Ewa Region include those necessary to support residential communities, governmental offices, and commercial and recreational uses. The proposed project, which will be developed within the area of the existing temporary emergency drainage ~~outlet~~channel, will be located near to the shoreline but not require alteration of the immediate shoreline or nearshore waters.

6.6.3 Kamaaina Interviews with Kupuna

Native Hawaiians and others use the ‘Ewa Shoreline and nearshore areas for gathering marine resources such as limu, fish, lobster, and other shellfish. Oral histories associated with the use of the Honouliuli-Puuloa area were conducted by Kepa Maly in May 1997, in order to record the cultural use of and sites associated with the area as part of the Archaeological Preservation Plan for the Ocean Pointe Project (**Appendix F**). Interview sessions were conducted as input to development of the site preservation plan. These interviews are summarized in **Appendix F**. Oral interviews with Ms. Arline Wainaha Pu’ulei Brede-Eaton, Miss Thelma Genevieve Parish, and Mr. Henry Chang Wo were conducted. They show that cultural practices in the area include the longtime use and harvesting of marine resources by Native Hawaiians and non-Hawaiians. These resources include limu, fish, lobster and other shellfish. In addition, further efforts to coordinate the perpetuation of traditional skills and culture involving coastal and nearshore uses, including the preservation of limu through the “Limu Project”, have been suggested by HASEKO through the recommendation that Kupuna provide further input through the Campbell High School Project, “Voices of the ‘Ewa Plains.” Kupuna

suggested for video interviews by Mr. Henry Chang Wo include: Ms. Arline Eaton, Mr. Walter Kamanaa, Ms. Helen Kamanaa, Ms. Mary Serrao, and Mr. Henry Chang Wo.

On July 27, 2004, a second interview by R. M. Towill Corporation, was held with Ms. Arline Eaton and Mr. Henry Chang Wo to further document historical and anecdotal information concerning prior cultural uses along the 'Ewa coastline in the area of the proposed project. This interview session is provided in **Appendix F**.

Impacts and Mitigation Measures

The proposed project involves the construction of improvements to the existing ocean outlet located above and mauka of the shoreline. The potential impacts associated with construction activities include: ~~–~~(1) temporary loss of access along the shoreline for purposes of gathering and harvesting marine resources; ~~and~~ (2) temporary loss of access to archaeological sites that lie outside or mauka of the project site; and (3) impacts to marine resources associated with operation of the drainage outlet when there could be stormflows to the ocean.

The proposed project will not result in a loss of shoreline access. Construction associated activities may involve work on an existing berm, which is located above the shoreline and other locations mauka within the Kaloi drainageway. No negative adverse impacts to access are therefore anticipated. Access related mitigation measures are not recommended because access to area shoreline resources will not be affected~~;~~.

The proposed project will not result in a loss of access to archaeological sites that lie outside or mauka of the project site. Roadway access to Oneula Beach Park will be maintained at all times during construction of the proposed improvements. Portions of the park through which the channel will pass will be cordoned off during some phases of work to allow heavy construction vehicles

and equipment to operate without endangering the public. Parking is expected to remain unaffected and no major park improvements are located within the affected area, e.g., they are lightly used.

Impacts to marine resources, including limu, are similarly not anticipated or expected as a consequence of the proposed drainage improvement project. This is due to the infrequent period in which stormwater discharges are expected. Projections are for a discharge at the frequency of the 1 in 10 year storm. This indicates that, for the majority of time, the ocean outlet will not be operating. Therefore, there will be no impacts associated with the ocean outlet.

Further, it is expected that when discharges do occur, they will be of stormwater treated through the use of upland detention basins, ponds, and grass-lined drainage swales, which will constitute an improvement of water quality over existing conditions. Negative adverse impacts to marine resources as a result of the proposed action are not anticipated.

CHAPTER 7
LAND USE PLANS, POLICIES, AND CONTROLS

This chapter summarizes the project's consistency with the land use plans, policies, and controls of the Federal Government, the State ~~of Hawaii~~, and the City ~~and County of Honolulu~~.

7.1 FEDERAL GOVERNMENT

Federal policy controls regulating development of the proposed project include the Clean Water Act of 1972 (CWA) and regulations of the Federal Emergency Management Agency (FEMA). CWA regulations are delegated primarily to the Department of the Army, Corps of Engineers (COE), and State Department of Health (DOH).

~~7.1.1 DEPARTMENT OF THE ARMY, COE~~

7.1.1 Department of the Army, COE

The COE's Honolulu District is responsible for regulating development activities in Hawaii waters, including ocean, coastal, and inland waters. Regulations that the COE administers through the Department of the Army permitting process include:

- CWA, Section 404, which regulates the discharge of dredge or fill material to waters of the United States;
- Title 10 of the Rivers and Harbors Act of 1899, which regulates the obstruction or alteration of navigable waters of the U.S.; and
- Marine Protection, Research, and Sanctuaries Act, Section 103, which governs the transportation of dredge material to an ocean disposal site.

On July 12, 2004, the Department of the Army, Regulatory Branch, issued a letter concerning the proposed project to the ~~Department of Planning and Permitting~~DPP (see Chapter 12, Comments and Responses to the EIS Preparation Notice). The letter stated

that the Department of the Army does not have jurisdiction over the subject project because the proposed action will involve work that is limited to the dry areas of the Kaloi Gulch Drainageway and will not require a surface water connection to the Pacific Ocean. (See also Chapter 8, Necessary Permits and Approvals.)

~~7.1.2 FEDERAL EMERGENCY MANAGEMENT AGENCY~~7.1.2 Federal Emergency Management Agency (FEMA)

The Federal Emergency Management Agency manages the National Flood Insurance Program. FEMA's responsibilities include designating flood zones that are used to guide development to ensure ~~pubic~~public safety from flooding. Habitable structures are discouraged from being located in flood prone areas, and FEMA policy states that new developments or construction must not increase the level or elevation of the floodway.

The proposed project will be designed to comply with FEMA requirements. The existing ground elevation at the site of the proposed channel improvements is approximately at the base flood elevation. The proposed drainage channel will have the capacity to handle a 100-year flood flow. No habitable structures are proposed to be constructed.

7.2 STATE OF HAWAII

~~Laws~~State laws and plans ~~of the State of Hawaii~~ that are relevant to the project include the State Land Use Law, the Hawaii State Plan, the State Functional Plans, and Guidelines for the Special Management Area.

7.2.1 State Land Use Law

~~The entirety~~Most of the project site is located within the State Land Use Urban District. The proposed use is permitted in the Urban District. A small portion of the project may involve work located seaward of the certified shoreline, which would be within the State Land Use Conservation District.

7.2.2 Hawaii State Plan

The Hawaii State Plan (Chapter 226, Hawaii Revised Statutes) sets forth long-range goals, objectives, policies and priority guidelines for the improvement and development of the State. The overall goal is to achieve a strong and viable economy and a desirable environment capable of promoting the physical, social, and economic well-being of the general population. The proposed project is consistent with the following objectives and policies of the Hawaii State Plan:

> *Section 226-6, HRS, Objectives and polices for the economy – in general:*
>
> *(a) Planning for the State's economy in general shall be directed toward achievement of the following objectives:*
>
> *(1) Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawaii's people.*
>
> *(b) To achieve the general economic objectives, it shall be the policy of the State to:*
>
> *(6) Strive to achieve a sustained level of construction activity responsive to, and consistent with, state growth objectives.*
>
> *(14) Promote and protect intangible resources in Hawaii, such as scenic beauty and the aloha spirit, which are vital to a healthy economy.*

The proposed project will promote employment through the provision of construction-related jobs. While construction job opportunities will be limited and temporary, the project will address the City's current ~~City and County of Honolulu's~~ requirement for sufficient regional drainage capacity. This in turn will create the opportunity for an increase in sustainable growth that is consistent with the State's growth objectives.

The proposed project will protect Hawaii's coastal and nearshore resources through the responsible development of regional drainage infrastructure, which will promote ~~an~~ overall improvement of existing conditions. These resources are directly related to the maintenance of the environment and contribute to Hawaii's aesthetic and scenic beauty.

Section 226-12, HRS, Objectives and policies for the physical environment – Scenic, natural beauty, and historic resources.

(a) Planning for the State's physical environmental shall be directed towards achievement of the objective of enhancement of Hawaii's scenic assets, natural beauty, and multicultural/historic resources.

(b) To achieve the scenic, natural beauty, and historic resources objective, it shall be the policy of this State to:

(1) Promote the preservation and restoration of significant natural and historic resources.

(3) Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes, and other natural features.

(5) Encourage the design of developments and activities that complement the natural beauty of the islands.

The proposed drainage improvement project has been designed to function as part of a larger regional drainage system that incorporates the use of natural vegetation and green open space to promote the detention of storm-water. The use of this design will facilitate the maintenance of Hawaii's scenic and natural beauty.

Archaeological and cultural resources within the project area were investigated and examined through the conduct of archaeological studies and interviews of selected Kupuna with knowledge of the project site. No negative adverse impacts to archaeological resources are anticipated as there were no significant findings in the area of the project. The Kupuna interviews indicated that the area was once known to be used for the gathering of limu, fish, lobster, and other shellfish. The proposed project is not anticipated to adversely affect these resources because: (1) access to the shoreline will be maintained both during and following construction; (2) the proposed drainageway is expected to be used infrequently, or only during a storm that occurs

once in every 10 years; and (3) the discharge from the drainage channel into the ocean will last for only a brief period of time.

Section 226-14, HRS, Objectives and policies for facility systems – in general.

(a) Planning for the State's facility systems in general shall be directed towards achievement of the objective of water, transportation, waste disposal, and energy and telecommunication systems that support statewide social, economic, and physical objectives.

(b) To achieve the general facility systems objective, it shall be the policy of this State to:

(1) Accommodate the needs of Hawaii's people through coordination of facility systems and capital improvement priorities in consonance with state and county plans.

(2) Encourage flexibility in the design and development of facility systems to promote prudent use of resources and accommodate changing public demands and priorities.

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

HASEKO is constructing the proposed project to comply with a requirement of the City ~~Department of Planning and Permitting~~DPP to provide sufficient capacity to handle regional stormwater discharges. The project, which is a coordinated effort to address the drainage needs of upland landowners, will also protect the health and safety of the general public.

Section 226-15, HRS, Objectives and policies for facility systems – solid and liquid wastes.

(a) Planning for the State's facility systems with regard to solid and liquid wastes shall be directed towards the achievement of the following objectives.

(1) Maintenance of basic public health and sanitation standards relating to treatment and disposal of solid and liquid wastes.

(2) Provision of adequate sewer facilities for physical and economic activities that alleviate problems in housing, employment, mobility and other areas.

(b) To achieve solid and liquid waste objectives, it shall be the policy of this State to:

(1) Encourage the adequate development of sewer systems that complement planned growth.

~~The proposed project has been designed to avoid the need to reconfigure the existing Honouliuli Wastewater Treatment Plant Sewer Outfall. The reconfiguration~~The proposed project is an alternative to lowering the Honouliuli sewer outfall pipe in order to provide a storm drainage ocean outlet for the Kaloi Gulch drainage basin. Alternatives are being explored because of the ~~outfall was determined to be an unacceptable risk due to the~~ potential ~~for~~ risks of adverse environmental and construction impacts associated with relocation of the outfall, including odor, complications involving the need to maintain outfall operations during construction, and the possibility of sewage spills. ~~In addition, modifying the sewer outfall could require the premature expansion of the outfall if the reconfiguration of the sewer main led to a reduction in capacity.~~

Solid waste generated as a result of construction activities will be disposed of at a refuse facility approved by the City. If feasible, some of the construction debris will be directed to the HPOWER Energy Recovery Facility at the Campbell Industrial Park.

7.2.3 State Functional Plans

The Hawaii State Plan (Sections 226-52 and 226-56, HRS) requires that the statewide planning system include the preparation of State Functional Plans. The State Functional Plans must further define and implement statewide goals, objectives, policies, and priority guidelines contained within the Hawaii State Plan. Functional Plans are required to be prepared in the areas of agriculture, conservation lands, education, energy, higher

education, health, historic preservation, housing, recreation, tourism, and transportation.

The proposed project is consistent with the following Functional Plan:

> *Historic Preservation Functional Plan*
> *Objective B: Protection of Historic Properties*
> *Policy B.1.: Provide timely historic property reviews which are integrated effectively into the land use regulatory system.*

The project site's historic resources have been evaluated through an archaeological survey that has been evaluated by the State Historic Preservation Division. The survey did not find or identify any human skeletal remains or prehistoric cultural materials (see Section 6.5). The results of the evaluation will serve as guidance should an archaeological monitoring plan be required for work during the construction phase.

~~7.2.4 SPECIAL MANAGEMENT AREA GUIDELINES~~

7.2.4 Special Management Area Guidelines

Special Management Area (SMA) guidelines are contained within Chapter 205A, HRS, and Chapter 25, Revised Ordinances of Honolulu. The guidelines are used to evaluate projects located within the SMA, which includes lands located along the shoreline. ~~A portion~~Most of the project ~~may be~~is located within the SMA. The project's relationship to the SMA guidelines includes the following:

> *(1) Access to Public Beaches, Recreational Areas and Natural Reserves*
> Access to public beaches and recreational areas will not be adversely affected by the proposed project. During construction, access to Oneula Beach Park will be maintained through use of a temporary detour road available for use by the general public. Following construction, the access road and connection with Papipi Road will be restored. Pedestrian access to the shoreline will be available both during and after construction.

(2) Location of Public Recreational Areas and Preserves

A portion of the Oneula Beach Park that involves the area of the existing Kaloi Gulch Drainageway will be modified by the proposed project. But the project will not adversely impact access to and the use of park facilities.

Construction activities will involve use of machinery and equipment for grading and earthwork and to modify the existing park access road. Mitigation measures to ensure that construction activities will not cause adverse impacts are described in Section 5.9, Parks and Recreation. The potential for construction-related impacts is not anticipated to be significant and will be temporary in nature. Oneula Beach Park will continue to operate as a public beach park facility both during and after construction activities.

The project is not anticipated or expected to affect any other beach parks or preserves.

(3) Provisions for Liquid and Solid Waste Disposal

The project will only generate liquid and solid wastes during construction activities. The handling of construction-related demolition materials and waste will be done in accordance with applicable regulations of the State of Hawaii and City and County of Honolulu. No adverse impacts are anticipated or expected.

(4) Alterations to Existing Land Forms, Vegetation, Effects on Water Resources, Scenic and Recreational Amenities, Flood Danger, Landslides and Erosion

Existing landforms within the Kaloi Drainage Channel will need to be altered in order to construct the drainage improvements. Approximately 20,000 cubic yards7,110 cy of soil and sandy material will need to be removed during project construction, whichand 7,873 cy of fill will be needed for the channel banks. This may result in the generation of fugitive dust and the release of sediment in storm water runoff into coastal waters during construction. Dust impacts will be

addressed by spraying water from a stationary source or tanker truck on an as-needed basis. Impacts from storm-water runoff will be mitigated through the use of ~~Best Management Practices~~BMPs as required by law. The alterations made by the project to existing land forms are thus not expected to have any long-term negative impacts or effects on coastal waters, ecosystems or other coastal resources.

The proposed grades of the drainage channel will range in height from ~~8~~banks that are 10 feet above mean sea level ~~at grade level~~ to a bottom that is 4 feet msl~~, and~~. The maximum grade difference will be approximately ~~4~~8 feet~~ deep at its deepest point. It will appear as a gentle swale or hill that gently slopes down,~~. The grades will be gradual and will not affect coastal views. The project will therefore not alter the current scenic resources of Oneula Beach Park (see Section 4.8).

The project will not negatively impact area vegetation. Almost all of the vegetation at the project site is composed of introduced or alien species. None of the plants observed on the project site is a threatened or endangered species or a species of concern. Vegetative controls such as the use of grass along either the mauka and/or makai side of the existing park access road will be used to promote soil stabilization. Further, native and endemic vegetation will be considered for groundcover (see Section 4.11).

The proposed project will not affect the potable water supply except during the construction phase, when work crews will use potable water for drinking purposes. There will be no effects on non-potable water resources because there are no non-potable wells located at the project site. Non-potable water from the Ocean Pointe Project may be used for dust control and to irrigate planted vegetation (see Sections 5.3 and 5.4).

The project site is within FEMA's Flood Insurance Rate Map Flood Zones A and AE. The flood hazards in Zones A and AE are associated with rising seas during a tsunami and not with storm-water runoff. The project is not anticipated to have any negative impacts on flood dangers in the area. The project will provide the capacity to handle a 100-year flood flow and will not include any habitable structures (see Section 4.7.1).

The project will not cause any landslides or other erosion hazards.

(5) Adverse Environmental or Ecological Effects and Elimination of Planning Options

This EIS discusses the potential for adverse environmental or ecological impacts associated with the proposed project. Mitigation measures are proposed as appropriate to minimize or mitigate the potential for negative effects (see Section 2.2). Coastal resources are not expected to be adversely affected (see Section 4.6), and the project will not eliminate reasonable planning options. The project will address the City's current ~~City~~ requirement for sufficient regional drainage capacity and therefore support existing public policies to protect ~~the~~ public safety and welfare.

(6) Consistency with the General Plan and Zoning

The project is consistent with the General Plan of the City ~~and County of Honolulu~~ (see Section 7.3.1). The project site is located within the P-2 General Preservation Zoning District. The proposed action is consistent with the intent of the P-2 District and with provisions of the City's Land Use Ordinance governing development within Flood Hazard Districts (see Section 7.3.3).

(7) Dredging, Filling, and Other Alterations

Alteration of land forms at the project site will be required to construct the proposed drainage channel (see (4) above). No adverse impacts to the coastal zone or SMA are anticipated.

(8) Reduction of Beaches or Other Recreational Areas

The proposed project will require use of a portion of the existing Kaloi Gulch Drainageway located within Oneula Beach Park. The project site is already used for ocean-related recreational purposes. After construction, the site will still be available for public recreation the vast majority of the time. The only time the site will not be usable would be during the project design storm, which is expected to occur only once every 10 years.

The proposed drainageway is not anticipated to reduce the beach or other recreational areas. The existing beach will not be subject to construction activity, and shoreline access will be maintained both during and after project construction. The park area will be restored after the drainage improvements project has been completed. Landscaping and planting of grass within the drainageway will help to improve the scenic quality of the surrounding area (see Section 2.2).

(9) Access to Tidal and Submerged Lands

No adverse access to tidal and submerged lands will result from this project. Construction activities will not occur on the existing beach.

(10) Line of Sight Towards the Sea from the Coastal Highway

The project does not include any structures and therefore will not impact coastal views toward the sea from the coastal highway (see Section 4.8).

(11) Effects on Water Quality, Fishing Grounds, Wildlife Habitat and Agricultural Lands

No negative effects on water quality are anticipated. The project will be constructed in accordance with City policies and plans for the improvement of drainage through use of natural and man-made vegetative controls (see Section 4.6).

Fishing grounds are not expected to be affected. The proposed use of natural and man-made vegetative drainage controls is expected to improve existing conditions. Existing conditions include bare patches of ground within the existing drainageway that are subject to erosion (and runoff of sediments) during large storm events.

Wildlife habitat is similarly not expected to be affected by the project due to prior surveys that noted an absence of threatened, rare, or endangered species and their associated habitats (see Section 4.12).

There are no agricultural lands that will be affected by the proposed project. The project site is located entirely within the P-2 General Preservation Zoning District and is surrounded by urban land uses (see Section 7.3.3).

7.3 CITY AND COUNTY OF HONOLULU

~~Land~~City land use policies and controls ~~of the City and County of Honolulu that are~~ relevant to the project include the City's General Plan, the ‘Ewa Development Plan, and the Land Use Ordinance.

7.3.1 General Plan

The City's General Plan is intended to be a dynamic document that expresses the aspirations of the people of Oahu. It sets forth the long-range objectives and policies for the general welfare and, together with the City Charter, provides a direction and framework to guide the programs and activities of the City and County of Honolulu. As will be seen below, the project is consistent with General Plan objectives and policies that relate to the Natural Environment, Public Safety, and Physical Development and Urban Design.

III. Natural Environment

Objective A: To protect and preserve the natural environment.

Policy 1: Protect Oahu's natural environment, especially the shoreline, valleys, and ridges, from incompatible development.

Policy 4: Require development projects to give due consideration to natural features such as slope, flood and erosion hazards, water-recharge areas, distinctive land forms, and existing vegetation.

Policy 6: Design surface drainage and flood-control systems in a manner which will help preserve their natural settings.

The project integrates and promotes the use of terrain features to provide drainage control by using grass-lined swales and detention basins. These features are designed to promote a more natural setting than the use of concrete channels to convey stormflows.

VIII. Public Safety

Objective B: To protect the people of Oahu and their property against natural disasters and other emergencies, traffic and fire hazards, and unsafe conditions.

Policy 2: Require all developments in areas subject to floods and tsunamis to be located and constructed in a manner that will not create any health or safety hazard.

Policy 3: Participate with State and Federal agencies in the funding and construction of flood-control projects.

The project will protect public safety, and public and private property, by conveying regional storm-waters to the ocean in a safe manner. The project will be constructed in accordance with safe engineering practices and designed to operate in a way that is consistent with its location within an existing public park. No structures are proposed, and the project site will be clearly marked with signage stating that the area is a drainageway. The project will be privately funded. ~~But~~However, extensive coordination with and review of the project by governmental agencies has been and will continue to be done throughout the planning, permitting, and construction processes.

VII. Physical Development and Urban Design

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

Policy 2: Coordinate the location and timing of new development with the availability of adequate water supply, sewage treatment, drainage, transportation, and public safety facilities.

The proposed project involves constructing improvements to an existing drainage facility to improve its capacity for handling stormwater runoff. The timing of the project is designed to meet the City's current ~~City~~ requirement for drainage capacity in the region. The project will provide a solution to regional drainage issues and enable the ~~development of Ocean Pointe and projects upstream of Ocean Pointe~~developments within the Kaloi Gulch drainage basin to proceed in an orderly fashion.

Project costs will be directly borne by HASEKO. ~~But~~However, the project will also benefit all upland landowners and the region in general by providing sufficient drainage capacity in accordance with ~~the~~ current City requirements.

7.3.2 'Ewa Development Plan

The project site is located within the 'Ewa Development Plan (DP) of the City and County of Honolulu. Together with the General Plan, the 'Ewa DP is intended to guide population and land use growth over a time span of more than 20 years. The 'Ewa DP provides policies and principles for drainage systems that are intended to guide planning and construction in the 'Ewa DP Area. General Policies for Drainage in the 'Ewa Development Plan ~~include~~includes the following:

Public Facilities for Infrastructure Policies and Principles

Section 4.6.1, Drainage Systems--General Policies

Drainage system design should emphasize control and minimization of non-point source pollution and the retention and/or detention of storm water on-site and in

appropriate open space and wetland areas.

Storm water should be viewed as a potential irregular source of water for recharge of the aquifer which should be retained for absorption rather than quickly moved to coastal waters.

Natural and man-made vegetated drainageways and retention basins should be the preferred solution to drainage problems wherever they could promote water recharge, help control non-point source pollutants, and provide passive recreation benefits.

Planning Principles

Planning principles to guide the development of 'Ewa drainage systems include:

- ***Retention and Detention**. Public and private agencies should employ methods of retaining or detaining storm water for gradual release into the ground as the preferred strategy for management of storm water. Where feasible, any open space, including parking lots, landscaped areas, mini and community parks, and public and private golf courses should be used to detain or infiltrate storm water flows to reduce their volume and runoff rates and the amounts of sediments and pollutants transported.*
- ***Relation to the Regional Open Space Network**. To the extent possible, the developers should integrate planned improvements to the drainage system into the regional open space network by emphasizing the use of retention basins, creation of passive recreational areas, and recreational access for pedestrians and bicycles.*
- *Natural gulches on the slopes of the Waianae Range foothills which are within the Urban Growth Boundary should be preserved as part of the open space network.*

The proposed project will conform to the 'Ewa DP by incorporating the following measures:

- ~~Natural and man-made vegetated drainageways have been incorporated into the design of the project.~~ The ~~function of the vegetated~~proposed drainageway ~~(grass-lined swale)~~ is designed to promote filtration of runoff, reduce flow velocity, and recharge groundwater resources through the use of natural materials.

- The design of the project within the Oneula Beach Park is consistent with the recreational and open space character of the area. No structures are proposed. The project site will remain in open space and continue to be available for ocean-based recreational uses. The only time the project area will not be available for recreational purposes would be during a design storm, which is forecasted to occur only once in every 10 years. The project will enhance the site's recreational and open space character through the addition of landscaping, which will improve the aesthetics of the Beach Park and existing drainageway.

Section 4.6.2, Planning Principles

The following principles apply specifically to development within the Kaloi Gulch drainage basin.

- ***Key Role of 'Ewa Marina**. The City supports timely development of the 'Ewa Marina as a key element needed to mitigate drainage impacts in the Kaloi Gulch watershed during major storms. The marina's role as a storm water storage and detention basin has been acknowledged and included in previously approved environmental impact statements and land use approvals for projects in the Kaloi Gulch watershed.*

The proposed project is ~~a modification of~~ an alternative to an earlier proposal which used the marina as the sole point of discharge for storm flows associated with the Kaloi Gulch Watershed. ~~The modification resulted from~~ This alternative is being explored due to environmental concerns related to the lowering of the Honouliuli Wastewater Treatment ~~Plan~~Plant Sewer Outfall. Drainage from the west side of the Kaloi Drainage

Channel will continue to flow across the Ocean Pointe Project into the marina. The proposed drainage channel will accommodate flows on the east side of the Honouliuli Sewer Outfall. This project is also proposed to comply with current City requirements to provide sufficient drainage for the region and address the need to properly handle and treat stormwater runoff.

7.3.3 ~~ZONING~~Zoning

The entirety of the project site is within the P-2 General Preservation Zoning District of the City~~ and County of Honolulu~~. Section 21-3.40 of the Land Use Ordinance (LUO) states that the purpose of the Preservation Districts is to preserve and manage major open space and recreational lands and lands of scenic and other resource value.

As was noted in the discussion on flood zones (see Section 4.7.1), the site is within Flood Zones A and AE of the ~~Federal Emergency Management Agency's~~FEMA's Flood Insurance Rate Map. These flood zones are designated as special flood hazard areas with base flood elevations of 6 to 8 feet. Section 21-9.10-4(d) and (f) of the LUO states that developments within the Flood Hazard Districts shall:

> Be consistent with the need to minimize damage by the regulatory flood to the best available technological and practical design and construction.
>
> Provide drainage to minimize damage by the regulatory flood in accordance with the storm drainage standards of the [D]epartment [of Planning and Permitting].

The project is consistent with the P-2 General Preservation District and LUO requirements relating to Flood Hazard Districts. The project area is within the existing Oneula Beach Park, which is a permitted use in the P-2 District as a "public use and structure," and will be kept in open space and available for recreational uses the vast majority of the time. The proposed project will not affect the short- or long-term use of the site for recreational purposes. The drainage channel will discharge storm flows into the ocean approximately once in every 10 years, which is the only time the project

would not be available for public recreational uses. These flows are also anticipated to be of brief duration. Further, the project will: provide drainage to minimize damage from the regulatory flood; be constructed in accordance with the best available technological and practical design and construction; and comply with the storm drainage standards of the Department of Planning and Permitting in order to address regional drainage issues.

CHAPTER 8

~~NECESSARY~~ PERMITS AND APPROVALS THAT MAY BE REQUIRED

This chapter discusses the permits and approvals that may be required for the proposed project.

8.1 FEDERAL

A U.S. Army Corps of Engineers, Department of the Army Permit (Section 404), was previously approved for the Ocean Pointe Marina and upper marina basin in the area of the proposed project. The COE was subsequently consulted for the subject proposal and rendered a letter determination on July 12, 2004 that stated, in part, the following:

> "...if the proposed development at this location is confined to the seasonally dry areas of the Kaloi Gulch Drainageway, the activity would be outside the limit of our [Corps of Engineers] jurisdiction. Consequently, a Department of the Army (DA) permit would not be required. However, if the proposed construction would result in the discharge of dredged or fill material into the adjacent waters of the Pacific Ocean, or be modified to include and [sic] surface water connection to the Pacific Ocean, consultation should take place with our office to determine whether a DA permit may be required."

The proposed project will be limited to the dry areas of the Kaloi Gulch Drainageway and will not require a surface water connection to the Pacific Ocean. Therefore, a Department of the Army permit will not be required for the subject project.

8.2 STATE OF HAWAII

Permits and/or approvals that the project may need to obtain from agencies of the State ~~of Hawaii~~ include the following:

- *Conservation District Use Permit (CDUP); Department of Land and Natural Resources (DLNR).* A portion of the proposed project may involve work located seaward of the certified shoreline as delineated by the State Survey Office. This area is located within the State Land Use Conservation District and therefore is under DLNR's jurisdiction. HASEKO will file an application for a CDUP with DLNR.

- *Land Disposition to dredge submerged lands; DLNR*. A portion of the proposed project may involve the excavation of material located makai of the certified shoreline on lands owned by the State and under the jurisdiction of DLNR. A land disposition under Chapter 171, HRS, would have to be obtained prior to the dredging of the affected area.

- *National Pollutant Discharge Elimination System (NPDES), Notice of Intent (NOI) Form C, Discharges of Stormwater Associated with Construction Activity; Department of Health.* The proposed action involves construction activity in an area that is greater than 1 acre, which triggers the requirement for an application for this permit.

- *NPDES, Municipal Separate Storm Sewer System (MS4) Permit; DOH.* The ~~modification of the existing~~ drainageway will require the filing of an application for this permit.

8.3 CITY AND COUNTY OF HONOLULU

- *Special Management Area Use Permit; Department of Planning and Permitting (DPP).* The proposed project will be located within the Special Management Area, which requires filing an application for a Special Management Area Use Permit with the City ~~*and County of Honolulu*~~.

- *Shoreline Setback Variance; DPP.* The proposed project may be located within the 40-foot Shoreline Setback, which will require the filing of an application for a Shoreline Setback Variance with the City.

- ~~*Land disposition by the*~~ *Authorization from the City and County of Honolulu for use of a portion of Oneula Beach Park for the regional drainage channel for Kaloi Gulch Watershed.*~~–~~ This approval may be acquired from the Department of Parks and Recreation or ~~*an*~~other department of the City ~~*and County of Honolulu*~~ for the non-exclusive use of ~~*3.7 acres for*~~City-owned land within the regional drainage channel.

- *Grading Permit; DPP.* The proposed project will require a grading permit.

8.4 OTHER APPROVALS

Construction related building ~~and grading~~ permits will be required for the subject action. Applications for these ministerial permits will be filed at the appropriate time with the relevant ~~City~~ agencies.

CHAPTER 9

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES AND THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

9.1 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The proposed project will require the irreversible and irretrievable commitment of resources, including: construction materials; capital; manpower; and the energy needed to plan, construct, operate, and maintain the proposed drainage improvement facility.

The proposed project will require the use of construction materials, including fill, asphalt, road-related safety equipment (signage and related appurtenances), and landscaping materials such as grass seedling and plants. The use of these materials for the project will limit use of these resources for other purposes. The capital expenditure for this project is estimated to be approximately $~~500,000.~~1.5 Million. The expenditure of this amount, while irretrievable, will be for the purpose of meeting the City drainage standard for the region.

Implementation of the project will not result in the significant loss of natural or cultural resources. The site is not a significant wildlife habitat, nor are any Federal- or State-listed endangered species known to inhabit the project site. There are known archaeological or historic sites in the vicinity, but outside of the project boundary. The mitigation measures as proposed in this FEIS are intended to protect those sites against any negative adverse impacts. Cultural resources, including limu, and the use of Oneula Beach Park for recreational purposes will also not be adversely impacted. Limu is not anticipated to be affected due to the limited scope and scale of the project as well as the expected infrequency of discharges from the drainage outlet.

After construction activities are completed, it is expected that the site will continue to remain as an open space resource within the park. The practice of integrating a drainageway feature with park uses has been successfully applied at other park facilities, including the Mililani Mauka Municipal Park on Oahu and the Hilo Municipal Park on the Big Island. Because of the infrequency of stormwater overflowing into the drainageway channel, the area will continue to be used as a park recreational area suitable for passive recreational activities that now occur at Oneula Beach Park.

The long-term use of the site as a drainage channel will preclude development of the site for residential or other related urban purposes. But the proposed use will be consistent with the site's existing use as a drainageway and will not preclude use of the site for park recreational purposes.

9.2 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The long-term use of the site will support and enhance the future long-term regional development and use of the area by providing for the safe and effective handling and transmission of stormwater associated with the 100-year flood flow. Further, no reasonable land uses will be curtailed ~~since~~ as the ~~current use of the site is for an existing~~ drainageway~~.~~ will be designed to accommodate recreational uses consistent with the remainder of Oneula Beach Park, and also since a portion of the site is currently used as a temporary emergency drainage channel.

CHAPTER 10
SIGNIFICANCE CRITERIA

In accordance with the content requirements of Chapter 343, Hawai-i Revised Statutes, and the significance criteria set forth in Section 11-200 of Title 11, Chapter 200, Hawai-i Administrative Rules, it is anticipated that this project will have no significant negative environmental impacts. All anticipated potential impacts will be addressed through the use of mitigation measures and practices as set forth in this Final Environmental Impact Statement.

Criteria 1 - Involves an irrevocable commitment to loss or destruction of any natural or cultural resources;

Surveys of flora, fauna, archaeological and historic sites at and near the project area were conducted. The terrestrial flora and faunal studies identified no rare, threatened, endangered, or otherwise important species. The small amount of work that will be done in the back beach area does not have the potential to affect turtles, seals, or other marine mammals. No work will be done in the ocean that might disturb marine organisms. Water quality modeling of the infrequent discharge following construction from the outlet indicates that the effects on water quality would be both small and ephemeral.

Studies to assess archaeological and cultural resources associated with the area indicate that no cultural resources are present that would be lost or destroyed by the proposed action. In accordance with the plan approved by the State Historic Preservation Division, HASEKO will provide appropriate archaeological monitoring during construction in case any human remains or significant cultural resources are inadvertently discovered.

Criteria 2 - ~~curtails~~Curtails the range of beneficial uses of the environment;

The proposed project site is located on land within the existing Oneula Beach Park property, which is owned by the City~~ and County of Honolulu~~. The site is within a low-lying, undeveloped portion of the park that contains introduced vegetation. No park facilities are currently within the area that will be altered in order to construct the drainage improvements. The project's design will allow the area to be used for passive recreational purposes that are consistent with the vision for the area outlined in the Oneula Beach Park Master Plan. The potential for negative adverse environmental impacts will be addressed through adherence to the mitigation measures and practices described in this document.

Criteria 3 - Conflicts with the State's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS;

The proposed project is consistent with applicable land use policies and controls of the Federal Government, the State ~~of Hawai'i,~~ and the City~~ and County of Honolulu~~. The project is also consistent with the State's long-term environmental policies and goals as expressed in Chapter 344, ~~*Hawai'i Revised Statutes*~~HRS and elsewhere in State law (see Section 7.2).

Criteria 4 - Substantially affects the economic or social welfare of the community or state;

The proposed project will have a beneficial effect on the economic and social welfare of the 'Ewa region by accommodating stormwater runoff that exceeds the capacity of upstream stormwater retention facilities. Construction of the project will generate some short-term economic benefits by creating construction jobs and material procurement.

Criteria 5 - Substantially affects the public health;

Construction activities will not adversely affect air or water quality. Neither will they generate solid waste or produce other emissions that will have a significant adverse effect on public health. Construction activity will increase ambient noise levels in the park but will not exceed regulatory limits of the State Department of Health.

Maintenance and operation of the drainageway does not have the potential to affect public health over the long term. It will not produce emissions of any sort~~, and the golf course operator or other entity designated by HASEKO will be responsible for ensuring that the area is properly maintained over the long term~~. Factors affecting public health, including air quality, water quality, noise levels, and other items were assessed and are addressed through the application of appropriate mitigation measures and practices. Mitigation measures and practices are planned for the design, construction and operation of the proposed project to avoid potential for negative adverse impacts to public health and the safety of the community.

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

Development of the project will not result in substantial secondary or cumulative impacts to the natural or built environment or to the social and economic community. The proposed project will not cause unexpected changes in area population. The proposed project will result in dual use (recreation and stormwater overflow) for a portion of an existing public facility. The two uses are compatible due to the infrequent nature of the discharge and the maintenance that will be performed ~~by the golf course operator or other entity designated by~~

~~HASEKO~~(See Criteria 5, above).

Criteria 7 - Involves a substantial degradation of environmental quality;

An assessment of air and water quality, noise levels, and land uses associated with the construction of the proposed project has determined that the environmental quality of the area will not be substantially degraded.

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

The project is designed to meet existing and anticipated future needs within the ‘Ewa Region and will not result in cumulative effects upon the environment nor involve a commitment for larger actions.

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

The proposed action will not have a substantial adverse effect on species that are listed as rare, threatened, or endangered by the State or Federal governments.

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

Short-term impacts to air quality and ambient noise levels will result from construction activities. But the potential for negative adverse impacts is anticipated to be minimal, and any impacts that do occur will cease when construction has ended. Due to the specific care taken in the project's design (including mitigation measures and practices), no detrimental long-term effects

to the environment are expected from development of the proposed project.

Criteria 11 - Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters;

The project is designed to accommodate stormwater runoff from the Kaloi Watershed that exceeds the capacity of upstream retention basins. The project will be designed in accordance with safe engineering practices. While it is located within a flood zone, the types of improvements proposed are not subject to substantial damage from coastal flooding. The project site is not in an erosion-prone area and does not involve habitable structures. Appropriate signage will be prepared and posted to warn the public about potential safety hazards and the alternative emergency exit road.

Criteria 12 - Substantially affects scenic vistas and view planes identified in County or State plans or studies; and,

The proposed project will not adversely impact any scenic vista or view plane. There will be equipment and personnel at the site during construction, but any visual impacts associated with construction will be temporary. After the work has been completed, all equipment and personnel associated with construction will be removed. Once grading is completed, the area will be returned to its current state and/or revegetated with grass and other landscape treatments.

Criteria 13 - Requires substantial energy consumption.

Construction activities associated with the project will require the use of energy during grading, site work, and the planting of landscaping. The energy resources that will be used (i.e., petroleum) will not be recoverable. But the use of these energy resources is not expected to be substantial given the limited scope and scale of the project.

Operation of the facility is not expected to result in further use of energy resources, except during periodic mowing and maintenance (clearing, cleaning and upkeep) of the drainageway facility. This activity would be undertaken even if the area were used only for park purposes.

CHAPTER 11
ORGANIZATIONS AND AGENCIES CONSULTED FOR THE ~~DRAFT~~ EIS

The following agencies, organizations, and individuals were consulted during the preparation of the ~~Draft~~ EIS.

11.1 GOVERNMENTAL AGENCIES

FEDERAL

- U.S. Army Corps of Engineers
- Department of Housing and Urban Development (HUD)
- National Marine Fisheries Service
- U.S. Fish and Wildlife Service

STATE

- ~~Department of Business, Economic Development and Tourism~~
  - ~~Office of Planning~~
- Department of Land and Natural Resources (DLNR)
  - Land Division
  - Historic Preservation Division
  - Office of Conservation and Coastal Lands
- Department of Business, Economic Development & Tourism
  - Office of Planning
- Department of Health
  - Clean Water Branch
  - Environmental Planning Office

Department of Transportation

Highways Division

CITY AND COUNTY OF HONOLULU

Department of Planning and Permitting

Department of Parks and Recreation

Department of Design and Construction

Department of Environmental Services

Department of Transportation Services

11.2 PUBLIC AND COMMUNITY GROUPS, ORGANIZATIONS AND INDIVIDUALS

State Senators Willie Espero and Brian Kanno

State Representatives Romeo Mindo and Tulsi Gabbard Tamayo

Honolulu City Councilmember Mike Gabbard, District 1

Ms. Arline Wainaha Pu'ulei ~~Breed~~ Brede-Eaton

Mr. Henry Chang Wo

Mr. Eric Whiteman

'Ewa Neighborhood Board No. 23

'Ewa Beach Community Association

Outdoor Circle

Historic Hawaii Foundation

'Ewa Puuloa Hawaiian Civic Club

11.3 PUBLIC AND COMMUNITY SCOPING AND CONSULTATION

Attendance at the following meetings were for the purpose of scoping and consulting with public and community groups and organizations.

April 3, 2004

Planning and Zoning Committee, 'Ewa Neighborhood Board No. 23

Eileen Lynn, Committee Chairperson

Summary: A presentation summarizing the proposed project was made to members of the committee. The committee asked that HASEKO be conscientious in developing a project that will not adversely affect the community or the environmental resources along the coastline. Major issues expressed during the course of the meeting included:

- DLNR is considering a moratorium on limu harvesting along the 'Ewa coast. The proposed project must not further impact limu or other marine resources that are important to the community.
- The community must be assured that fresh water released from the drainageway improvements will not impact the growth of limu.
- The proposed project gives the appearance that Oneula Beach Park will be taking drainage from the entire region (Note: It was clarified that the project will constitute one of two drainage courses that will accept drainage from the Kaloi watershed. The other drainage course will be to the marina).
- The use of a portion of Oneula Beach Park for a drainageway is an important issue since the prior project did not affect its use. The park is heavily used by the community and therefore access must be maintained. The project, during and after construction, must not adversely impact beach park users.

- Additional community users should be included in the consultation process for the EIS. Consultants should also be prepared to answer questions from the community concerning environmental issues.

May 13, 2004

'Ewa Neighborhood Board No. 23

Tesha Malama, Board Chairperson

Summary: A presentation summarizing the proposed project was provided at a regularly scheduled meeting of the Board. The purpose of the presentation was to advise the 'Ewa Neighborhood Board and community that an Environmental Impact Statement Preparation Notice (EISPN) was being prepared for the project and would be published shortly. The Board was advised that written comments to the EISPN would be responded to by the EIS consultants.

A number of issues were raised concerning the project. A summary of the major issue categories relevant to the project included:

- The use of the Kaloi drainageway is a major change in the project. Why is this now considered the only viable alternative when prior plans called for the use of the marina to handle all drainage flows (note: it was responded that use of the Kaloi drainageway is based on consideration of environmental concerns and the potential for operational impacts to the Honouliuli Wastewater Treatment Plant sewer outfall during construction).
- The project would result in increased contamination of coastal waters including impacts to the environment (note: marine water quality studies and analyses will be included in the Final EIS).
- The project would result in loss of use of the beach park. This is a major concern since the prior drainage plan was to use the marina which did not involve a loss of use (note: it was responded that public access would be maintained during construction and that access to the shoreline would not

be impeded. A portion of the project site could be temporarily restricted from access for public safety when heavy equipment is in use. However, this would be temporary and public access would be restored when the work is completed).

- The project would result in unsafe conditions to the public using Oneula Beach Park when it floods because stormwater will pass over the road (note: it was responded that safety procedures will be implemented during the relatively rare one in 10 year storm event that would cause water to flow from the outlet to the ocean).

June 28, 2004

Eric Whiteman, James Campbell High School Educator and Member,
The Limu Project

Summary: A meeting was held with Eric Whiteman to provide a project overview and to discuss environmental concerns that should be addressed during the EIS process. The following is a summary of the issues that were discussed:

- Contaminants that could be discharged from the ocean outlet are of concern and include pesticides, heavy metals and turbidity. These contaminants must be properly monitored to ensure there are no adverse environmental impacts.
- Crushed coral rock should not be used for filtration. This is because when the coral is broken to make the crushed rock, it propagates the pathogens that cause ciguatera.
- There are many different species of Limu. Some can break and then regrow depending on the species. They are selective on habitat and rely on fresh water associated nutrients.
- Studies on the marine environment should be broadened. There are many reasons for this including presence of Green Sea Turtles and because the nearshore serves as a hatchery for the coastline.

- Irrigation for the golf course should be done with R-1 recycled water.
- Kupuna should be consulted in the assessment of cultural impacts.

June 29, 2004

'Ewa Beach Community Association

Dee White, President

Summary: A presentation concerning the project and status of the EIS was provided to members and guests of the 'Ewa Beach Community Association. The purpose for attendance was to advise the association that the EISPN was published by the Office of Environmental Quality Control in the June 8, 2004 issue of the Environmental Notice. The community was advised that a response to written comments to the EISPN would be accepted for a period of 30 days that would end on July 8, 2004.

A summary of the major comments provided during the meeting included:

- The community is being duped. Why is the discharge no longer going to the marina? Is it because it is too expensive? (Note: it was responded that the reason for use of the Kaloi drainageway involved difficulty and problems associated with lowering the Honouliuli Wastewater Treatment Plant sewer outfall. At the same time, the current project will provide a better drainage solution that will use both overland treatment, e.g., a grass lined channel, and the marina for stormwater treatment).
- Stormwater barriers should be provided upstream. This should include use of trees and grassing. Furthermore the barriers should be made out of blue rock and not excavated materials since they could be filled with pesticides and other contaminants. Coral should not be used.
- There is concern that this project will open up the beach to accommodate the flow of stormwater (note: it was explained that this will not be required and that only the berm would need to be slightly lowered, e.g.,

the beach area along the ocean would not need to be disturbed).

July 27, 2004

Kupuna, Ms. Arline Wainaha Pu'ulei Brede-Eaton and Kupuna, Mr. Henry Chang Wo

Summary: A meeting to interview Kupuna, "Aunty" Arline and "Uncle" Henry was held to further document historical and anecdotal information on past cultural uses of the 'Ewa Coast in the vicinity of the proposed project. The results of the interview are provided in Chapter 6, Section 6.6.3, Kamaaina Interviews with Kupuna.

CHAPTER 12
COMMENTS AND RESPONSES TO THE EIS PREPARATION NOTICE

The following are written comments and responses to comments to the EIS Preparation Notice prepared for the subject project.

List of Public Comments Received for

Environmental Impact Statement Preparation Notice for

Kaloi Gulch Drainageway Improvements at Oneula Beach Park, Oahu, Hawaii

No.	Date	From
1	7/21/2004	Department of Transportation Services
2	7/20/2004	Department of Planning and Permitting
3	7/12/2004	Army Corps of Engineers
4	7/8/2004	Department of Transportation
5	7/8/2004	Department of Design and Construction
6	7/8/2004	Mr. Glenn Oamilda
7	7/7/2004	Mr. Henry Chang Wo
8	7/6/2004	Office of Environmental Quality Control
9	7/6/2004	Housing and Community Development Corporation of Hawaii
10	7/2/2004	Honolulu Police Department
11	7/2/2004	Board of Water Supply
12	6/29/2004	Ms. Tesha Malama
13	6/28/2004	Office of Hawaiian Affairs
14	6/22/2004	Honolulu Fire Department
15	6/18/2004	Department of Education
16	6/17/2004	Department of Health
17	6/14/2004	Estate of James Campbell
18	6/10/2004	Department of Parks and Recreation
19	6/9/2004	Department of Facility Maintenance
20	6/9/2004	Department of Community Services

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 3RD FLOOR • HONOLULU, HAWAII 96813
TELEPHONE: (808) 523-4529 • FAX: (808) 523-4730 • INTERNET: www.co.honolulu.hi.us

2004 JUL 23 AM 10 46

CITY & COUNTY OF HONOLULU

JEREMY HARRIS
MAYOR

CHERYL D. SOON
DIRECTOR

GEORGE "KEOKI" MIYAMOTO
DEPUTY DIRECTOR

TP6/04-63881R

July 21, 2004

MEMORANDUM

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

FROM: CHERYL D. SOON, DIRECTOR

SUBJECT: KALOI GULCH DRAINAGEWAY IMPROVEMENTS AT ONEULA BEACH PARK, REF: (2004/ED-12(ASK))

In response to your transmittal letter, we reviewed the Environmental Impact Statement (EIS) Preparation Notice for the subject project. The following comments are the result of this review:

1. All pages in the document should be numbered.
2. On Page 10, Figure 2-2, Project Site Tax Keys (TMKs), should show the demarcation between the park access road and Papipi Road.
3. On Page 12, reference is made to preparation of an Emergency Action Plan (EAP). The specifics of the EAP should be discussed in the draft EIS.
4. The section on Traffic and Roadways (Pages 38 and 39) should include a discussion of any potential traffic impacts and mitigative measures on the surrounding roadways during construction of the project.
5. Prior to construction of the proposed project, Oahu Tansit Services, Inc. TheBus and TheHandi-Van should be notified of the construction activities and scheduling.
6. On Page 45, the statement is made that a temporary detour road may be required during construction of the proposed project. The construction of this temporary road should be discussed further in the draft EIS, especially if there will be any impacts on the surrounding roadways in the area.
7. On Page 52, Figure 6-1, Oneula Archaeological District, shows a "Papipi Drive". This should be "Papipi Road".

8. On Page 60, the Department of Transportation Services should be added to the list of City departments that are being consulted.

We look forward to reviewing the draft EIS. Should you have any questions regarding these comments, please contact Faith Miyamoto of the Transportation Planning Division at Local 6976.

CHERYL D. SOON

420 Waiakamilo Road
Suite 411
Honolulu Hawaii 96817-4941
Telephone 808 842 1133
Fax 808 842 1937
eMail rmtowill@hawaii.rr.com

R. M. TOWILL CORPORATION
SINCE 1930

Planning
Engineering
Environmental Services
Photogrammetry
Surveying
Construction Management

December 8, 2004

Acting Director
Department of Transportation Services
City and County of Honolulu
650 South King Street, 3rd Floor
Honolulu, Hawaii 96813

Dear Madam/Sir:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Environmental Impact Statement Preparation Notice

On behalf of HASEKO (Ewa), Inc., thank you for your letter dated July 21, 2004, to the Department of Planning and Permitting relating to the subject project. We have prepared the following in response to your comments:

1. *All pages in the document should be numbered*

   We will number all pages in the forthcoming Draft EIS for the subject project.

2. *On page 10, Figure 2-2, Project site Tax Map Keys (TMKs), should show the demarcation between the park access road and Papipi Road.*

   The subject figure will be revised to reflect the general property boundary between the access road and Papipi Road.

3. *On Page 12, reference is made to preparation of an Emergency Action Plan (EAP). The specifics of the EAP should be discussed in the Draft EIS.*

   Please be advised that the EAP is only in the preliminary stages of development. Development of the EAP will therefore require our continued coordination with City agencies such as the Departments of Planning and Permitting, Parks and Recreation, and other possible agencies and parties to ensure that all issues are addressed. Once the EAP is completed it will be issued to all required parties as identified by the City.

4. *The section on Traffic and Roadways (pages 38 and 39) should include a discussion of any potential impacts and mitigative measures on the surroundings roadways during construction of the project.*

   The proposed construction will be within the Oneula Beach Park and will not directly impact traffic on surround roadways. We anticipate only a small increase in traffic during the construction period due to the movement of equipment and construction workers. To address the potential for impacts during peak hour traffic flows, we will consider the

movement of heavy construction equipment and the hauling of material during off-peak periods.

5. *Prior to construction of the proposed project, Oahu Transit Services, Inc., TheBus and TheHandi-Van should be notified of the construction activities and scheduling.*

   We acknowledge your request and will notify these parties of the proposed construction activities and schedule.

6. *On page 45, the statement is made that a temporary detour road may be required during construction of the proposed project. The construction of this temporary road should be discussed further in the Draft EIS, especially if there will be any impacts on the surrounding roadways in the area.*

   We acknowledge your request. It is the intention of HASEKO to maintain access to the park for the duration of construction. The location of the temporary detour road, is currently in the planning stage with a specific location subject to further assessment to ensure there will no negative adverse impacts to the surrounding roadways in the area.

7. *On page 52, Figure 6-1, Oneula Archaeological District, show a "Papipi Drive." This should be "Papipi Road."*

   We will correct this reference to Papipi Road.

8. *On page 60, the Department of Transportation Services should be added to the list of City department that are being consulted.*

   We will amend the list to include the Department of Transportation Services.

We appreciate the time you have taken to review and comment on this important project. Should you have any further comments please do not hesitate to contact use at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Eric C. Crispin, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Oshima Chun Fong and Chung, LLP

DEPARTMENT OF PLANNING AND PERMITTING
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JEREMY HARRIS
MAYOR

ERIC G. CRISPIN, AIA
DIRECTOR

BARBARA KIM STANTON
DEPUTY DIRECTOR

July 20, 2004

2004/ED-12(ASK)

Mr. Brian Takeda
R.M. Towill Corporation
420 Waiakamilo Road, Suite 411
Honolulu, Hawaii 96817-4941

Dear Mr. Takeda:

Environmental Impact Statement Preparation Notice (EISPN)
Chapter 343, Hawaii Revised Statutes

Project Name	:	Kaloi Gulch Drainageway Improvements at One'ula Beach Park
Applicant	:	Haseko (Ewa), Inc.
Agent	:	R.M. Towill Corporation
Landowner	:	City and County of Honolulu
Location	:	One'ula Beach Park, Ewa, Oahu
Tax Map Key	:	9-2-12: 2 and 25

We are forwarding copies of all comments we have received relating to the EISPN for the above-referenced project as well as DPP comments.

In accordance with the procedural provisions of Chapter 343, Hawaii Revised Statutes, you must respond in writing to these and any other comments which were received during the 30-day public comment period which began with the publication of a notice of availability of the EISPN on June 8, 2004. The final Draft Environmental Impact Statement (DEIS) must include these comments and responses, as well as revised text, if appropriate.

Our comments are as follows:

Page 4 of the EISPN states that the Master Plan reconfiguration will not involve changes to the approved "zoning density". The DEIS should clarify what is meant by the term "zoning density". (We understand that the total number of residential units within the Ocean Pointe Master Plan project area will remain unchanged.)

Plans

1) The DEIS should describe the work within the State Conservation District. The location of the shoreline should be identified. A copy of the certified shoreline survey will be required prior to acceptance of the Special Management Area Use Permit.

2) Conceptual plans (including sections, grading, paving and landscaping) of the park with the ford crossing should be made part of the DEIS.

3) An up-to-date One'ula Beach Park Master Plan, showing proposed improvements (see attached plan from the Final EA and Finding of No significant Impact) and the location of the additional pedestrian and vehicular access being developed in conjunction with the revisions to the Ocean Pointe's Master Plan, should be included in the DEIS. The location of the channel should be overlaid to illustrate the specific park activity areas that are within the drainage channel. Mitigation measures, such as relocation of displaced recreational activities should be included as part of the Kaloi Gulch Drainage Improvements at One'ula Beach Park project and addressed in the DEIS. This may require revisions to the Park Master Plan.

Scope

While the trigger for the EIS is use of the shoreline area and government lands the DEIS should more broadly describe the Kaloi Gulch drainage improvements.

Archaeology

We note that an archaeological site appears to be located within the proposed drainage way north of the park. The Draft EIS should include a discussion of how the proposed Drainage Master Plan will impact archaeological resources including those north of the park. Will access to the archaeological preserves be impacted? Will the appearance of the preserves, such as views to or from the archaeological sites be impacted? What mitigation measures can be offered? Will modifications to the memorandum of agreement with the Army Corps be required to allow the proposed Drainage Master Plan, including potential impacts to archaeological site to proceed?

Park Access and Use

1) The DEIS should describe surrounding uses. How will the project, particularly construction activities impact recreational activities including access to One'ula Beach Park.

2) The DEIS should clarify the statement that "park users will be able to walk around the makai end of the channel" (page12). What implications will grading of the bank slopes have on park use and accessibility?

3) If use of 3.7 acres of the park as a drainage outlet reduces recreational opportunities or functionality, then mitigation measures, including providing additional public recreational areas or construction of park improvements should be addressed in the DEIS. Such improvements could include infrastructure (water, sewer) to support the construction of physical facilities (i.e. comfort stations) within the park. Costs for these mitigation measures should be born by the developer. Another, possible mitigation would be to allow public use of the proposed Haseko meeting facility (located at the east edge of the park). Such a change would require revisions to the park master plan. A revision effort should include community input, particularly regarding the loss of park function and the need to relocate activity areas.

4) As an alternative to reconstruction of the park access road in its current location outside of the park, the DEIS should include an alternative to reconstruction of the park road within One'ula Beach Park as is contemplated in the One'ula Park Master Plan. We are aware that the unilateral agreement incorporated into Ordinance 93-94 indicates that One'ula Beach Park will be expanded to include the 9 acres destined to be conveyed to the City and that Haseko (Ewa), Inc. shall be required to make improvements to One'ula Beach Park and access road. Since the proposed project includes reconstruction of a portion of the park access road, consideration should be given to coordinating the future access way reconstruction with that taking place as part of the Kaloi Gulch Drainage Way Improvements.

Drainage

1) The DEIS should describe existing and proposed drainage patterns and storm water runoff volumes. How will these change?

2) Are the east and west subdrain systems separate in terms of the storm water not flowing from one to the other? A legend describing the abbreviations should be provided for Figure 4-3.

3) Page 27 of the EISPN refers to vegetative swales. The DEIS should describe how these will work to promote improved water quality.

4) Both the Department of Parks and Recreation and the Department of Facilities Maintenance have stated that they will not maintain the drainageway. The DEIS should discuss how the drainageway will be maintained.

5) The tsunami inundation zone should be identified in the DEIS. Will the proposed project have any impact on the potential for inundation of the park or surrounding areas during a tsunami?

Traffic

Figure 1-2 of the EISP should be revised to be consistent with the roadway configuration on Figure 4-3.

Urban Design

A portion of the project is located in the area governed by 2003/PDH-3 and the Ocean Pointe Urban Design Plan (UDP) mandated by Ordinance 93.94. In that regard, we offer the following comments:

1) Modification to the Planned Development Housing Permit will be required to reflect the omission of previously planned dwelling units which are located in the path of the drainageway north of the park.

2) Modification to the UDP will be required to address the transition from the excavated drainage area to the adjacent properties including existing and proposed residential areas. This transition, including information about topography, grade differentials, walls, fences and access should be discussed in the DEIS.

The above modifications may be processed subsequent to the City Council's action on the Special Management Area Use Permit for this project

Access and Circulation

1) As the inundated ford crossing and locked gates will hinder access to certain parts of the park during inclement weather, the DEIS should discuss mitigation including the provision of a secondary park access on the west side of the ford crossing which connects to the park access roadway provided in the Ocean Pointe Master Plan.

2) Additionally, Haseko's Ocean Pointe Area III (approved under Planned Development Housing permit no. 2003/PDH-3) will eliminate the existing access road to One'ula Beach Park. In the event that Haseko's construction of proposed Area IIIF and H and the flood channel precedes completion of the planned park access road and other park improvements, it would appear that there would be no vehicular access to the park from Papipi Road.

   The DEIS should address mitigation measures for this loss of park access, including: construction of a replacement roadway within the park to ensure uninterrupted public access to the beach park from Papipi Road, and the relocation of those park facilities (i.e., parking, benches, comfort stations) that will be removed as a result of the new park roadway. The cost of such construction and relocation work should be borne by the developer.

3) Furthermore, the DEIS should explain how the ford crossing will affect emergency vehicle access to the park. An illustration and explanation of closure operations for the access gates, to be constructed at each end of the ford crossing, should be provided in the DEIS.

4) We are concerned that the proposed drainage master plan, which includes the proposed park drainage channel, appears to impede vehicular and pedestrian circulation. As was indicated in our January 26, 2004 comments on the Proposed Conceptual Master Plan for Ocean Pointe (attached), provisions for access to recreational facilities, including the Marina, One'ula Beach Park, archaeological sites and connector roadways must be provided. The DEIS should discuss how these requirements will be met.

Liability

It appears the City will be accepting additional liability for having a floodway through its park. The DEIS should discuss the potential City liability and/or exposure. The Department of Parks and Recreation should be fully aware of this liability and be willing to accept it as part of this project, or measures should be provided to reduce/eliminate the City's potential liability to the City should be discussed in the DEIS.

If you have any questions, please call Ardis Shaw-Kim of our staff at 527-5349.

Sincerely yours,

ERIC G. CRISPIN, AIA
Director of Planning
and Permitting

EGC:cs
Attachment

cc: Department of Parks and Recreation
Department of Corporation Counsel, Dawn Spurlin

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

ERIC G. CRISPIN, AIA
DIRECTOR

BARBARA KIM STANTON
DEPUTY DIRECTOR

2003/ELOG-3756(ET)

January 26, 2004

Mr. Nelson Lee, Executive Vice President
HASEKO (Ewa), Inc.
820 Mililani Street, Suite 820
Honolulu, Hawaii 96813

Dear Mr. Lee:

New Proposed Conceptual Master Plan for Ocean Pointe

This is in response to your December 2, 2003 request for comments on the new proposed conceptual master plan for Ocean Pointe. The purpose of a "Master Plan" is to serve as a guide for the long-term development of the area.

We have reviewed the conceptual master plan and provide the following comments:

1. Kaileolea Drive
   a. Kaileolea Drive should be extended to provide makai access to the marina area. Papipi Road should service Oneula Beach Park, as well as providing a secondary access to the marina area. The design of the roadway would need to be coordinated with the Department of Transportation Services and the Department of Planning and Permitting.
   b. Additionally, extending Kaileolea Drive to the marina would provide public access to the development's archaeological sites, as well as a secondary access to Oneula Beach Park. Both are required as conditions of previously-approved permits.
   c. Finally, a looped roadway system within the development will benefit circulation in all of Ocean Pointe and adjoining areas of Ewa Beach by providing alternate vehicular, bike, transit and pedestrian routes.

2. Portions of Papipi Road which are intended for park access only, and not for general public use, should be clarified. A defined terminus should also be identified, in case there is a need to secure the park at night.

3. Final plans should refect buffering treatments along segments of Keoneula Boulevard adjacent to the golf course, either in the form of heavy landscaping or elevated grade differences to prevent errant golf balls from entering the public street right-of-way.

4. A small commercial area in the mauka residential section (Area IV) should be included to serve the large Area IV resident population.

5. The master plan should identify how public access to all archaeological sites identified in the approved October 1994 Urban Design plan is provided, including conceptual vehicular and pedestrian circulation, and parking.

6. A layer/addendum to the master plan should identify all pedestrian promenades (those 6 feet or wider), common parking areas, mini parks, marina open spaces (as identified in the original urban design plan) and public access points to the shoreline. The addendum should also identify the development's hierarchy of roadways and proposed commercial, resort and civic uses.

7. As you know, proposed work within the Special Management Area requires a Special Management Area Use Permit. Work within the shoreline setback requires a shoreline setback variance.

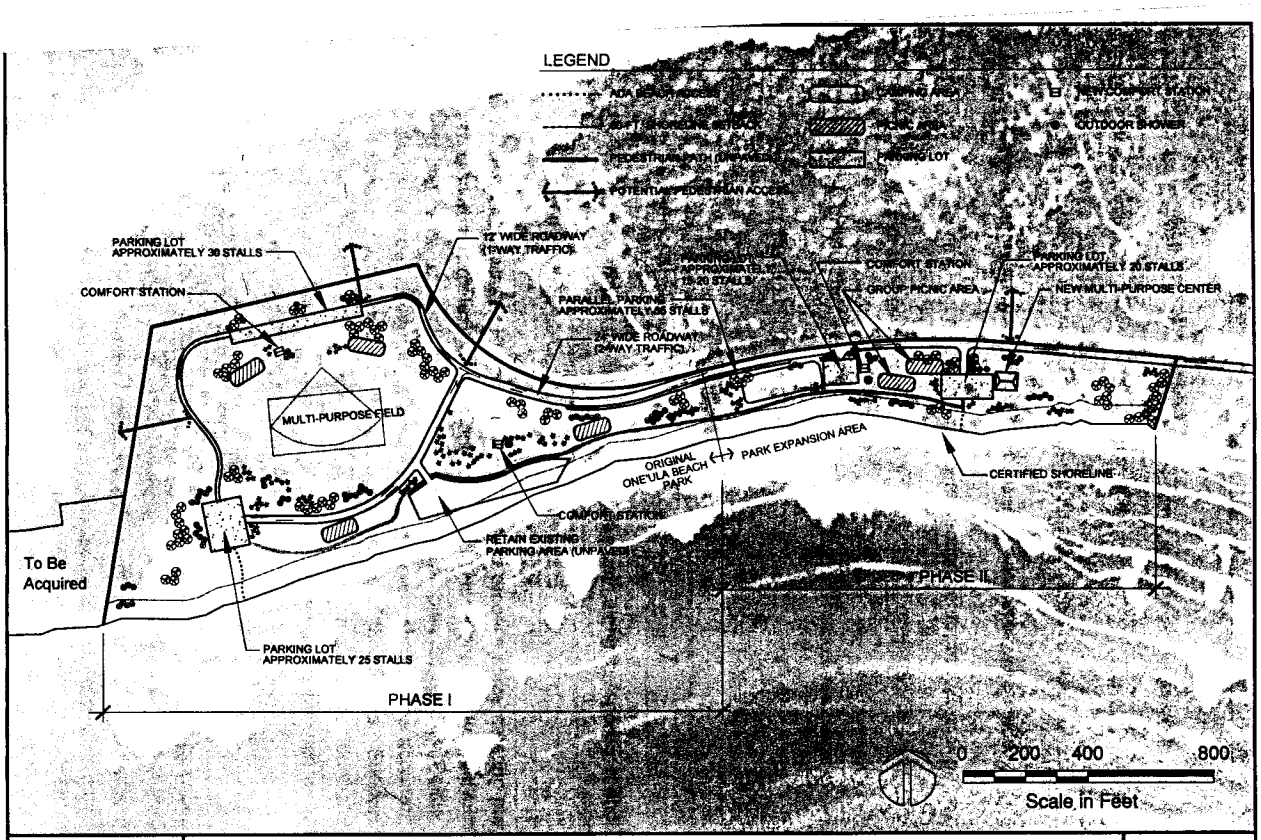
Should you have any questions, you may contact Eugene Takahashi of our staff at 527-6022.

Sincerely yours,

ERIC G. CRISPIN, AIA
Director of Planning and Permitting

EGC:et
271470

cc: Angela Fong, Oshima Chun Fong & Chung



WILSON OKAMOTO & ASSOCIATES, INC.
ENGINEERS · PLANNERS

ONE'ULA BEACH PARK MASTER PLAN

ONE'ULA BEACH PARK MASTER PLAN

FIGURE 5

420 Waiakamilo Road
Suite 411
Honolulu Hawaii 96817-4941
Telephone 808 842 1133
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eMail rmtowill@hawaii.rr.com

R. M. TOWILL CORPORATION
SINCE 1930

Planning
Engineering
Environmental Services
Photogrammetry
Surveying
Construction Management

December 8, 2004

Mr. Eric G. Crispin, AIA, Director
Department of Planning and Permitting
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, Hawaii 96813

Dear Mr. Crispin:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Environmental Impact Statement Preparation Notice

On behalf of HASEKO (Ewa), Inc. ("HASEKO"), thank you for your letter dated July 20, 2004, concerning the subject project. We have prepared the following in response to your comments (italicized for reference):

Page 4 of the EISPN states that the Master Plan configuration will not involve changes to the approved "zoning density". The DEIS should clarify what is meant by the term "zoning density". (We understand that the total number of residential units within the Ocean Pointe Master Plan project area will remain unchanged.)

Response: The term "zoning density" will not be used in the DEIS (See DEIS, Chapter 1, Section 1.1). In its place, reference is made to the total number of residential and visitor units in the Ocean Pointe Master Plan project area remaining unchanged (See DEIS, Section 1.4.1).

Plans

1) *The DEIS should describe the work within the State Conservation District. The location of the shoreline should be identified. A copy of the certified shoreline survey will be required prior to acceptance of the Special Management Area Use Permit.*

Response: Discussion of the work required in the Conservation District is described in Chapter 2, Section 2.2.1, and Chapter 8, Section 8.2, of the DEIS. As required for work within the shoreline setback, HASEKO will file a shoreline certification.

2) *Conceptual plans (including sections, grading, paving and landscaping) of the park with the ford crossing should be made part of the DEIS.*

Response: Conceptual plans of the park with the ford crossing are included in Figures 2-1 and 2-2 (Chapter 2, Section 2.2.1).

3) *An up-to-date One'ula Beach Park Master Plan, showing proposed improvements (see attached plan from the Final EA and Finding of No significant Impact) and the location of the additional pedestrian and vehicular access being developed in conjunction with the revisions to the Ocean Pointe's Master Plan, should be included in the DEIS. The location of the channel should be overlaid to illustrate the specific park activity areas that are within the drainage channel. Mitigation measures, such as relocation of displaced recreational activities should be included as part of the Kaloi Gulch Drainage Improvements at One'ula Beach Park project and addressed in the DEIS. This may require revisions to the Park Master Plan.*

Response: Potential impacts to the Oneula Park Master Plan are discussed in Chapter 2, Section 2.3 of the DEIS. HASEKO anticipates that there will be no major revisions to the Master Plan nor will it displace recreational activities. Potential, for impacts on recreational activities are further discussed in Chapter 5, Section 5.9.

Scope
While the trigger for the EIS is use of the shoreline area and government lands the DEIS should more broadly describe the Kaloi Gulch drainage improvements.

Response: We agree with your comment. We have more broadly described the improvements to Kaloi Gulch drainage improvements in Chapter 2 of the DEIS.

Archaeology
We note that an archaeological site appears to be located within the proposed drainage way north of the park. The DRAFT EIS should include a discussion of how the proposed Drainage Master Plan will impact archaeological resources including those north of the park. Will access to the archaeological preserves be impacted? Will the appearance of the preserves, such as views to or from the archaeological sites be impacted? What mitigation measures can be offered? Will modifications to the memorandum of agreement with the Army Corps be required to allow the proposed Drainage Master Plan, including potential impacts to archaeological site to proceed?

Response: You are correct, the archeological sites are not within the project area or Oneula Beach Park. We also do not believe that the project will have any impact on that area or other established archeological preserves on the Ocean Pointe property. No amendment of the memorandum of agreement with the Army Corps of Engineers will be required for this project. A detailed discussion of the impact of this project on archeological sites, including a summary of additional archeological work is discussed in Chapter 6, Section 6.5, and Appendix E, Supplemental Archaeological Survey: Subsurface Testing of Beach Areas at Marina Channel and Kaloi Drainage Channel, Ocean Pointe Project.

Park Access and Use

1) *The DEIS should describe surrounding uses. How will the project, particularly construction activities impact recreational activities including access to One'ula Beach Park.*

Response: The surrounding uses are described in Chapter 1, Section 1.4.1 ('Ewa Marina Drainage Plan), Section 1.4.2 (Kaloi Gulch Watershed), and Section 1.4.3 (Oneula Beach Park Master Plan). The potential impact of construction on park recreational uses is discussed in Chapter 5, Section 5.9. Construction is not expected to adversely impact access to the park and will only have a temporary displacement in the actual areas of construction to maintain public safety for the relatively short period of work. The drainage channel is not located in an active recreational area currently in use at the park.

2) *The DEIS should clarify the statement that "park users will be able to walk around the makai end of the channel" (page 12). What implications will grading of the bank slopes have on park use and accessibility?*

Response: Shoreline access is discussed in Chapter 5, Section 5.9 and Chapter 6, Section 6.6.3 of the DEIS. The grading of the bank slopes should not have a significant effect on park use and accessibility. Slopes within the channel will have a relatively gentle slope ratio of 1 foot vertical to 10 feet horizontal, within the Park.

3) *If use of 3.7 acres of the park as drainage outlet reduces recreational opportunities or functionality, then mitigation measures, including providing additional public recreational areas or construction of park improvements should be addressed in the DEIS. Such improvements could include infrastructure (water, sewer) to support the construction of physical facilities (i.e. comfort stations) within the park. Costs for these mitigation measures should be born by the developer. Another, possible mitigation would be to allow public use of the proposed Haseko meeting facility (located at the east edge of the park). Such a change would require revisions to the park master plan. A revision effort should include community input, particularly regarding the loss of park function and the need to relocate activity areas.*

Response: Use of the 3.7 acres within the Park is not expected to reduce recreational opportunities at the park. A small picnic area identified in the Oneula Beach Park Master Plan for future construction is located along the western portion of the proposed drainage channel and will have to be relocated to accommodate the project. HASEKO will consult with the Department of Parks and Recreation on the relocation of the picnic area. The relocation will be done at HASEKO's expense. If a revision is required to the Master Plan because of this project, HASEKO will participate in public hearings and any community input process for the revision.

4) *As an alternative to reconstruction of the park access road in its current location outside of the park, the DEIS should include an alternative to reconstruction of the park road within One'ula Beach Park as is contemplated in the One'ula Park Master Plan. We are aware that the unilateral agreement incorporated into Ordinance 93-94 indicates that One'ula Beach Park will be expanded to include the 9 acres destined to be conveyed to the City and that Haseko (Ewa), Inc. shall be required to make improvements to One'ula Beach Park and access road. Since the proposed project includes reconstruction of a portion of the park access road, consideration should be given to coordinating the future access way reconstruction with that taking place as part of the Kaloi Gulch Drainageway Improvements.*

Response: The alignment of the reconstructed park access road will be coordinated with the appropriate City agencies, including Department of Planning and Permitting, Department of Parks and Recreation and Department of Design and Construction. It is intended that the road be placed in its permanent master-planned location.

Drainage

1) *The DEIS should describe existing and proposed drainage patterns and storm water runoff volumes. How will these change?*

Response: The Kaloi Gulch drainageway currently outlets to the ocean through Oneula Beach Park. The proposed drainageway improvements will not change this drainage pattern for the Kaloi Gulch drainageway. The drainage and flow patterns are described in more detail in Chapter 4, Section 4.5, and Appendix B: Numerical Modeling of Storm Drain Discharge Plume Transport.

2) *Are the east and west subdrain systems separate in terms of the storm water not flowing from one to the other? A legend describing the abbreviations should be provided for Figure 4-3.*

Response: The east and west subdrainage systems are separate subsystems which do not flow into each other. Figure 4-3 (referenced above), was eliminated from the DEIS.

3) *Page 27 of the EISPN refers to vegetative swales. The DEIS should describe how these work to promote improved water quality.*

Response: Chapter 7, Section 7.3.2 of the DEIS, describes how vegetated drainageways help to improve water quality by promoting the filtration of runoff, reducing flow velocity, and recharging groundwater resources.

4) *Both the Department of Parks and Recreation and the Department of Facilities Maintenance have stated that they will not maintain the drainageway. The DEIS should discuss how the drainageway will be maintained.*

Response: The golf course owner or some other entity designated by HASEKO will be responsible for the maintenance of the regional drainage channel through the Park. A maintenance agreement satisfactory to the Department of Parks and Recreation will be prepared for this project.

5) *The tsunami inundation zone should be identified in the DEIS. Will the proposed project have any impact on the potential for inundation of the park or surrounding areas during a tsunami?*

Response: The entirety of Oneula Beach Park, which includes the subject project site, is subject to inundation by a tsunami. Further discussion is provided in Chapter 4, Section 4.7.4 of the DEIS. We note that the proposed project is not expected to have any adverse impacts as a result of a tsunami induced event.

Traffic
Figure 1-2 of the EISP should be revised to be consistent with the roadway configuration on Figure 4-3.

Response: Figure 4-3 from the EISPN was eliminated in the DEIS. Roadways surrounding the project site are shown on Figure 6-1, Chapter 6, Section 6.4 of the DEIS.

Urban Design
A portion of the project is located in the area governed by 2003/PDH-3 and the Ocean Pointe Urban Design Plan (UDP) mandated by Ordinance 93.94. In that regard, we offer the following comments:

1) *Modification to the Planned Development Housing Permit will be required to reflect the omission of previously planned dwelling units which are located in the path of the drainageway north of the park.*

Response: The Planned Development Housing Permit (PDH) is being updated through a separate process. HASEKO will continue to work with DPP on the updating of the PDH.

2) *Modification to the UDP will be required to address the transition from the excavated drainage area to the adjacent properties including existing and proposed residential areas. This transition, including information about*

topography, grade differentials, walls, fences and access should be discussed in the DEIS.

Response: The UDP is also being updated through a separate process. HASEKO will continue to work with DPP on the updating of the UDP.

The above modifications may be processed subsequent to the City Council's action on the Special Management Area Use Permit for this project.

Access and Circulation
1) *As the inundated ford crossing and locked gates will hinder access to certain parts of the park during inclement weather, the DEIS should discuss mitigation including the provision of a secondary park access on the west side of the ford crossing which connects to the park access roadway provided in the Ocean Pointe Master Plan.*

Response: There will be no locked gates to the park access road. There will be signage warning of crossing hazards during periods of heavy storm water flows. A second park access road will be used during these periods when the primary park access road must operate as a ford to convey storm flows.

2) *Additionally, Haseko's Ocean Pointe Area III (approved under Planned Development Housing permit no. 2003/PDH-3) will eliminate the existing access road to One'ula Beach Park. In the event that Haseko's construction of proposed Area IIIF and H and the flood channel precedes completion of the planned park access road and other park improvements, it would appear that there would be no vehicular access to the park from Papipi Road.*

The DEIS should address mitigation measures from this loss of park access, including: construction of a replacement roadway within the park to ensure uninterrupted public access to the beach park from Papipi Road, and the relocation of those park facilities (i.e., parking, benches, comfort stations) that will be removed as a result of a the new park roadway. The cost of such construction and relocation work should be borne by the developer.

Response: Haseko will work with the City, including DPR and DPP, to coordinate continued vehicular access to One'ula Beach Park.

3) *Furthermore, the DEIS should explain how the ford crossing will affect emergency vehicle access to the park. An illustration and explanation of closure operations for the access gates, to be constructed at each end of the ford crossing, should be provided in the DEIS.*

Response: Access gates will not be used for the ford crossing or the access roads. Chapter 5, Section 5.1, describes the two access roads, and provision for emergency ingress and egress during major storms that force closure of the primary park access road.

4) *We are concerned that the proposed drainage master plan, which includes the proposed park drainage channel, appears to impede vehicular and pedestrian circulation. As was indicated in our January 26, 2004 comments on the Proposed Conceptual Master Plan for Ocean Pointe (attached), provisions for access to recreational facilities, including the Marina, One'ula Beach Park, archaeological sites and connector roadways must be provided. The DEIS should discuss how these requirements will be met.*

Response: The provisions for access to recreational facilities, including the Marina, One'ula Beach Park, archeological sites, and connector roadways are located in the Ocean Pointe project and outside of the project area for the DEIS. These provisions for access and how these requirements will be met will be addressed in Ocean Pointe's infrastructure master plan and/or in the rezoning process that will occur for the reconfigured Ocean Pointe project.

Liability
It appears the City will be accepting additional liability for having a floodway through its park. The DEIS should discuss the potential City liability and/or exposure. The Department of Parks and Recreation should be fully aware of this liability and be willing to accept it as part of this project, or measures should be provided to reduce/eliminate the City's potential liability to the City should be discussed in the DEIS.

Response: Kaloi Gulch currently functions as an existing drainageway with an ocean outlet that discharges at Oneula Beach Park. The proposed project is therefore not expected to increase the liability already borne by the City from the location of this existing drainageway. We do note that the proposed drainage improvements project does have the potential for reducing liability by identifying and formalizing the use of this area as a drainageway.

We appreciate the time you have taken to review and comment on the EIS Preparation Notice. Should you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: HASEKO (Ewa), Inc.
Oshima Chun Fong and Chung, LLP

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

REPLY TO ATTENTION OF

Regulatory Branch

July 12, 2004

2004 JUL 15 PM 6 25

CITY & COUNTY OF HONOLULU

Ms. Ardis Shaw-Kim
Planner
Department of Planning and Permitting
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Ms. Shaw-Kim:

This responds to your request for comments to be included in a draft Environmental Impact Statement for the proposed Kaloi Gulch Drainageway Improvements at Oneula Beach park (TMK 9-1-012: por. 2, 25), Ewa, Oahu Island. Based on the information provided, I have determined that if the proposed development at this location is confined to the seasonally dry areas of the Kaloi Gulch drainageway, the activity would be outside the limit of our jurisdiction. Consequently, a Department of Army (DA) permit would not be required. However, if the proposed construction would result in the discharge of dredged or fill material into the adjacent waters of the Pacific Ocean, or be modified to include and surface water connection to the Pacific Ocean, consultation should take place with our office to determine whether a DA permit may be required.

In the future regarding jurisdictional determinations for a DA permit or comments related to regulatory requirements of a DA permit, written correspondence should be directed to Mr. George Young, Chief, Regulatory Program, U.S. Army Engineer District, Honolulu, Building 230, Fort Shafter, Honolulu, Hawaii 96858-5440. File Number **200400353** has been assigned to this proposed project. Please feel free to contact Mr. Farley Watanabe of my staff at 438-7701, if you have additional questions.

Sincerely,

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

420 Waiakamilo Road
Suite 411
Honolulu Hawaii 96817-4941
Telephone 808 842 1133
Fax 808 842 1937
eMail rmtowill@hawaii.rr.com

R. M. TOWILL CORPORATION
SINCE 1930

Planning
Engineering
Environmental Services
Photogrammetry
Surveying
Construction Management

December 8, 2004

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

Dear Mr. Young:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Environmental Impact Statement Preparation Notice

On behalf of HASEKO (Ewa) Inc., thank you for your letter dated July 12, 2004, to the Department of Planning and Permitting. We acknowledge that you have determined that if the proposed development is confined to the seasonally dry areas of the Kaloi Gulch Drainageway, that the activity would be outside the limit of Corps jurisdiction, and that a Department of the Army (DA) Permit would not be required. We further acknowledge that if the proposed construction results in the discharge of dredged or fill material into adjacent waters of the Pacific Ocean, that we will consult with your office to determine if a DA Permit is required.

HASEKO intends to comply fully with all DA permitting requirements. You will be kept informed of the project's progress and of any changes that would require our further consultation with you.

We appreciate your taking the time to review and comment on this important project. Should you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Eric G. Crispin, AIA, Department of Planning and Permitting
Haseko (Ewa) Inc.
Oshima Chun Fong and Chung, LLP

LINDA LINGLE
GOVERNOR

2004 JUL 22 AM 8 31

CITY & COUNTY OF HONOLULU

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

RODNEY K. HARAGA
DIRECTOR

Deputy Director
BRUCE Y. MATSUI
LINDEN H. JOESTING
BRIAN H. SEKIGUCHI

IN REPLY REFER TO:

STP 8.1234

July 8, 2004

Mr. Eric G. Crispin, AIA
Director
Department of Planning and Permitting
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Crispin:

Subject: Kaloi Gulch Drainageway Improvements at Oneula Park
Environmental Impact Statement Preparation Notice (EISPN)
TMK: 9-1-12: portion of 2 and 25

In reply to your request for our review of the subject project, this is to advise you that the proposed drainageway project improvements will not directly affect our State highways and we anticipate that the proposed North-South Road in Ewa will not have a significant impact on the total discharge at Oneula Beach Park.

We appreciate the opportunity to provide our comments.

Very truly yours,

RODNEY K. HARAGA
Director of Transportation

420 Waiakamilo Road
Suite 411
Honolulu Hawaii 96817-4941
Telephone 808 842 1133
Fax 808 842 1937
eMail rmtowill@hawaii.rr.com

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Environmental Services
Photogrammetry
Surveying
Construction Management

December 8, 2004

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

Dear Madam/Sir:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Environmental Impact Statement Preparation Notice

On behalf of HASEKO (Ewa), Inc., thank you for your letter dated July 8, 2004, to the Department of Planning and Permitting relating to the subject project. We acknowledge your comment that the proposed project will not directly affect the State highways and that the proposed North-South Road in Ewa will not have a significant impact on the total discharge at Oneula Beach Park.

We appreciate your review and comment on this important project. Should you have any further comments please do not hesitate to contact use at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Eric G. Crispin, AIA, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Oshima Chun Fong and Chung, LLP

DEPARTMENT OF DESIGN AND CONSTRUCTION

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4564 • Fax: (808) 523-4567
Website: www.co.honolulu.hi.us

2004 JUL 9 PM 3 46
CITY & COUNTY OF HONOLULU

JEREMY HARRIS
MAYOR

TIMOTHY E. STEINBERGER, P.E.
DIRECTOR

64136

July 8, 2004

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

ATTENTION: ARDIS SHAW-KIM

FROM: TIMOTHY E. STEINBERGER, P.E., DIRECTOR

SUBJECT: KALOI GULCH DRAINAGEWAY IMPROVEMENTS
ENVIRONMENTAL IMPACT STATEMENT PREPARATION
NOTICE (EISPN), PROJECT NUMBER 2004/ED-12

Thank you for the opportunity to review and provide comments to the referenced EISPN by Haseko (Ewa), Inc. We offer the following comments.

We have generally no objections to the proposed project as described in the report. However, we recommend that the project be depicted in greater detail in drawings included in the report. At a minimum, we suggest that the applicant and their agent show profiles of the drainageway at transects of likely interest to its audience, such as the proposed ford where the Oneula Beach Park roadway crosses the drainageway, at the shoreline, and at the development's private golf course. Such drawings in our view would clarify the degree of impact to be caused by the drainageway.

We also recommend that the applicant and their agent seek advice from a qualified landscape architect or other professional regarding the groundcover vegetation to be maintained in the drainageway. The EISPN report specifies no particular groundcover treatment. We believe that if just any vegetation is allowed to grow in the drainageway, the result may be unsightly or perhaps, hazardous (as some plant species are toxic, or have thorns or spiky seed pods which injure people) and may be more difficult to maintain than an appropriate, intended plant species. Naturally, we recommend treatment that is least costly to maintain but also safest and visually acceptable to the public.

If there are any questions, please contact Mr. Terry Hildebrand at extension 4696.

TES:ei

cc: William D. Balfour, Jr., Department of Parks and Recreation

420 Waiakamilo Road
Suite 411
Honolulu Hawaii 96817-4941
Telephone 808 842 1133
Fax 808 842 1937
eMail rmtowill@hawaii.rr.com

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Environmental Services
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Construction Management

December 8, 2004

Mr. Timothy E. Steinberger, P.E., Director
Department of Design and Construction
City and County of Honolulu
650 South King Street, 11th Floor
Honolulu, Hawaii 96813

Dear Mr. Steinberger:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Environmental Impact Statement Preparation Notice

On behalf of HASEKO (Ewa), Inc., thank you for your letter dated July 8, 2004 to the Department of Planning and Permitting stating that the Department of Design and Construction generally has no objections to the proposed project.

You have recommended the following:

(1) The project should be depicted in greater detail in drawings, showing at a minimum profiles of the drainageway at transects of likely interest to its audience (such as the proposed ford where the Oneula Beach Park roadway crosses the drainageway, at the shoreline and at the development's private golf course); and

(2) The Applicant and its agent should seek advice from a qualified landscape architect or other professional regarding the groundcover vegetation to be maintained in the drainageway. The concern is that vegetation used in the drainageway should be selected to avoid hazardous (toxic, thorny, or spiky seed pod bearing plants) species.

Although the proposed project is in the preliminary stage of design, renderings depicting the profile and plan view of the channel will be provided in the forthcoming Draft Environmental Impact Statement (DEIS). The figures will illustrate: the relationship of the project to the location of the existing access road (which will be modified to function as a ford on rare occasions when flood flows are anticipated); the shoreline; and the golf course.

The selection of groundcover vegetation will be based on consultation with an appropriate design professional. We will consider using native and endemic plants, and to avoid selecting any species that may be considered hazardous. Our intention is to select species that are suited to this generally arid area and which are not unsightly or hazardous, and to use landscaping that is easy to maintain.

We appreciate your taking the time to review and comment on this important project. Should you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Eric G. Crispin, AIA, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Oshima Chun Fong and Chung, LLP

JULY
JUNE 8, 2004

GLENN J. OAMILDA
91-1170 Puamae'ole Street, 24V
'Ewa Beach, Hawai'i 96706

RECEIVED
JUL 12 2004
DEPT. OF PLANNING AND PERMITTING
650 SOUTH KING ST.
HONOLULU, HI 96813

R.M. TOWILL CORPORATION
420 Waiakamilo Road, Suite 411
Honolulu, Hawai'i 96817-4941

REFERENCE: KALOI GULCH DRAINAGEWAY IMPROVEMENTS AT ONE'ULA BEACH PARK, RMTC #19944-OP

Gentlemen, Aloha!

If introductions are in order, then by all means, let me introduce myself. My name is Glenn Oamilda, perhaps one in a handful of 'Ewa Beach residents left who have followed the developer, Haseko from inception, some fifteen (15) or twenty (20) years ago, following its Development very closely to where it's at today. I also continue to participate in community activities -- social, cultural, as well as, being active and vocal on political issues that directly affect the general welfare of the community.

Throughout the years I have watched Haseko struggle along with great progress on the marina development and on its housing construction projects. Moreover, despite all the social and cultural road blocks, and through the whole political processes Haseko had to go through could not have done it without the trust and cooperation of the -- COMMUNITY!

However, within the last five (5) years, relationship have strained, and at time very contentious because of the lack of consideration, sensitivity and failure to consult with the 'Ewa Beach community on issues and plans that directly impact their *'quality-of-life'* and their social and cultural *'life-style'*, as well.

At this time I want to take this opportunity to present my personal views and opinions on two (2) topics of interest. One of which no doubt is Haseko's proposed project, KALOI GULCH DRAINAGE IMPROVEMENTS AT ONE'ULA BEACH PARK, in which I consider changes to Ocean Pointe Master Plan, and changes from the original 'Ewa Marina Master Plan, approved by and accepted by the 'Ewa Beach community back in the early '90s, that will:

1) alter the 'Ewa Beach community's One'ula Beach Park's recreation and social activities;
2) 'Ewa Beach community's ocean cultural *'life- style'*;
3) cause potential irreversible impacts to the coastline, i.e., the ocean's ecosystem - flora and fauna; and,
4) the lost forever of nearby kiawe forest, the nesting places for birds, and natural habitat for ground animals; and, the other

is, the City and County of Honolulu's inaction, of which many citizens share my deep resentment, for not addressing the potential impacts that this project will cause, and its past inability to provide direct leadership, guidance and control on all developments on the 'Ewa Plains. For all these reasons and many more, I oppose the flood and storm control proposal.

This Kaloi Gulch Drainageway Improvements at One'ula Beach Park plan will alter and change drastically the key and important physical characteristic, of which is, the drainage pattern. As originally approved in a Plan entitled 'Ewa Marina: Final Supplemental Environmental Impact Statement that specifically addressed all heavy rains, storms and the hundred (100) years flood received on Haseko's property through Kaloi Gulch.

It was a drainage plan that was much safer and less risky to the 'Ewa Beach community. The old plan configured Haseko's golf course, at the upper most limits of the property, running makai of Geiger Road, in an

easterly and westerly as a retention and/or detention wash-out plain from the mauka rain and flood waters, which in no way the waters could come remotely close to the ocean.

What waters passed through the golf course, would eventually drain into the upper, inland waterways of the marina. This is what the community considered to be environmentally the safest, and in the community's mind the most logical.

This new Haseko drainageway improvements totally reconfigure the golf course which originally ran makai of Geiger Road in an easterly/ westerly direction, now would run down the length of Chicken Creek ending perpendicular to the entry road to Hau Bush.

Furthermore, at the Hau Bush entrance and Chicken Creek, Haseko's new modified plan calls for a even wider opening from the present and existing fifty (50) feet to a whopping five-hundred (500) feet, almost one and half (1-1/2) football fields wide. Why? To Haseko, Hau Bush could be used as the terminus, a retention, a catchment, "out-wash" flood basin, a dumping ground, a channel to catch the mauka storm and rain waters from Kaloi Gluch's hundred (100) year flood. No way! Get off it Haseko!

Furthermore, the decision to shrink the upper inland waterways of the marina, which would serve as a catchment for the excess flood and storm waters passing through the golf course would increase the likelihood that Hau Bush would now be used as a flooding zone, an out-wash plain during heavy rains, and act as a catchment basin for the hundred (100) Kaloi Gulch Flood. This proposal simply takes advantage of the community, and with little forethrought, or consideration for the community, I think is appalling!

Let me for a second revisit at least two (2) government entities that Haseko had to initially apply to and comply with in order to get the

necessary permits to start the building process. 1) The Hawai'i Coastal Zone Management (CZM) Program Federal Consistency Program that said,

> "Before the Federal permits can be issued .... the project must encompass broad concerns such as impact on recreation resources, historical and archaeological resources, coastal scenic resources and open spaces, and coastal hazards .... "

and, 2) as approval for an Special Management Area (SMA) Use Permit,

> "The proposed marina will act as a receiving embayment for storm water runoff from the Kaloi (Gulch) watersheds, buffering the impact of stormwater flowing into the ocean and providing flood control. The proposed 'Ewa Marina Phase II golf course will be used as a detention area, and together with silt basins incorporated in the design of the drainage system, will minimize the amount of silt entering the marina."

Haseko also makes the assertion that this drainageway improvements are warranted because of the existing main sewage out-fall pipe coming from the Honouliuli Waste Water Treatment Plant (HWWTP) that terminates into the ocean, would be too costly to lower the pipe eight-hundred (800) feet in length to a depth of no less than eight (8) feet.

Honestly in my opinion, it's all about money! Haseko, the developer, would rather put the community 'at risk' by this total reconfiguration of the golf course, which would now run down Chicken Creek and terminating at the mauka entrance road to Hau Bush Park, perpendicular to the ocean's high water mark, than to spend money modifying eight-hundred (800) feet of piping.

This idea, in my opinion, will adversely impact Hau Bush, One'ula Beach Park's recreation, athletic and social activities; it will cause irreversible damages to the coastline; it will impact the public's ocean *'life-style'*; it will severely strain the ocean's ecosystem - the flora and fauna, and; it will cause the lost of nearby kiawe forest, nesting places for birds, and a natural habitat for ground animals.

Now at this point it leads me to the other half of my testimony. Where is the City any way? Where is the Department of Planning and Permitting, who issues all the permits so developers can continue to build and impact our lives? And the Department of Parks and Recreation, who allows the developer to flood the park, and which will cause great harm to the 'Ewa Beach's recreation, coastal and near shore areas. Yes, Roger, you're right, no where to be found!

If anyone think there's no *'hands-in-pockets,'* connection between government and politicians with the developer, consider this: Beginning the '80s and into the '90s, when the 'Ewa Plains was designated the Second City, the City and County of Honolulu envisioned huge wind-fall profits from the booming housing construction along the Fort Weaver Road corridor in 'Ewa.

Plagued by continuing greed, scandals and mismanagement in the 'Ewa Villages rehab program and the West Loch projects, the City who was heavily engaged in housing construction, at that time, was forced to abandon its Housing Department forever.

Demoralized, the City by the mid-'90s was completely overwhelmed by approval requests for zoning, re-zoning, waivers, amendments, agreements and permits for new housing construction. Thus, unable to control growth and development in the 'Ewa area, or even attempt to mitigating the mounting impacts, it became apparently clearer that the City had yielded most if its inherent powers to the developers, landowner and to the

politicians. So the thought of a *'balanced and sustainable growth'* on the 'Ewa Plains as envisioned by the guidelines and enforceable provisions of the 'Ewa Development Plan had all, for the most part, been for naught.

When the City was then left to die sapped of all political powers, the developers ('Ewa by Gentry, Haseko, Schuler Homes, Castle Cooke) who had 'morphed' themselves into a four-headed *'Beast'* with the landowner (Estate of James Campbell) and politicians embedded in its belly, simply moved in for the kill, strangling the City of its last breath, regretfully, leaving it powerless in the 'Ewa Region.

With no governmental agency left to channel and redress formal grievances against the developers, the communities on the 'Ewa Plains was left *'holding the bag.'* It became apparently clearer that this four-headed Beast has taken over the leadership role in guiding and directing all developments in the Second City.

Today the *Beast* proudly slithers freely along the 'Ewa landscape hissing and sneering at those who question its behavior, and shows no changes in attitude, or compassion for the distruction of 'Ewa's people *life-style* and *quality-of-life*. The *Beast* continues to build at a rampant, uncontrolled, fast-tracked pace, and rushes to build out with great concern for construction deadlines. It hungers for profits, and awaits patiently savoring the tastes of buyers' markets.

Furthermore, since the mid-'90s, and at the mercy of the *Beast*, the City's Planning and Permitting Department, under the directorship of Mr. Eric Crispin, has never denied or turned-down any permit requests from any of the developers in the Region, or the landowner for zoning, re-zoning, waivers, unilateral agreements, amendments and housing permits.

Regretfully and shamelessly, Honolulu's City government had freely-handed over its responsibility by not providing the adequate

guidance, leadership and control over all the developments in the Region to the landowner and developers, from 'Ewa Beach to Makakilo.

It came as no surprise to me, in July, 2003, after testifying against Haseko's permit request for an additional nine-hundred-forty (940) units because of heightened impacts to the entire Region, the City without a single question to the developer that would address the area's concerns, approved its request.

Additionally, some living in the community would say let's *'wait and see'*, (a public's attitude leery of governmental decision-making), how the City handles 'Ewa by Gentry's permit request for an additional eighteen-hundred (1,800) units and a twenty (20) acre shopping center. The same prevailing concerns I had addressed in Haseko' project were reiterated in 'Ewa by Gentry's public testimony on impacts that will no doubt double and intensify in 'Ewa Beach and throughout entire 'Ewa Plains as well. Honestly with the handwriting on the wall and knowing the track record of the City, having never denied any request, it will become clear, and that without question 'Ewa by Gentry will have its cake and eat it too.

My only retort is addressed to Mr. Eric Crispin, the City's chief Planning and Permitting officer and Mr. Bill Balfour, the Director of Parks and Recreation, is this, " I don't think you should alter, in way, your practice of freely granting developers their requests, nor even question their reasoning, because the public overtly knows you are being held in bondage by this ugly *Beast*, and until the *Beast* is slain, you and your Department will always be subservient to the developers!"

So, what are the communities in the 'Ewa Plains, namely 'Ewa Beach and Makakilo to do without government's leadership, guidance and control over all developments? Simply put, Go at it alone! Let the government

sit alone along the sideline as a spectator sucked of all its powers and leadership, and watch as the public, from 'Ewa Beach to Makakilo, from Hawai'i Kai to Mililani Mauka, from East Maui to the big island and Kaua'i, battles this ugly *Beast* one on one.

In 'Ewa Beach alone, Haseko's Ocean Pointe, a head the *Beast*, has unleashed heavy havoc from the mounting impacts caused by its development on the residents and homeowners of 'Ewa. The impacts has intensified to a point that living in 'Ewa has become so unbearable -- *mentally, physically, and financially!*

In recent weeks, Haseko's Ocean Pointe has been embroiled, in yet, another contentious issue with the 'Ewa Beach community.

Locked up in litigation by a (TRO) Temporary Restraining Order over "THE WALL," the presiding judge in thie case made it empathetically clear that the community and Haseko should engage in mediation or resolution on the issue. But yea, judge, where is the psychological and financial fairness and advantage in this whole process, when the developer has already built a physical barrier, "THE WALL."? If we talk about fairness, let's start at ground zero, level the playing field, otherwise no dice!

Haseko had been coming before members of the community in hopes of garnering preliminary support for this revised flood control plan proposal for this 'Ewa Marina development.

So then why a new and modified 'Ewa Marina Master Flood Control Plan? Is it about Haseko spending the bucks? Is it taking advantage of the political process, in that the City has not maintained an active role? Good guess, Joe!

It is inconceivable , but it comes as no shock to me that Haseko who was once a player, along with community and the government, have overtly resorted to scheming and deceit. If Haseko still wishes to play fair, I ask

you spend the money to modify the eight-hundred (800) feet of sewage drainage piping, rather than ask the community to give up five-hundred (500) feet of cherished ocean front. The community is not the visitor, you are!

If Haseko, you don't wish to spend, then I simply ask that you again go though political procese, and again face those entities that have allowed you to be where you are today, The Navy Corp of Engineers, CZM, SMA, and the -- COMMUNITY!

Mahalo! In justice and fairness,

Glenn Oamilda

cc: Mr. William Balfour, Jr., Director
Department of Parks and Recreation
City and County of Honolulu
1000 Ulu'ohia Street, Suite 309
Kapolei, Hawai'i 96707

Mr. Eric Crispin, AIA, Director
Department of Planning and Permitting
City and County of Honolulu
650 South King Street, 7th floor
Honolulu, Hawai'i 96813

Councilman Mike Gabbard, District 1
Holululu Hale
530 South King Street, Room 202
Honolulu, Hawai'i 96813

Mr. Nelson W.G. Lee, Executive Vice-President
91-1001 Kaimalie Street, Suite 205
'Ewa Beach, Hawai'i 96706

Representative Romy Mindo
Hawai'i State Capitol
415 South Beretania Street
Honolulu, Hawai'i 96813

Senator Willie C. Eepero
Hawai'i State Capitol
415 South Beretania Street
Honolulu, Hawai'i 96813

420 Waiakamilo Road
Suite 411
Honolulu Hawaii 96817-4941
Telephone 808 842 1133
Fax 808 842 1937
eMail rmtowill@hawaii.rr.com

R. M. TOWILL CORPORATION
SINCE 1930

Planning
Engineering
Environmental Services
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Surveying
Construction Management

December 8, 2004

Mr. Glen J. Oamilda
91-1170 Puamae'ole Street, 24V
Ewa Beach, Hawaii 96706

Dear Mr. Oamilda:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Environmental Impact Statement Preparation Notice

On behalf of HASEKO (Ewa), Inc., thank you for your letter dated July 8, 2004, relating to the subject project. We appreciate the time you have taken to assemble your comments and wish to recognize your past support.

We believe you have expressed two major points: (1) comments regarding the Kaloi Gulch drainage improvements; and (2) comments regarding the City and County of Honolulu. A response to your first point has been prepared by us, but we cannot respond to your second point because it is inappropriate for us to speak for the City and County of Honolulu.

The plan for the Ocean Pointe (Ewa Marina) project has evolved over time in response to new regulatory and market conditions. You will note that HASEKO has attempted to implement development over the past two decades in the face of changes to the regulatory environment which were not present during the early beginnings of the project.

The development landscape on the Ewa plain has also changed since the 1980s when sugar was in transition out of production. The sugar cane fields gave way to new developments such as the second city in Kapolei, Ewa Villages, and Ewa by Gentry. Future development will include projects associated with the University of Hawaii and the Department of Hawaiian Home Lands. The effect of this new pattern of land use is that we must change the way that existing stormwater flows are handled to maintain public safety. HASEKO (Ewa), Inc., proposes to construct the subject project as part of its responsibility and obligation for public safety.

You have noted that this is a change from earlier plans to lower the Honouliuli Waste Water Treatment Plant sewer outfall, and then construct an upper marina basin. HASEKO is not pursuing the option to lower the sewer outfall at this time due to recently raised environmental, maintenance, and construction issues.

At the same time, the planned drainage project will not change the basic drainage scheme you reference. The drainage plan outlined in the Ewa Marina EIS still requires up-stream users to discharge stormwater into the Ocean Pointe Golf Course. The golf course will act as a detention area to settle out sediments before discharges reach the ocean. From the golf course a portion of this stormwater will drain into the marina and a portion will drain into Kaloi Gulch.

In the late 1990s and early 2000, an emergency drainage channel was constructed by HASEKO (Ewa), Inc., at the request of the City and County of Honolulu. The emergency channel, however, is not wide

enough to convey the stormwater that is expected from the 100-year flood flow. Based on information regarding the potential discharge of stormwater from upstream developments, it has been determined that the channel will need to be improved to approximately 500 feet wide by 300 feet long, by 8 feet deep to convey the maximum amount of runoff that would be generated. A further description of the channel in relation to the Oneula Beach Park and related information will be provided in the project Draft EIS.

We are hopeful that the planned Oneula Beach Park Master Plan in conjunction with the subject drainage improvement project will transform this former "end of the road" park into one that has the potential of becoming an even more important open space and recreation amenity for the Ewa Beach community. This is clearly in keeping with the intention to further improve the aesthetics of the channel in relation to the park through the use of landscaping and grassing. The use of vegetation will also be consistent with a more natural approach to drainage control.

While we do not agree with many of the assertions that you have made concerning the subject project, we do point out that many of the drainage features that are now in place throughout the Ewa region include the use of more sensible and environmentally sensitive natural controls such as vegetated detention basins and grass-lined drainage channels in open space areas such as parks and golf courses. The consideration and use of natural features such as these are the result of the City seeking the input of the Ewa community to author such regulatory documents as the Ewa Development Plan with its provisions for public facilities and infrastructure.

It is our hope that we will continue to have an open discussion with you as we value your comments and wish to maintain a constructive dialog. Should you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Eric G. Crispin, AIA, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Oshima Chun Fong and Chung, LLP

July 7, 2004

Eric Crispin, AIA Director
Department of Plannng and Engineering
City and County of Honolulu
650 south King Street
Honolulu Hawauu

Dear Mr Crispin:

This letter is in response to your most recent correspondence requesting my comments on the Environmental Imparement Statement Preparation Notice (EIS) prepared by R.M. Towhill Corporation for the Kaloi Gulch Drainage Way Improvement at Oneula Beach Park for Haseko Corporation Ewa Beach, Hawaii. The following is an outline of my concenrs after careful review of the EIS attached withthe aforementioned correspondence.

1. Best management Practices (BMP) be revised to include surface retention of oils and other organic compouiinds from contaqinment ponds. The captured contaminants should be disposed of in afccordance with all applicable federal or local codes or which ever is the most stringent.

2. The Marine Study element of the existing EIS be broadened to include assessment of coastal habitat, giving serious consideration to ecologial food webs and chains.

3. The proposed golf course should be maintained using recycled water as the primary source. The ground water supply should utlized only when receycled water is not available, not as a mechanism to control operating costs for the golf course.

4. Rock and aggregate used for the containment ponds be basalt, not limestone or coral rock quarrird from the site.

5. The cultural component of the study be broadened to include video interviews with Kupuna from Ewa Beach. The video should be made available to the public through the community library. The following Kupuna are highly recommended:

   Unncle Henry Chang Wo
   Aunt Eileen Eaton
   Uncle Walter Kamana
   Aunt Helen Kamana
   Aunt Mary Serrell

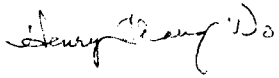
6. Development of a comprehensive BMP , Emergency and water quality test manuals. The manuals should be submitted to Ewa Bweach Neiughborhood Board and Ewa Beach Association for final review.

7. Extensive monitoring of water quality (WQ) before and after the water enters the Kaloi Gulch drainageway. The testing should include but not be limited to contaminants, heavy metals, sediment and bacteria (enterococcus and coliform). The test results should be provided to the Ewa Bweach Neighborhood Board and Ewa Beach Association for review no later than two weeks after the tests have been performed. The frequency of testing should be commensurate with seasonal rainfalls and at reasonable intervals thereafter.

8. Resources should be allovated ot improve the system if it is found to be inefficient or unable to meet minimum state or federal, which ever is more stringent, water quality standards.

In closing I sincerely appreciate the opportunity to review the initial draft and look forward to our future dealings as the project progresses.

Sincerely



Henry Chang Wo

cc. R.M Towhill Corporation
Shareen Tam, Haseko Corporation

420 Waiakamilo Road
Suite 411
Honolulu Hawaii 96817-4941
Telephone 808 842 1133
Fax 808 842 1937
eMail rmtowill@hawaii.rr.com

R. M. TOWILL CORPORATION
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Planning
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December 8, 2004

Mr. Henry Chang Wo
801 South Beretania Street
Honolulu, Hawaii 96813

Dear Mr. Wo:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Environmental Impact Statement Preparation Notice

On behalf of HASEKO (Ewa), Inc., thank you for your letter dated July 7, 2004, to the Department of Planning and Permitting, describing your concerns. We have prepared the following in response to your comments:

1. Best Management Practices (BMPs)
A BMPs Plan will be prepared as part of the National Pollutant Discharge Elimination System (NPDES) permit to address discharges of stormwater associated with construction of the proposed project. A standard part of the BMPs Plan will be to ensure that discharges of petroleum, oils, and lubricants (POLs) and other contaminants are prevented from commingling with stormwater to reduce the chances of such discharges entering State waters.

   Following construction, maintenance measures will be put into place to ensure that the drainage channel can continue to operate in an optimal manner. This will include the removal of any built up sediments that may be deposited in the channel. The disposal of this sediment will be in accordance with all applicable state, local and federal regulations.

2. Marine Study of the Coastal Environment
HASEKO has undertaken a number of marine environmental studies along the Ewa coastal area for this and other Ocean Pointe projects which are regulated by federal, state, and county environmental law. Information from studies recently completed for this project will be provided in the Draft Environmental Impact Statement. These studies include:
   - Ocean Pointe Marine Environmental Monitoring Program Water Chemistry, March 2004
   - Numerical Modeling of Storm Drain Discharge Plume Transport, August 2004

   - Sea Turtle Marine Surveys Conducted Off of Ocean Pointe and Oneula Beach Park, 1992 through 2003, 2004

   We appreciate your concern for a study to further assess the coastal habitat, including further investigation of ecological food webs and chains. Although we do not believe that the proposed project involving construction of improvements to an existing drainage facility would adversely affect the marine environment or ecology, we are willing to consider your suggestion if there should be a major modification to the project which would result in the potential for such impacts.

3. Maintenance of Golf Course Using Recycled Water
Although the operation of the Golf Course is not specifically a part of the proposed project, we do agree that it is important to utilize our water resources wisely. It is the intention of HASEKO to consider the use of non-potable water to support construction of the proposed drainage improvement project. This will include the possible use of non-potable water from HASEKO wells for dust control and irrigation to establish the growth of grass and landscape vegetation.

4. Use of Basalt for Aggregate
We acknowledge your comment concerning the use of basaltic rock and aggregate for construction of the containment ponds. Our intention is to utilize the existing soils found on site during construction of the drainage channel improvements. Grassing and other landscaping treatments will be applied to the surface of these facilities to promote the detention and filtration of storm water runoff.

5. We wish to acknowledge and thank you and Ms. Arline Breed-Eaton, for your participation in the cultural interviews we undertook to better understand the history and use of coastal resources in the Ewa area of Oneula Beach Park. We understand that the James Campbell High School will be undertaking the Voices of the Ewa Plains Project to interview or record stories from individuals about the history of the Ewa area. These interviews and recordings will eventually be kept at the Ewa Beach Public and School Library.

6. Comprehensive BMPs, Emergency and Water Quality Test Manuals
The BMPs being undertaken for this project will be in association with the NPDES permit application described above. Water quality monitoring, which has been an ongoing activity for this project is also described in the report, Marine Environmental Monitoring Program Water Chemistry, March 2004. We will provide the findings of this document in the forthcoming project Draft EIS. An important report finding was that natural environmental factors have been influencing water quality in the Ewa region, and are not a result of construction activities. The report also noted that the water quality monitoring program continues to indicate that there has been no discernible effect to the nearshore ocean from ongoing construction activities.

7. Extensive Monitoring of Water Quality
HASEKO shares your concern that stormwater discharges from the Kaloi Gulch should not result in the potential for negative adverse impacts to the environment. This concern was in part responsible for the water quality monitoring which has been undertaken. Further testing of storm water discharges will be conducted as required, through our consultation with the State Department of Health (DOH) to ensure the continued protection of the Ewa coastal environment.

8. Further Allocation of Resources to Improve the Drainage System
As we have indicated above, we will continue our work with DOH to meet the water quality standards of the State (as contained in Hawaii Administrative Rules, Chapter 11-54 Water Quality Standards, and Chapter 11-55 Water Pollution Control).

We appreciate the time you have taken to review and comment on the EIS Preparation Notice and look forward to your future communication as we consult with you and the community on this important project. Should you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Eric G. Crispin, AIA, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Oshima Chun Fong and Chung, LLP

LINDA LINGLE
GOVERNOR OF HAWAII

GENEVIEVE SALMONSON
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
235 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186
E-mail: oeqc@health.state.hi.us

CITY & COUNTY OF HONOLULU

July 6, 2004

Mr. Eric Crispin, Director
Department of Planning and Permitting
City and County of Honolulu
650 South King Street
Honolulu, Hawai'i 96813

Dear Mr. Crispin:

Subject: EISPN for the Kaloi Gulch Drainageway Improvements at Oneula Beach Park, O'ahu

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

1. Please study the impact on the nearby ocean resources such as limu, etc.

2. Please consult with users of the nearby ocean resources.

Sincerely,

Genevieve Salmonson
Director

c: Haseko

420 Waiakamilo Road
Suite 411
Honolulu Hawaii 96817-4941
Telephone 808 842 1133
Fax 808 842 1937
eMail rmtowill@hawaii.rr.com

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December 8, 2004

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

Dear Ms. Salmonson:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Environmental Impact Statement Preparation Notice

On behalf of HASEKO (Ewa), Inc., thank you for your letter dated July 6, 2004, stating that the Office of Environmental Quality Control has the following comments on the above-referenced project: (1) please study the impact on the nearby ocean resources such as limu, etc.; and (2) please consult with users of the nearby ocean resources.

HASEKO has undertaken further review of information on the potential impact of the proposed project on nearby ocean resources. We have also discussed the potential for impacts on limu with marine biologists and residents involved in the Limu Project. These matters will be addressed in the Draft Environmental Impact Statement. Further, HASEKO has consulted and will continue to consult with users of the nearby ocean resources as well as other members of the community during the Environmental Impact Statement process.

Should you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda
Planning Project Coordinator

cc: Mr. Eric G. Crispin, AIA, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Oshima Chun Fong and Chung, LLP

LINDA LINGLE
GOVERNOR

STEPHANIE AVEIRO
EXECUTIVE DIRECTOR

PAMELA Y. DODSON
EXECUTIVE ASSISTANT

STATE OF HAWAII
DEPARTMENT OF HUMAN SERVICES
HOUSING AND COMMUNITY DEVELOPMENT CORPORATION OF HAWAII
677 QUEEN STREET, SUITE 300
Honolulu, Hawaii 96813
FAX: (808) 587-0600

IN REPLY REFER TO:
04:PEO/124

2004 JUL 8 PM 1 36
CITY & COUNTY OF HONOLULU

July 6, 2004

Mr. Eric G. Crispin, AIA
Director
Department of Planning and Permitting
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Crispin:

Re: Environmental Impact Statement Preparation Notice for Kaloi Gulch Drainageway Improvements at Oneula Beach Park

The applicant is proposing to construct drainageway improvements including (1) drainage channel widening; (2) reconstruction of existing access road; and (3) accessory improvements including grassing, landscaping, fencing, and installation of signage at Oneula Beach Park. The HCDCH is supportive of the proposed action which would provide drainage capacity for the region.

Thank you for the opportunity to comment.

Sincerely,

Stephanie Aveiro

Stephanie Aveiro
Executive Director

420 Waiakamilo Road
Suite 411
Honolulu Hawaii 96817-4941
Telephone 808 842 1133
Fax 808 842 1937
eMail rmtowill@hawaii.rr.com

R. M. TOWILL CORPORATION
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December 8, 2004

Ms. Stephanie Aveiro
Executive Director
State of Hawaii
Department of Human Services
Housing and Community Development Corporation of Hawaii
677 Queen Street, Suite 300
Honolulu, Hawaii 96813

Dear Ms. Aveiro:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Environmental Impact Statement Preparation Notice

On behalf of HASEKO (Ewa), Inc., thank you for your letter dated July 6, 2004 to the Department of Planning and Permitting stating that the Housing and Community Development Corporation of Hawaii is supportive of the proposed action to provide sufficient drainage capacity for the Ewa Region.

We appreciate your support and the time you have taken to review and comment on this important project. Should you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Eric G. Crispin, AIA, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Oshima Chun Fong and Chung, LLP

POLICE DEPARTMENT

CITY AND COUNTY OF HONOLULU

801 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96813 - AREA CODE (808) 529-3111
http://www.honolulupd.org
www.co.honolulu.hi.us

JEREMY HARRIS
MAYOR

GLEN R. KAJIYAMA
~~LEE D. DONOHUE~~
ACTING CHIEF

~~GLEN R. KAJIYAMA~~
PAUL D. PUTZULU
DEPUTY CHIEFS

OUR REFERENCE CS-KP

July 2, 2004

2004 JUL 6 PM 12 23
CITY & COUNTY OF HONOLULU

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

FROM: GLEN R. KAJIYAMA, ACTING CHIEF OF POLICE
HONOLULU POLICE DEPARTMENT

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT PEPARATION NOTICE, KALOI GULCH DRAINAGEWAY IMPROVEMENTS AT ONEULA BEACH PARK, TMK: 9-1-12: PORTION OF 2 AND 25

Thank you for the opportunity to review and comment on the subject project.

We do not anticipate any significant impact on police services as a result of this project.

If there are any questions, please call Captain Gregory Lefcourt of District 8 at 692-4253 or Ms. Carol Sodetani of the Support Services Bureau at 529-3658.

GLEN R. KAJIYAMA
Acting Chief of Police

By
KARL GODSEY
Assistant Chief of Police
Support Services Bureau

Serving and Protecting with Aloha

420 Waiakamilo Road
Suite 411
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December 8, 2004

Mr. Karl Godsey
Assistant Chief of Police
Support Services Bureau
Honolulu Police Department
City and County of Honolulu
801 South Beretania Street
Honolulu, Hawaii 96813

Dear Mr. Godsey:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Environmental Impact Statement Preparation Notice

On behalf of HASEKO (Ewa), Inc., thank you for your letter dated July 2, 2004, to the Department of Planning and Permitting, stating that the Honolulu Police Department does not anticipate any significant impact on police services as a result of the subject project.

We appreciate your taking the time to review and comment on this important project. Should you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Eric G. Crispin, AIA, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Oshima Chun Fong and Chung, LLP

20041ELOG-1541

BOARD OF WATER SUPPLY

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

2004 JUL 8 AM 8 42

CITY & COUNTY OF HONOLULU

July 2, 2004

JEREMY HARRIS, Mayor

EDDIE FLORES, JR., Chairman
CHARLES A. STED, Vice-Chairman
HERBERT S. K. KAOPUA, SR.
DAROLYN H. LENDIO

RODNEY K. HARAGA, Ex-Officio
LARRY J. LEOPARDI, Ex-Officio

CLIFFORD S. JAMILE
Manager and Chief Engineer

DONNA FAY K. KIYOSAKI
Deputy Manager and Chief Engineer

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

FROM: for CLIFFORD S. JAMILE K. Sinda

SUBJECT: YOUR LETTER ON THE ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE FOR THE KALOI GULCH DRAINAGEWAY IMPROVEMENTS, 2004/ED-12 (ASK), TMK: 9-1-12: PORTION 2 AND 25

The construction drawings for the proposed improvements should be submitted for approval.

If you have any questions, please contact Joseph Kaakua at 748-5442.

Pure Water . . . our greatest need – use it wisely

420 Waiakamilo Road
Suite 411
Honolulu Hawaii 96817-4941
Telephone 808 842 1133
Fax 808 842 1937
eMail rmtowill@hawaii.rr.com

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December 8, 2004

Mr. Clifford S. Jamile
Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843

Dear Mr. Jamile:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Environmental Impact Statement Preparation Notice

On behalf of HASEKO (Ewa), Inc., thank you for your letter dated July 2, 2004, to the Department of Planning and Permitting stating that the construction drawings for the proposed improvements should be submitted for approval. We acknowledge and intend to comply with the requirements of the Board of Water Supply during the planning process for this project.

We appreciate your taking the time to review and comment on this important project. Should you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Eric G. Crispin, AIA, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Oshima Chun Fong and Chung, LLP

Date: June 29, 2004

To: R. M. Towill Corporation
420 Waiakamilo Road, Suite 411
Honolulu, HI 96817

From: Tesha H. Malama
91-818 Lawalu Pl.
Ewa Beach, HI 96706

Subject: Kaloi Gulch Drainageway Improvements at One'ula Beach Park

Pg. 11 2.2 A, Ground Elevation. Between 3 and 8 feet above mean sea level.
- What is the actual height of the bank slopes from the park ground level view?
- What is the height of the bank slopes traveling from sea to mountain?
- Will the height of the bank slopes impede the site of the ocean or view of the east (Diamond Head)?
- How will the water drain out side the banks of the drainage way?

Pg. 12 2.2 B. Access Road.
- Will the new access road eliminate the current flooding conditions before you get to the park?
- Will the new access road be constructed with guard rails to prevent people driving off the sides?
- Will the new access road be constructed to allow for proper drainage of rain water on both the Mauka and Makai sides of the access road?

Pg. 22 4.4 Groundwater.
- Is there any impact on the groundwater as you dredge near the projected site?
- What is the sediment and pesticides from undeveloped lands impact on the groundwater?
- What is the sediment and pesticides from undeveloped lands impact on the sand and beach area of the site and the surrounding park area?

Pg. 25 4.6 Drainage and Coastal Waters
- What kind of requirements and filtering process is required for the future Ocean Pointe Golf Course?
- What are the water holding capacity requirements for the golf courses mauka of the project site?
- What is the filtering capacity of the golf courses mauka of the project site?
- What are the water holding requirements for each development mauka of the project site?

General Inquiry
1. Is there an educated projection for the capacity of rain water and run-off created by a 100 year flood for the Makakilo/Ewa plain?
2. What are the other areas in this state with similar situations and were similar steps taken to prepare for the 100 year flood?
3. What kind of measures will be implemented to monitor the holding capacities of each golf courses mauka of the project site to ensure they are always ready for the 100 year flood?
4. Each golf course mauka of the project site should be required to meet holding capacities.

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eMail rmtowill@hawaii.rr.com

R. M. TOWILL CORPORATION
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Construction Management

December 8, 2004

Ms. Tesha H. Malama
91-818 Lawalu Place
Ewa Beach, Hawaii 96706

Dear Ms. Malama:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Environmental Impact Statement Preparation Notice

On behalf of HASEKO (Ewa), Inc., thank you for your letter dated June 29, 2004, providing an outline of your well considered questions. We have prepared the following in response:

1. Ground Elevation
   - The height of the bank slopes will be 4 to 6 feet when viewed from within the channel and 1 to 3 feet high as viewed from outside the channel.
   - The height of the channel banks will be 4 feet at the shoreline and then will rise to approximately 10 feet at the mauka park boundary.
   - The height of the bank slopes are not expected to be high enough to adversely impeded views to the east.
   - Drainage on the west of the channel will flow to the existing park swales. Drainage on the east will flow to the Papipi Road area as it currently does. This area will later be fitted with a drainage system when HASEKO developed that area.

2. Access Road
   - Yes, the area will be graded so that the new access road drainage will not pond with standing water.
   - No, guard rails will not be needed since there will no steep drops next to access road. This is something we will coordinate through our discussions with the Department of Parks and Recreation and Department of Planning and Permitting.
   - Yes, as noted above the access road will be designed so that there will be sufficient drainage with no ponding.

3. Groundwater
   - Dredging into groundwater will not be a part of the proposed project. We therefore do not expect nor anticipate that groundwater resources will be affected.
   - We do not anticipate that our project will have a negative impact on groundwater resources. However, we do know that through the use of more natural control measures such as the grass-lined channel, that there will be improved control over stormwater related sediment loading in the ocean. We will further discuss this matter in the project Draft EIS and welcome your review of the document.
   - The use of the grass-lined channel in combination with the vegetated detention features of the golf course will also help to promote the recharge of groundwater which might otherwise be lost if the runoff were simply directed into the open ocean.
   - The proposed project is designed to provide regional drainage capacity through improvements to an existing drainage facility. Discharges of sediments normally associated with storm flows have been considered and are addressed by this project. We have undertaken numerous discussions with city and state agencies concerning this project and are not aware of and do not anticipate any potential impacts associated with pesticides from developed or undeveloped land upstream of the project site.

3. Drainage and Coastal Waters
   - A major requirement for the golf course, and all upstream developments in the Kaloi Drainage Tributary is that they comply with Hawaii Administrative Rules (HAR), Chapter 11-54, Water Quality Standards, and Chapter 11-55, Water Pollution Control. There are other federal and county standards that apply including provisions of the federal Clean Water Act that are specifically regulated by agencies such as the U.S. Department of the Army, Corps of Engineers, and at the county level by the Department of Planning and Permitting.
   - Presently, there is approximately 160 acre/feet of retention and 400 acre/feet total detention for the Ewa Villages and Coral Creek golf courses.

4. General Inquiry
   - The volume of runoff that will be handled by this project from upland developments in Ewa is 10,800 cubic feet per second from the 100-year flood flow as required by the City.
   - A similar situation involving the use of public recreational space to handle stormwater is at the Hilo Municipal Park, which uses open grassed park space for stormwater detention. The majority of the time when the park space remains dry, the area is used for soccer and other recreational sports.

   - The City will monitor storage capacity provided by upland developments through the Plan Review process. Grading and drainage permits will be monitored by the Department of Planning and Permitting.
   - We agree with your statement that each golf course mauka of the project site should be required to meet holding capacities as required by the City.

We appreciate the time you have taken to review and comment on the EIS Preparation Notice. We look forward to your future communication as we consult with you and the community on this important project. Should you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Eric G. Crispin, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Oshima Chun Fong and Chung, LLP

2004/2004-1422

PHONE (808) 594-1888

FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

2004 JUN 30 PM 1 13

CITY & COUNTY OF HONOLULU

HRD04/1422

June 28, 2004

Eric G. Crispin, AIA
Director, Department of Planning and Permitting
City and County of Honolulu
650 South King Street
Honolulu, HI 96813

RE: Request for Comments on an Environmental Impact Statement Preparation Notice for Kaloi Gulch Drainageway Improvements at Oneula Beach Park, Ewa, O'ahu, TMK: 9-1-012: portion of 002 and 025

Dear Eric Crispin,

The Office of Hawaiian Affairs is in receipt of your request for comments on the above proposed project, which would upgrade part of the existing Kaloi Gulch drainageway by creating a shallow, 500-foot-wide channel. OHA offers the following comments on the proposed project and looks forward to reviewing the eventual Draft Environmental Impact Statement.

OHA understands the need to improve drainage capacity for the Kaloi watershed and to meet the City and County of Honolulu's current drainage standard, which requires the capacity to withstand a 100-year flood. We are concerned about the level of stormwater runoff that is anticipated from the build out affecting the Kaloi Gulch drainageway. We hope that the forthcoming Draft Environmental Impact Statement (Draft EIS) will provide reliable assurances that "the flat gradient of the channel in combination with the Ocean Pointe golf course will also help to filter out and control re-entrainment of sediments in the event of stormwater discharges to nearshore waters." (EISPN, p. 16) Planned modification of a segment of the existing park access road to act as a ford to stormwaters further intensifies our concerns about non-point source pollution to marine ecosystems from pollutants on the road that will not benefit from the upstream opportunities for ground filtering. We look forward to examining the descriptions of the storm runoff Best Management Practices to be used by the project "to help control runoff

water quality prior to any ocean discharges" (EISPN, p. 17) both during and after the construction stage of the project.

We further note that the accessory landscaping around the drainageway should include native and endemic vegetation as much as possible. This will enable the area to absorb as much water as is locally and naturally possible, while also ensuring fewer introductions of alien species to our fragile ecosystems.

Threatened Hawaiian green sea turtles (honu), which are protected by federal and state law, often come into the Ewa Beach area, as noted in the applicant's document. OHA encourages the applicant to monitor its work to ensure that no turtles are impacted, harmed or harassed in any sense of these legal terms. We look forward to reviewing the presentation of the sediment transport and water quality impact studies that will be provided in the upcoming Draft EIS.

Because this project exists entirely within Oneula Beach Park, consideration must be given to applicable cultural gathering and access rights. Native Hawaiians have historically, and presently, fished, gathered limu, lobster and other shellfish. Existing public access to and along the shoreline should not be restricted – even during construction – except as necessary to ensure safety. If such safety-related restrictions are put in place, alternate public access routes must be provided.

OHA further requests assurances from the applicant that should iwi or Native Hawaiian cultural or traditional deposits be found during ground disturbance or excavation, work will cease, and the appropriate agencies will be contacted pursuant to applicable law.

Thank you for the opportunity to comment. If you have further questions, please contact Heidi Guth at 594-1962 or e-mail her at heidig@oha.org.

Sincerely,

Donald B. Mun

for Clyde W. Namu'o
Administrator

CC: R.M. Towill Corporation
420 Waiakamilo Road, Suite 411
Honolulu, HI 96817-4941

Haseko (Ewa), Inc.
91-1001 Kaimalie Street, Suite 204
Ewa Beach, HI 96706

420 Waiakamilo Road
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Telephone 808 842 1133
Fax 808 842 1937
eMail rmtowill@hawaii.rr.com

R. M. TOWILL CORPORATION
SINCE 1930

Planning
Engineering
Environmental Services
Photogrammetry
Surveying
Construction Management

December 8, 2004

Mr. Clyde W. Nāmu'o, Administrator
Office of Hawaiian Affairs
State of Hawai'i
711 Kapi'olani Boulevard, Suite 500
Honolulu, HI 96813

Dear Mr. Nāmu'o:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Environmental Impact Statement Preparation Notice

On behalf of HASEKO (Ewa), Inc., thank you for your letter dated June 17, 2004, concerning the subject document. We have prepared the following in response to your comments which have been noted in italics:

> *OHA understands the need to improve drainage capacity for the Kaloi watershed and to meet the City and County of Honolulu's current drainage standard, which requires the capacity to withstand a 100-year flood. We are concerned about the level of stormwater runoff that is anticipated from the build out affecting the Kalo'i Gulch drainageway. We hope that the forthcoming Draft Environmental Impact Statement (Draft EIS) will provide reliable assurances that "the flat gradient of the channel in combination with the Ocean Pointe golf course will also help to filter out and control re-entrainment of sediments in the event of stormwater discharges to nearshore waters."* (EISPN, p. 16)

HASEKO has completed extensive studies of the Kaloi watershed and has designed the stormwater drainage system for the project site in compliance with City & County of Honolulu standards. The Draft EIS (DEIS) will summarize the key conclusions from these studies and design efforts to address this key issue.

> *Planned modification of a segment of the existing park access road to act as a ford to stormwaters further intensifies our concerns about non-point source pollution to marine ecosystems from pollutants on the road that will not benefit from the upstream opportunities for ground filtering. We look forward to examining the descriptions of the storm runoff Best Management Practices to be used by the project "to help control runoff water quality prior to any ocean discharges" (EISPN, p. 17) both during and after the construction stage of the project.*

A BMPs Plan will be prepared as part of the National Pollutant Discharge Elimination System (NPDES) permit to address discharges of stormwater associated with construction of the proposed project. A standard part of the BMPs Plan will be to ensure that discharges of petroleum, oils, and

lubricants (POLs) and other contaminants are prevented from commingling with stormwater to reduce the chances of such discharges entering State waters.

Following construction, maintenance measures will be put into place to ensure that the drainage channel can continue to operate in an optimal manner. This will include the removal of any built up sediments that may be deposited in the channel. The disposal of this sediment will be in accordance with all applicable state, local and federal regulations.

> *We further note that the accessory landscaping around the drainageway should include native and endemic vegetation as much as possible. This will enable the area to absorb as much water as is locally and naturally possible, while also ensuring fewer introductions of alien species to our fragile ecosystems.*

Native and endemic plants will be used on the margins of the drainageway to the extent that they are practically suited to this generally arid area. The DEIS will briefly address this issue in the description of the proposed action and under the discussion of flora resources.

> *Threatened Hawaiian green sea turtles (honu), which are protected by federal and state law, often come into the 'Ewa Beach area, as noted in the applicant's document. OHA encourages the applicant to monitor its work to ensure that no turtles are impacted, harmed or harassed in any sense of these legal terms.*

HASEKO has been monitoring the occurrence of turtles in the area for over a decade as required by the U.S. Army Corps of Engineers, the National Marine Fisheries Service, and the U.S. Fish and Wildlife Service. We note that the area has supported a relatively stable population of turtles for a considerable period of time. We agree that monitoring of this species should continue as long it is required by regulatory agencies. Further, HASEKO contractors working on the project will be clearly instructed to avoid any activities that could negatively impact *honu*.

> *We look forward to reviewing the presentation of the sediment transport and water quality impact studies that will be provided in the upcoming Draft EIS.*

The results of the studies you have identified will be provided in the DEIS.

> *Because this project exists entirely within One'ula Beach Park, consideration: must be given to applicable cultural gathering and access rights. Native Hawaiians have historically, and presently, fished, gathered limo, lobster and other shellfish. Existing public access to and along the shoreline should not be restricted - even during construction - except as necessary to ensure safety. If such safety-related restrictions are put in place, alternate public access routes must be provided.*

Public access to and along the shoreline will not be affected by the project. Vehicular access to the beach park will be maintained during construction. After construction, and in the rare event of a heavy storm which require the closure of the park access road, a detour park access road will be provided to maintain entry and exit.

OHA, further requests assurances from the applicant that should iwi or Native Hawaiian cultural or traditional deposits be found during ground disturbance or excavation, work will cease, and the appropriate agencies will be contacted pursuant to applicable law.

HASEKO has commissioned an archaeological inventory survey of the project site and found no evidence of significant native Hawaiian cultural or traditional deposits or *iwi*. It is the intention of HASEKO to continue working closely with the State Historic Preservation Division (SHPD), Department of Land and Natural Resources, to maintain the protection and preservation of cultural and archaeological resources. As will be noted in the DEIS, because it is always possible that subsurface human remains may be encountered during construction, work crews will be instructed to stop work immediately in the event of a find and to notify SHPD.

We appreciate the time you and your staff have taken to review the document and to provide written comments. Should you have any further comments concerning this project, please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Eric G. Crispin, AIA, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Oshima Chun Fong and Chung, LLP

FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU
3375 KOAPAKA STREET, SUITE H425 • HONOLULU, HAWAII 96819-1869
TELEPHONE: (808) 831-7761 • FAX: (808) 831-7750 • INTERNET: www.honolulufire.org

2004 JUN 24 PM 4 40

CITY & COUNTY HONOLULU

JEREMY HARRIS
MAYOR

ATTILIO K. LEONARDI
FIRE CHIEF

JOHN CLARK
DEPUTY FIRE CHIEF

June 22, 2004

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

FROM: ATTILIO K. LEONARDI, FIRE CHIEF

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE (EISPN)

PROJECT NAME:	KALOI GULCH DRAINAGEWAY IMPROVEMENTS AT ONEULA BEACH PARK
APPLICANT:	HASEKO (EWA), INC.
AGENT:	R.M. TOWILL CORPORATION
LANDOWNER:	CITY AND COUNTY OF HONOLULU
LOCATION:	ONEULA BEACH PARK, EWA, OAHU
TAX MAP KEY:	9-1-012: PORTION OF 002 AND 025

We received your memorandum requesting our review and comments on the above-mentioned EISPN.

The Honolulu Fire Department requires that the following be complied with for the duration of the project:

1. Maintain fire apparatus access throughout the construction site.
2. Notify the Fire Communication Center at 523-4411 regarding any interruption of the existing fire hydrant system.

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

Attilio K. Leonardi

ATTILIO K. LEONARDI
Fire Chief

AKL/SK:bh

420 Waiakamilo Road
Suite 411
Honolulu Hawaii 96817-4941
Telephone 808 842 1133
Fax 808 842 1937
eMail rmtowill@hawaii.rr.com

R. M. TOWILL CORPORATION
SINCE 1930

Planning
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Environmental Services
Photogrammetry
Surveying
Construction Management

December 8, 2004

Mr. Attilio K. Leonardi
Fire Chief
Honolulu Fire Department
City and County of Honolulu
3375 Kopaka Street, Suite H425
Honolulu, Hawaii 96819

Dear Mr. Leonardi:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Environmental Impact Statement Preparation Notice

On behalf of HASEKO (Ewa), Inc., thank you for your letter dated June 22, 2004, to the Department of Planning and Permitting, stating that the Honolulu Fire Department requests compliance with the following for the duration of the project: (1) maintain fire apparatus access throughout the construction site; and (2) notify the Fire Communications Center at 523-4411 regarding any interruption of the existing fire hydrant system.

HASEKO recognizes the importance of complying with requirements for fire safety. The concerns of your Department will be taken into account during the planning process for this project.

We appreciate your taking the time to review and comment on this important project. Should you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Eric G. Crispin, AIA, Department of Planning and Permitting
Haseko (Ewa), Inc.
Oshima Chun Fong and Chung, LLP

Linda Lingle
GOVERNOR

PATRICIA HAMAMOTO
SUPERINTENDENT

STATE OF HAWAI'I
DEPARTMENT OF EDUCATION
P.O. BOX 2360
HONOLULU, HAWAI'I 96804

2004 JUN 22 PM 3 59

CITY & COUNTY OF HONOLULU

OFFICE OF THE SUPERINTENDENT

June 18, 2004

Mr. Eric G. Crispin, Director
Department of Planning and Permitting
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, Hawaii 96813

Dear Mr. Crispin:

SUBJECT: Kaloi Gulch Drainageway Improvements to
Oneula Beach Park, Ewa, TMK: 9-1-12: por. 25

The Department of Education has no comment concerning the preparation notice for an Environmental Impact Statement (EIS) for improvements to Oneula Beach Park in Ewa. We look forward to reviewing the EIS.

If you have any questions, please call Rae M. Loui, Assistant Superintendent of the Office of Business Services, at 586-3444 or Heidi Meeker of the Facilities and Support Services Branch at 733-4862.

Very truly yours,

Patricia Hamamoto
Superintendent

PH:jmb

cc: Rae M. Loui, OBS

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

420 Waiakamilo Road
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Surveying
Construction Management

December 8, 2004

Ms. Patricia Hamamoto, Superintendent
State of Hawaii
Department of Education
P.O. Box 2380
Honolulu, Hawaii 96804

Dear Ms. Hamamoto:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Environmental Impact Statement Preparation Notice

On behalf of HASEKO (Ewa), Inc., thank you for your letter dated June 18, 2004 to the Department of Planning and Permitting stating that the Department of Education has no comment concerning the proposed project.

We appreciate the time you have taken to review the subject document and your submittal of a written response. Should you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Eric G. Crispin, AIA, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Oshima Chun Fong and Chung, LLP

LINDA LINGLE
GOVERNOR OF HAWAII

2004 JUN 21 AM 8 05

CITY & COUNTY OF HONOLULU

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

CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

In reply, please refer to:
EPO-04-129

June 17, 2004

Mr. Eric Crispin
Department of Planning and Permitting
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Crispin:

SUBJECT: Kaloi Gulch Drainageway Improvements at Oneula Beach Park, Ewa, Oahu
TMK: 9-1-12: portion of 2 and 25

Thank you for allowing us to review and comment on the subject document. We have the following comments to offer:

Clean Water Branch Standard Comments Dated 3/2/04

1. The Army Corps of Engineers should be contacted at (808) 438-9258 to identify whether a Federal license or permit (including a Department of Army permit) is required for this project. Pursuant to Section 401(a)(1) of the Federal Water Pollution Act (commonly known as the "Clean Water Act"), a Section 401 Water Quality Certification is required for "[a]ny applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters...."

2. A National Pollutant Discharge Elimination System (NPDES) general permit coverage is required for the following activities:

   a. Storm water associated with industrial activities, as defined in Title 40, Code of Federal Regulations, Sections 122.26(b)(14)(i) through 122.26(b)(14)(ix) and 122.26(b)(14)(xi).

   b. Construction activities, including clearing, grading, and excavation, that result in the disturbance of equal to or greater than one (1) acre of total land area. The total land area includes a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under a larger common plan of development or sale. **An NPDES permit is required before the commencement of the construction activities.**

   c. Discharges of treated effluent from leaking underground storage tank remedial activities.

   d. Discharges of once through cooling water less than one (1) million gallons per day.

   e. Discharges of hydrotesting water.

   f. Discharges of construction dewatering effluent.

   g. Discharges of treated effluent from petroleum bulk stations and terminals.

   h. Discharges of treated effluent from well drilling activities.

   i. Discharges of treated effluent from recycled water distribution systems.

   j. Discharges of storm water from a small municipal separate storm sewer system.

   k. Discharges of circulation water from decorative ponds or tanks.

   The CWB requires that a Notice of Intent (NOI) to be covered by a NPDES general permit for any of the above activities be submitted at least 30 days before the commencement of the respective activities. The NOI forms may be picked up at our office or downloaded from our website at http://www.state.hi.us/health/eh/cwb/forms/genl-index.html.

3. The applicant may be required to apply for an individual NPDES permit if there is any type of activity in which wastewater is discharged from the project into State waters and/or coverage of the discharge(s) under the NPDES general permit(s) is not permissible (i.e. NPDES general permits do not cover discharges into Class 1 or Class AA receiving waters). An application for the NPDES permit is to be submitted at least 180 days before the commencement of the respective activities. The NPDES application forms may also be picked up at our office or downloaded from our website at http://www.state.hi.us/health/eh/cwb/forms/indiv-index.html.

4. Hawaii Administrative Rules, Section 11-55-38, also requires the owner to either submit a copy of the new NOI or NPDES permit application to the State Department of Land and Natural Resources, State Historic Preservation Division (SHPD), or demonstrate to the satisfaction of the DOH that the project, activity, or site covered by the NOI or application has been or is being reviewed by SHPD. Please submit a copy of the request for review by SHPD or SHPD's determination letter for the project.

If you have any questions, please contact the CWB at 586-4309.

Environmental Planning Office Standard Comments Dated 3/2/04

The Environmental Planning Office (EPO) is responsible for several surface water quality management programs mandated by the federal Clean Water Act or dictated by State policy . (http://www.state.hi.us/doh/eh/epo/wqm/wqm.htm). Among these responsibilities, EPO:

- maintains the *List of Impaired Waters in Hawaii Prepared under Clean Water Act §303(d)* (http://www.state.hi.us/doh/eh/epo/wqm/303dpcfinal.pdf);
- develops and establishes Total Maximum Daily Loads (TMDLs) for listed waters (suggesting how much existing pollutant loads should be reduced in order to attain water quality standards, please see http://www.epa.gov/owow/tmdl/intro.html);
- writes TMDL Implementation Plans describing how suggested pollutant load reductions can be achieved; and
- conducts assessments of stream habitat quality and biological integrity.

To facilitate TMDL development and implementation, and to assist with our assessment of the potential impact of proposed actions upon water quality, pollutant loading, and biological resources in receiving waters, we suggest that environmental review documents, permit applications, and related submittals include the following standard information and analyses:

Waterbody type and class

1. Identify the waterbody type and class, as defined in Hawaii Administrative Rules Chapter 11-54 (http://www.state.hi.us/doh/rules/11-54.pdf), of all potentially affected water bodies[1].

Existing water quality management actions

2. Identify any existing National Pollutant Discharge Elimination System (NPDES) permits and related connection permits (issued by permittees) that will govern the management of water that runs off or is discharged from the proposed project site or facility. Please include NPDES and other permit numbers; names of permittees, permitted facilities, and receiving waters (including waterbody type and class as in 1. above); diagrams showing drainage/discharge pathways and outfall locations; and note any permit conditions that may specifically apply to the proposed project.

3. Identify any planning documents, groups, and projects that include specific prescriptions for water quality management at the proposed project site and in the potentially affected waterbodies. Please note those prescriptions that may specifically apply to the proposed project.

Pending water quality management actions

4. Identify all potentially affected water bodies that appear on the current *List of Impaired Waters in Hawaii Prepared under Clean Water Act §303(d)* including the listed waterbody, geographic scope of listing, and pollutant(s) (See Table 7 at http://www.state.hi.us/doh/eh/epo/wqm/303dpcfinal.pdf).

5. If the proposed project involves potentially affected water bodies that appear on the current *List of Impaired Waters in Hawaii Prepared under Clean Water Act §303(d)*, identify and quantify expected changes in the following site and watershed conditions and characteristics:
   - surface permeability
   - hydrologic response of surface (timing, magnitude, and pathways)
   - receiving water hydrology
   - runoff and discharge constituents
   - pollutant concentrations and loads in receiving waters
   - aquatic habitat quality and the integrity of aquatic biota

Where TMDLs are already established they include pollutant load allocations for the surrounding lands and point source discharges. In these cases, we suggest that the submittal specify how the proposed project would contribute to achieving the applicable load reductions.

Where TMDLs are yet to be established and implemented, a first step in achieving TMDL objectives is to prevent any project-related increases in pollutant loads. This is generally accomplished through the proper application of suitable best management practices in all phases of the project and adherence to any applicable ordinances, standards, and permit conditions. In these cases we suggest that the submittal specify how the proposed project would contribute to reducing the polluted discharge and runoff entering the receiving waters, including plans for additional pollutant load reduction practices in future management of the surrounding lands and drainage/discharge systems.

Proposed Action and Alternatives Considered

We suggest that each submittal identify and analyze potential project impacts at a watershed scale by considering the potential contribution of the proposed project to cumulative, multi-project watershed effects on hydrology, water quality, and aquatic and riparian ecosystems.

We also suggest that each submittal broadly evaluate project alternatives by identifying more than one engineering solution for proposed projects. In particular, we suggest the consideration of "alternative," "soft," and "green" engineering solutions for channel modifications that would provide a more environmentally friendly and aesthetically pleasing channel environment and minimize the destruction of natural landscapes.

If you have any questions about these comments or EPO programs, please contact Ryan Davenport at 586-4346.

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[1]"Potentially affected waterbodies" means those in which proposed project activity would take place and any others that could receive water discharged by the proposed project activity or water flowing down from the proposed project site. These waterbodies can be presented as a chain of receiving waters whose top link is at the project site upslope and whose bottom link is in Pacific Ocean "oceanic waters," with all receiving waters named according to conventions established by Chapter 11-54 and the *List of Impaired Waters in Hawaii Prepared under Clean Water Act §303(d)*. For example, a recent project proposed for Nuhelewai Stream, Oahu (a tributary of Kapalama Canal) might potentially affect Nuhelewai Stream, Kapalama Canal, Honolulu Harbor and Shore Areas, and the Pacific Ocean.

Sincerely,

June F. Harrigan-Lum

JUNE F. HARRIGAN-LUM, MANAGER
Environmental Planning Office

c: EPO
CWB

420 Waiakamilo Road
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Planning
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Environmental Services
Photogrammetry
Surveying
Construction Management

December 8, 2004

Ms. June F. Harrigan-Lum, Manager
Environmental Planning Office
Department of Health
State of Hawaii
P.O. Box 3378
Honolulu, Hawaii 96801-3378

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Environmental Impact Statement Preparation Notice

On behalf of HASEKO (Ewa), Inc., thank you for your letter dated June 17, 2004, concerning the subject project. We have prepared the following in response to your comments which have been noted in italics:

Clean Water Branch (CWB) Comments

1. The Army Corps of Engineers should be contacted to identify whether a Federal permit (including a Department of Army permit) is required this project. Pursuant to Section 401(a)(1) of the Federal Water Pollution Act (commonly known as the "Clean Water Act"), a Section 401 Water Quality Certification is required for "[a]ny applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters....

We were notified by the Corps of Engineers concerning this matter on July 12, 2004. We have confirmed with the Corps that the subject project will not require a Department of the Army Permit. The letter from the Corps and our response has been attached for your use and reference.

2. A National Pollutant Discharge Elimination System (NPDES) general permit coverage is required for the following activities:
a. Storm water associated with industrial activities, as defined in Title 40, Code of Federal Regulations, Sections 122.26(b)(14)(i) through 122.26(b)(I4)(ix) and 122.26(b)(14)(xi);
b. Construction activities, including clearing, grading, and excavation that result in the disturbance of equal to or greater than one (1) acre of total land area. The total land area includes a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under a larger common plan of development or sale. ***An NPDES permit is required before the commencement of the construction activities.***
c. Discharge of treated effluent from leaking underground storage tank remedial activities;
d. Discharge of once through cooling water less than one (1) million gallons per day;
e. Discharge of hydrotesting water;
f. Discharge of construction dewatering effluent;
g. Discharge of treated effluent from petroleum bulk stations and terminals;
h. Discharge of treated effluent from well drilling activities,
i. Discharges of treated effluent from recycled water distribution systems;
j. Discharges of storm water from a small municipal separate storm sewer system; and

k. Discharge of circulation water from decorative ponds or tanks.
The CWB requires that a Notice of Intent (NOT) to be covered by a NPDES general permit for any of the above activities be submitted at least 30 days before the commencement of the respective activities.
3. The applicant may be required to apply for an individual NPDES permit if there is any type of activity in which wastewater is discharged from the project into State waters, and/or coverage of the discharge(s) under the NPDES general permit(s) is not permissible. An application for the NPDES permit is to be submitted at least 180 days before the commencement of the activities.
4. Hawaii Administrative Rules, Section 11-55-38, also requires the owner to either submit a copy of the NOI or NPDES permit application to the State Department of Land and Natural Resources, State Historic Preservation Division (SHPD) or demonstrate to the satisfaction of the DOH that the project, activity, or site covered by the NOI or application has been or is being reviewed by SHPD.

The proposed project will require construction in an area that is approximately 3.7 acres. Therefore an NOI Form C, Construction Stormwater Permit Application, will be required for submittal to DOH and SHPD, DLNR. No other storm or non-stormwater discharges are anticipated which would require preparation of other NPDES related permits.

Environmental Planning Office (EPO)
To facilitate TMDL development and implementation, and to assist with our assessment of the potential impact of proposed actions upon water quality, pollutant loading, and biological resources in receiving waters, we suggest that environmental review documents, permit applications, and related submittals include the following standard information and analyses:

- *Waterbody type and class*
- *Existing water quality management actions*
- *Pending water quality management actions*

HASEKO wishes to thank your TMDL Coordinator, Mr. David Penn, who met with us to discuss the relationship of this project to our TMDL reporting and coordination responsibilities. We look forward to further consultation with David to ensure that all required information is provided. For purposes of the Draft EIS we will describe the existing Open Coastal Waters off Oneula Beach Park (Class "A") and provide further discussion concerning our findings with regard to our long term coastal water quality monitoring of the area.

Where TMDLs are already established they include pollutant load allocations for the surrounding lands and point source discharges. In these cases, we suggest that the submittal specify how the proposed project would contribute to achieving the applicable load reductions. Where TMDLs are yet to be established and implemented, a first step in achieving TMDL objectives is to prevent any project-related increases in pollutant loads. This is generally accomplished through the proper application of suitable best management practices in all phases of the project and adherence to any applicable ordinances, standards, and permit conditions. In. these cases we suggest that the submittal specify how the proposed project would contribute to reducing the polluted discharge and runoff entering the receiving waters, including plans for additional pollutant load reduction practices in future management of the surrounding lands and drainage/discharge systems.

The receiving water for the Kaloi drainageway is designated as water quality limited, with TMDLs not yet established for this area. We acknowledge that an important first step in achieving TMDL objectives is to prevent any project-related increases in pollutant loading. Extensive use of Best Management Practices (BMPs) have been incorporated into the design of the subject drainage improvement project as well as the upstream improvements within Ocean Pointe. As noted, HASEKO intends to continue to consult with Mr. Penn to discuss these BMPs as the project design is finalized, and to examine how they can contribute to reducing pollutant levels in potential discharges associated with the project.

> ***Proposed Action and Alternatives Considered***
> *We suggest that each submittal identify and analyze potential project impacts at a watershed scale by considering the potential contribution of the proposed project to cumulative, multiproject watershed effects on hydrology, water quality, and aquatic and riparian ecosystems. We also suggest that each submittal broadly evaluate project alternatives by identifying more than one engineering solution for proposed projects. In particular, we suggest the consideration of "alternative," "soft," and "green" engineering solutions for channel modifications that would provide a more environmentally friendly and aesthetically pleasing channel environment and minimize the destruction of natural landscapes.*

A summary of the alternatives considered for the proposed project will be provided in the Draft EIS. The document will discuss the Kaloi watershed as it relates to the need to provide for regional drainage. We note, that in part the City and County of Honolulu has required the use of "green" engineering solutions for drainage in the Ewa Region through planning documents such as the Ewa Development Plan which directs all developers in Ewa to utilize vegetative and more natural features to handle stormwater discharges. Therefore, the preferred alternative to this project utilizes a wide, vegetated swale for a drainage channel. This feature is consistent with a more natural drainage system that promotes evapotranspiration, groundwater recharge, evaporation, and the settling of sediments in stormwater.

We appreciate the time you have taken to review and comment on the subject document. If you have any further comments concerning this project, please contact us at (808) 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

Attachment

cc: Mr. Eric G. Crispin, AIA, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Oshima Chun Fong and Chung, LLP

THE ESTATE OF JAMES CAMPBELL

June 14, 2004

2004 JUN 17 PM 3 27

CITY & COUNTY OF HONOLULU

Eric G. Crispin, AIA
Director of Planning and Permitting
City and County of Honolulu
650 S. King Street
Honolulu, HI 96813

Dear Mr. Crispin:

Environmental Impact Statement
Preparation Notice, Kaloi Gulch
Drainageway Improvements 2004/ED-12 (ASK)

We are in receipt of the Environmental Impact Statement Preparation Notice that was prepared for the Kaloi Gulch Drainageway Improvements at Oneula Beach Park for applicant Haseko (Ewa), Inc. The Estate of James Campbell has no comments regarding environmental impacts.

If you have any questions, you may call me at 674-3209.

Sincerely,

Howard Schwiebert

Howard R. Schwiebert
Asset Manager, Hawaii Land Management

jo:01030200\K10122

1061 Kamokila Boulevard, Kapolei, Hawaii 96707 Phone (808) 674-6674 Facsimile (808) 674-3111 Website: www.kapoleki.com

420 Waiakamilo Road
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Fax 808 842 1937
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R. M. TOWILL CORPORATION
SINCE 1930

Planning
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Construction Management

December 8, 2004

Mr. Howard R. Schwiebert
Asset Manager, Hawaii Land Management
The Estate of James Campbell
1061 Kamokila Boulevard
Kapolei, Hawaii 96707

Dear Mr. Schwiebert:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Environmental Impact Statement Preparation Notice

On behalf of HASEKO (Ewa), Inc., thank you for our letter dated June 14, 2004 to the Department of Planning and Permitting stating that the Estate of James Campbell has no comments regarding environmental impacts of the Kaloi Gulch Drainageway Improvements at Oneula Beach Park.

We appreciate the time you have taken to review the subject document and your submittal of a written response. Should you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Eric G. Crispin, AIA, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Oshima Chun Fong and Chung, LLP

DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU
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JEREMY HARRIS
MAYOR

WILLIAM D. BALFOUR, JR.
DIRECTOR

EDWARD T. "SKIPPA" DIAZ
DEPUTY DIRECTOR

RECEIVED
JUN 15 2004
DEPT. OF PLANNING AND PERMITTING
650 SOUTH KING ST.
HONOLULU, HI 96813

June 10, 2004

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

FROM: WILLIAM D. BALFOUR, JR., DIRECTOR

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE
KALOI GULCH DRAINAGEWAY IMPROVEMENTS AT ONEULA BEACH PARK

Thank you for the opportunity to review and comment on the Environmental Impact Statement Preparation Notice relating to the Kaloi Gulch Drainageway Improvements at Oneula Beach Park.

We have no objection to the construction of the proposed drainage improvements within the park, with the proviso that the Department of Parks and Recreation will not be responsible for the maintenance of the drainage channel or channel banks.

Should you have any questions, please contact Mr. John Reid, Planner, at 692-5454.

W. D. Balfour

WILLIAM D. BALFOUR, JR.
Director

WDB:mk
(64013)

420 Waiakamilo Road
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Honolulu Hawaii 96817-4941
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eMail rmtowill@hawaii.rr.com

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December 8, 2004

Mr. William D. Balfour, Jr., Director
Department of Parks and Recreation
City and County of Honolulu
650 South King Street, 10th Floor
Honolulu, Hawaii 96813

Dear Mr. Balfour:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Environmental Impact Statement Preparation Notice

On behalf of HASEKO (Ewa), Inc., thank you for your letter dated June 22, 2004, to the Department of Planning and Permitting stating that the Department of Parks and Recreation (DPR) does not object to the construction of the proposed drainage improvements within Oneula Beach Park, provided that DPR will not be responsible for the maintenance of the drainage channel or channel banks.

We acknowledge your comments and appreciate the time you have taken to review this important project. Should you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Eric G. Crispin, AIA, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Oshima Chun Fong and Chung, LLP

DEPARTMENT OF FACILITY MAINTENANCE

CITY AND COUNTY OF HONOLULU

1000 ULUOHIA STREET, KAPOLEI HALE, SUITE 215, KAPOLEI, HAWAII 96707
TELEPHONE : (808) 692-5054 FAX: (808) 692-5857

JEREMY HARRIS
MAYOR

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

ALVIN K. C. AU
DEPUTY DIRECTOR

IN REPLY REFER TO:
DRM 04-555

June 9, 2004

MEMORANDUM

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

FROM: LARRY LEOPARDI, P.E., DIRECTOR AND CHIEF ENGINEER
DEPARTMENT OF FACILITY MAINTENANCE

SUBJECT: **ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE, CHAPTER 343, HAWAII REVISED STATUTES – KALOI GULCH DRAINAGEWAY IMPROVEMENTS AT ONEULA BEACH PARK**

Subject project is located entirely within Oneula Beach Park which is under the jurisdiction of the Department of Parks and Recreation. The Department of Facility Maintenance will not be responsible for any maintenance and as such, has no comments to offer.

Should you need any further information, please contact me at 692-5054.

420 Waiakamilo Road
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Telephone 808 842 1133
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eMail rmtowill@hawaii.rr.com

R. M. TOWILL CORPORATION
SINCE 1930

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Construction Management

December 8, 2004

Mr. Larry Leopardi, P.E.
Director and Chief Engineer
Department of Facility Maintenance
City and County of Honolulu
1000 Uluohia Street
Kapolei Hale, Suite 215
Kapolei, Hawaii 96707

Dear Mr. Leopardi:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Environmental Impact Statement Preparation Notice

On behalf of HASEKO (Ewa) Inc., thank you for your letter dated June 9, 2004, to the Department of Planning and Permitting, stating that: (1) the subject project is located entirely within Oneula Beach Park, which is under the jurisdiction of the Department of Parks and Recreation; and (2) the Department of Facility Maintenance will not be responsible for any maintenance and therefore has no comments to offer.

We acknowledge your comments and appreciate your taking the time to review and comment on this important project. Should you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Eric G. Crispin, AIA, Department of Planning and Permitting
Haseko (Ewa) Inc.
Oshima Chun Fong and Chung, LLP

DEPARTMENT OF COMMUNITY SERVICES
CITY AND COUNTY OF HONOLULU
715 SOUTH KING STREET, SUITE 311 • HONOLULU, HAWAII 96813
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JEREMY HARRIS
MAYOR

MICHAEL T. AMII
DIRECTOR

JOHN R. SABAS
DEPUTY DIRECTOR

June 9, 2004

RECEIVED
'04 JUN 15 P5:36
DEPT OF PLANNING AND PERMITTING
CITY & COUNTY OF HONOLULU

MEMORANDUM

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

FROM: MICHAEL T. AMII, DIRECTOR

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE
KALOI GULCH DRAINAGEWAY IMPROVEMENTS
TAX MAP KEY 9-1-12: 2 (POR.) AND 25 (POR.)

The Department of Community Services (DCS) appreciates the opportunity to review and comment on the subject Environmental Impact Statement Preparation Notice (EISPN). Although the City is no longer undertaking direct housing development activities, DCS continues to work with several nonprofit agencies undertaking the development of affordable housing in the Ewa Villages. As noted in the EISPN, the Ewa Villages are located in the Kaloi Watershed Boundary and thus the proposed action may have an impact on development activities in the Ewa Villages.

The draft Environmental Impact Statement should fully disclose short and long-term impacts of the proposed action on the entire Kaloi Watershed Boundary, including a description of how the proposed action will impact on storm water flows through the Kaloi Gulch Drainageway.

Thank you for the opportunity to provide these comments. Questions regarding this matter may be directed to Mr. Keith Ishida at 527-5092.

MICHAEL T. AMII
Director

MTA:dk

420 Waiakamilo Road
Suite 411
Honolulu Hawaii 96817-4941
Telephone 808 842 1133
Fax 808 842 1937
eMail rmtowill@hawaii.rr.com

R. M. TOWILL CORPORATION
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December 8, 2004

Mr. Michael T. Amii, Director
Department of Community Services
City and County of Honolulu
715 South King Street Suite 311
Honolulu, Hawaii 96813

Dear Mr. Amii:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Environmental Impact Statement Preparation Notice

On behalf of HASEKO (Ewa), Inc., thank you for your letter dated June 9, 2004, to the Department of Planning and Permitting relating to the subject project.

We acknowledge your comment that the Draft Environmental Impact Statement (DEIS) should fully disclose short and long-term impacts of the proposed action on the entire Kaloi Watershed Boundary, including a description of how the proposed action will impact on storm water flows through the Kaloi Gulch Drainageway. We have incorporated further information on the potential for short and long-term impacts associated with the proposed project on the Kaloi Gulch drainageway, in Chapter 4 of the DEIS.

We appreciate your review and comment on this important project. Should you have any further comments please do not hesitate to contact use at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Eric G. Crispin, AIA, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Oshima Chun Fong and Chung, LLP

CHAPTER 13
COMMENTS AND RESPONSES TO THE DRAFT EIS

The following are written comments and responses to comments to the Draft EIS prepared for the subject project.

List of Public Comments Received for
Draft Environmental Impact Statement for
Kaloi Gulch Drainageway Improvements at Oneula Beach Park, Oahu, Hawaii

No.	Date	From
1	12/21/04	Department of Community Services
2	12/28/04	Department of Parks and Recreation
3	02/14/05	Department of Planning and Permitting
4	02/14/05	Department of Design and Construction
5	01/24/05	Department of Design and Construction
6	02/08/05	UH Environmental Center
7	02/07/05	Department of Transportation Services
8	02/07/05	Mr. Carl Foytik
9	02/07/05	Department of Environmental Services
10	02/07/05	Office of Environmental Quality Control
11	02/07/05	The Outdoor Circle
12	02/06/05	Mr. Craig Smallwood
13	02/05/05	Hawaii Community Development Authority
14	02/02/05	Natural Resources Conservation Service
15	02/01/05	Hawaii's Thousand Friends
16	01/31/05	Mr. Henry Chang-Wo
17	01/25/05	Honolulu Police Department
18	01/20/05	Department of Education
19	01/19/05	Department of Accounting and General Services
20	01/18/05	Dept. of Land & Natural Resources, Land Division
21	01/13/05	Board of Water Supply
22	01/12/05	Honolulu Fire Department
23	11/30/05	Department of Environmental Services

DEPARTMENT OF COMMUNITY SERVICES
CITY AND COUNTY OF HONOLULU
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JEREMY HARRIS
MAYOR

MICHAEL T. AMII
DIRECTOR

JOHN R. SABAS
DEPUTY DIRECTOR

December 21, 2004

RECEIVED
DEC 22 2004
DEPT. OF PLANNING AND PERMITTING
650 SOUTH KING ST.
HONOLULU, HI 96813

MEMORANDUM

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

FROM: MICHAEL T. AMII, DIRECTOR

SUBJECT: KALOI GULCH DRAINAGEWAY IMPROVEMENTS AT ONEULA BEACH PARK
DRAFT ENVIRONMENTAL IMPACT STATEMENT

Thank you for providing the Department of Community Services the opportunity to comment on the Draft Environmental Impact Statement (EIS) for the Kaloi Gulch Drainageway Improvements at Oneula Beach Park.

The improvements involve enlarging the existing drainageway and are intended to provide flood control and address regional drainage for all communities within the Kaloi Gulch Watershed.

We have completed a review of the draft EIS and have no comment at this time. Please contact Mr. Randy Wong at 523-4435 should you have any questions.

MICHAEL T. AMII
Director

MTA:dk

420 Waiakamilo Road
Suite 411
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eMail rmtowill@hawaii.rr.com

R. M. TOWILL CORPORATION
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December 15, 2005

Mr. Michael T. Amii, Director
Department of Community Services
City and County of Honolulu
715 South King Street, Suite 311
Honolulu, Hawaii 96813

Dear Mr. Amii:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Draft Environmental Impact Statement (DEIS)

On behalf of HASEKO (Ewa), Inc., thank you for your memorandum dated December 21, 2004, to the Department of Planning and Permitting, stating that you have no comments to offer at this time.

We appreciate your review of the subject DEIS. Should you have any comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Henry Eng, FAICP, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Morihara Lau & Fong LLP

DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU
1000 ULUOHIA STREET, SUITE 309 • KAPOLEI, HAWAII 96707
TELEPHONE: (808) 692-5561 • FAX: (808) 692-5131 • INTERNET: www.co.honolulu.hi.us

RECEIVED
JAN - 3 2005
DEPT OF PLANNING AND PERMITTING
650 SOUTH KING ST.
HONOLULU, HI 96813

WILLIAM D. BALFOUR, JR.
DIRECTOR

EDWARD T. "SKIPPA" DIAZ
DEPUTY DIRECTOR

December 28, 2004

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

FROM: WILLIAM D. BALFOUR, JR., DIRECTOR

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT
KALOI GULCH DRAINAGEWAY IMPROVEMENTS AT
ONEULA BEACH PARK

Thank you for the opportunity to review and comment on the Draft Environmental Impact Statement relating to the Kaloi Gulch Drainageway Improvements at Oneula Beach Park.

The Department of Parks and Recreation reiterates that it will not be responsible for maintenance of the regional drainageway through the park and is pleased to see that the developer proposes to prepare a maintenance agreement with the golf course owner or other entity that is satisfactory to this department.

Should you have any questions, please contact Mr. John Reid, Planner, at 692-5454.

WILLIAM D. BALFOUR, JR.
Director

WDB:mk
(87848)

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December 15, 2005

Mr. William D. Balfour, Jr., Director
Department of Parks and Recreation
City and County of Honolulu
1000 Uluohia Street, Suite 309
Kapolei, Hawaii 96707

Dear Mr. Balfour:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Draft Environmental Impact Statement

On behalf of HASEKO (Ewa), Inc., thank you for your memorandum dated December 28, 2004, to the Department of Planning and Permitting, stating that the Department of Parks and Recreation will not be responsible for maintenance of the regional drainageway through the Park.

The Final EIS has been revised and further discussion of maintenance is provided in Section ES.8.1, Maintenance of Kaloi Drainageway Improvements. We confirm that a maintenance agreement in accordance with law will be prepared for this project.

We appreciate this opportunity to respond. Should you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda
Planning Project Coordinator

cc: Mr. Henry Eng, FAICP, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Morihara Lau & Fong LLP

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU
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PHONE: (808) 523-4432 • FAX: (808) 527-6743
DEPT. WEB SITE: www.honoluludpp.org • CITY WEB SITE: www.honolulu.gov

MUFI HANNEMANN
MAYOR

HENRY ENG, FAICP
ACTING DIRECTOR

DAVID K. TANOUE
DEPUTY DIRECTOR

February 14, 2005

2004/ED-12(ASK)

Mr. Brian Takeda
R.M. Towill Corporation
420 Waiakamilo Road, Suite 411
Honolulu, Hawaii 96817-4941

Dear Mr. Takeda:

Environmental Impact Statement Preparation Notice (EISPN)
Chapter 343, Hawaii Revised Statutes

Project Name	:	Kaloi Gulch Drainageway Improvements at One'ula Beach Park
Applicant	:	Haseko (Ewa), Inc.
Agent	:	R.M. Towill Corporation
Landowner	:	City and County of Honolulu
Location	:	One'ula Beach Park, Ewa, Oahu
Tax Map Key	:	9-2-12: 2 and 25

We are forwarding copies of all comments we have received relating to the EISPN for the above-referenced project as well as DPP comments.

In accordance with the provisions of Chapter 343, Hawaii Revised Statutes, you must respond in writing to these and any other comments which were received during the 45-day public comment period which began with the publication of a notice of availability of the Draft Environmental Impact Statement (EIS) on December 23, 2004. The Final EIS must include these comments and responses, as well as revised text, if appropriate.

Plans

1) Figure 2-4 indicates that a portion of the project extends into the future park expansion area to the east. Other plans indicate that the drainage channel will be entirely within the existing park. This discrepancy should be rectified.

2) Generally the conceptual plans do not provide sufficient definitive detail regarding the proposed improvements. The Final EIS should include the following plans:

- A typical cross section taken midway between the mauka and makai project boundary.

- A cross section showing the transition from the park to the golf course.

- Cross-sections showing the transition from the golf course to the residential Ocean Pointe developments to the east and west of the golf course. (These plans will provide a clear picture of how the topography of upland areas will transition to the proposed drainage channel.) If possible, the Final EIS should describe any planned/proposed fences and walls at the perimeter of the golf course and/or between the golf course and the park.

- A detail cross section of the channel banks showing the existing and proposed elevations including the raised banks referred to in the last paragraph of page 2-3. Will the outside slope of these raised banks be the same as that along the banks inside the channel i.e. 1 to 10?

Plans should show property lines, the existing and proposed park access road (where applicable), existing and proposed elevations and should be drawn to scale.

Park Usage

The discussion on the project impacts to Oneula Beach Park, park usage and future development should be expanded.

Pedestrian Path

We understand the stated 10:1 slope does not meet either Park Dedication standards for active recreational park space or ADA requirements for pedestrian use. The Final EIS should clearly describe how this slope would impact the proposed pedestrian paths shown in the Oneula Beach Park Master Plan. Page 1-12 states a portion of the proposed pedestrian path will be relocated. The Final EIS should show the location of the relocated pedestrian path.

The proposed pedestrian access ways, shown on Figure 2-4 should be consistent with those of the revised Ocean Pointe Master Plan for Area 3.

Oneula Beach Park Master Plan

We are aware that the Oneula Beach Park Master Plan has been modified with the relocation of parking (now located along the existing internal park road) and bathhouse. Figure 2-4 should be updated to reflect these changes. The drainage way will likely result in relocation of the planned picnic area (as indicated in Figure 2-1), pedestrian way along the shoreline (as indicated on page 2-12) and possibly a portion of the mauka parking area.

If, however, park improvements, such as irrigation, parking areas, and pedestrian ways are to be developed within the footprint of the drainage channel, the Final EIS should identify design standards or measures would apply to withstand flooding.

Page 4-31 indicates that the drainage way will be kept clear of trees and other features that could impede storm water flows. Will any park amenities such as picnic tables, trash receptacles, and barbeques be allowed in this area?

Page 2-12 indicates that HASEKO will coordinate park changes with the Department of Design and Construction (DDC) and the Department of Parks and Recreation (DPR) regarding changes to the Oneula Beach Park Master Plan and construction schedule for project and park improvements. The Final EIS should identify the changes to be made to the Master Plan as well as the progression of the proposed development with that of the Master Plan. The development schedules are important for several reasons. A graded drainage channel without irrigation or a reconstructed access road with no transition to the existing access road could have significant implications for park users.

Landscaping

Page 2-6 states, "Due to the dry conditions, grass cover in the channel may be thin and sand may be used as a supplement for ground cover." While it is clear that the project will remove the existing vegetation creating an "open space", it's not clear how or when the channel will be revegetated. The Final EIS must describe when vegetation will be replaced and irrigation installed. We are concerned that an unvegetated drainage channel could result in increased turbidity in the event of a 100-year storm.

Figure 2-2 shows trees in the channel. Section 2.2.4 indicates that trees will be planted on the banks. If these trees are not within the footprint of the drainage channel, Figure 2-2 should be revised by removing the trees in the channel.

Roadways

Section 2.2.2 should explicitly state that the access road would be reconstructed makai of the current location, on park lands in the location envisioned in the Oneula Beach Park Master Plan. While it is clear that the segment of the park access road crossing the channel will be relocated and reconstructed with the implementation of the channel project, it is not evident how this new road will connect to roadway segments to the east and west, be they existing or new. The Final EIS must specify how this will be accomplished and how access will be provided during the various phases of development.

The section of the Final EIS on traffic and roadways (Chapter 5 in the Draft EIS) should be revised to mention Condition 3.e.7 of 2003/PDH-3, which requires the applicant to provide roadway improvements (in conformance with the City's future park access roadway) from the Diamond Head boundary of the 9.4-acre parcel to be conveyed to the City, to Papipi Road.

In so much as the secondary park access road to be located at the northwestern end of the park mitigates against inaccessibility during storm events, the location of the secondary road should be shown on the Conceptual Plan View, Figure 2-4. As has been recommended in our comments on the revised Ocean Pointe Master Plan, this roadway must be a public roadway dedicated to the City which would be available to the public when the park is open. (Paragraph three; Page 5-4, of the Draft EIS should be revised accordingly.) The Final EIS should specifically state that the cost of constructing the secondary park access road would be borne by HASEKO. Completion of this road should coincide with construction of the drainage channel improvements.

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Sewer Line/Wastewater

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Potable Water

Page 5-7 acknowledges the existing waterlines will have to be relocated to accommodate the channel invert. The Final EIS should indicate where the existing and new lines would be located. When will the new water line be constructed?

Power and Communication

The Final EA should describe the location of existing electrical and communication infrastructure and indicate whether or not they would have to be relocated (lowered) as a result of the project.

Visual Impacts

The Final EIS should describe project impacts to views from the project area. Will standing in the excavated, tree-lined channel obstruct views in different directions?

Clarification

The following are recommended changes to Page vi:

The Draft EIS lists the County Zoning as "P-2, Preservation". It would be more accurate to identify the zoning as P-2, General Preservation.

Page vi should be amended to note that Henry Eng, FAICP is the Acting Director of DPP.

Grading permits should be added to the list of required permits.

Page 1-8 of the Final EIS states that the current drainage way is too small to meet the 100-year storm flow requirements. The Final EIS should describe the existing project condition including the drainage/channel improvements. The disclosure of what exists will help reviewers understand the magnitude of the potential change in the existing conditions.

The first paragraph on page 2-2 of the Draft EIS states that a portion of the berm will be lowered. The Final EIS should identify the location of the berm.

Page 2-3 indicates that the existing shoreline berm will be lowered by approximately 2-4 feet. Figure 2-2, "Typical Channel Mouth Section" shows existing grade at 8 feet and an invert of 2.5 feet MSL, 5.5 feet lower than the existing grade. The Final EIS should clarify the depth of the excavation at the channel mouth.

Page 2-3 states that the banks will be raised to approximately 4-6 feet higher than the channel bottom. The Final EIS should provide a comparison between the existing grade and the top of the bank.

Water Quality

Please identify the meaning of "TSS" used in Table 4-1 on page 4-21 of the Draft EIS.

The Final EIS should address project impacts on the near shore environment such as coral reefs, the sedentary organisms that inhabit them and those organisms that depend on them for food and shelter.

Water quality parameters evaluated in the Draft EIS are primarily those designated by State regulation for open coastal waters and several others. The Final EIS should explain why these constituents are the exclusive predictors of water quality and ecological impacts. Could the storm water runoff from an urban environment contain other pollutants which might adversely impact the marine environment? If so, the Final EIS should provide an analysis of these pollutants and potential environmental impacts.

Flood

We note that the Federal Emergency Management Agency's Flood Insurance Rate Map for the area was updated on November 20, 2000 and suggest that references to the older maps found on pages 4-27 and 4-28 be updated.

Page 4-27 states that, unlike some coastal areas, the tsunami phenomenon in this area would be attributed to rapidly rising and declining sea levels. The Final EIS should explain why this is the case.

Page 4-27 states that the presence of the channel embankments is likely to lessen the potential for flooding of adjacent areas. The Final EIS should explain this statement.

Safety

The Final EIS should address the safety for park users and vehicles if the park is used as a drainage channel. The broad width and the gentle slope of the proposed channel would make it difficult to distinguish areas of flooding from areas of safety. How might a flooded access road ford hinder evacuation and emergency/rescue services?

100 year Storm Events

The Final EIS should identify which agencies will review and approve plans for procedures, including the posting of signs, in preparation for flood events at the park. We are aware that there will need to be coordination probably with multiple agencies. Required flood precautions could dictate project modifications which should be included as part of the environmental review at this time. We recommend that the Oahu Civil Defense Agency be consulted regarding preparation of an emergency flood plan.

Drainage

The Final EIS should expand on the sand berm scour. What is the maximum sand berm height? At this height, what storm flow rate will be necessary to break open the sand berm? Address the impact on the upstream hydraulic grade line. The drainage master plan for Ocean Pointe should also address the sand berm scour.

The project description throughout the Final EIS should clarify that the project is for the Kaloi Gulch drainage basin 100 year storm flow outlet and not imply that it is an overflow in which storm water was always directed to the beach park.

The Final EIS must address mitigation measures and the erosion potential of the shoreline.

A drainage easement in favor of Haseko will be required for the maintenance of the drainage way including the access roads.

Encroachments should not be allowed within the drainage way unless it can be shown that it will not have an impact on the design hydraulic grade of the channel.

Development Plan

The 5-year review of the adopted Ewa Development Plan is currently underway. Proposed revisions to the plan will include updated information related to the Ocean Pointe (Ewa Marina) development and proposed drainage reconfiguration.

We note that Kaloi Gulch is part of Ewa's open space and greenways network. The plan recognizes the importance of the Kaloi Gulch drainage way in Ewa.

Unresolved Issues

Page-5 of the Draft EIS states that no significant unresolved issues have been identified which would result in the potential for negative adverse environmental impacts. The Final EIS should identify, provide the status and possibly resolutions for all significant issues whether or not they would result in potential negative impacts.

The following is only intended to highlight several possible unresolved issues:

Maintenance

Page 2-6 of the Draft EIS states that maintenance will be done by either the golf course operator or an entity designated by HASEKO. The Final EIS should identify the City agencies or any other entity which would be a party to the proposed maintenance agreement. (We note your December 8, 2004 letter states the agreement will be drawn to the satisfaction of the Department of Parks and Recreation. We suggest you also consult with the Department of Facilities Maintenance and the Oahu Civil Defense Agency.)

Modification to the Park

As recommended above, specific changes to the Oneula Beach Park Master Plan should be described in the Final EIS. To the extent that specific details are not forthcoming, they should be identified as unresolved issues.

Alternatives

Please address the alternative of lower slopes that would meet park dedication and ADA standards for pedestrian access.

If you have any questions, please call Ardis Shaw-Kim of our staff at 527-5349.

Sincerely yours,

HENRY ENG, FAICP
for Acting Director of Planning
and Permitting

HE:cs
Attachments

cc: Department of Parks and Recreation
Department of Corporation Counsel, Dawn Spurlin

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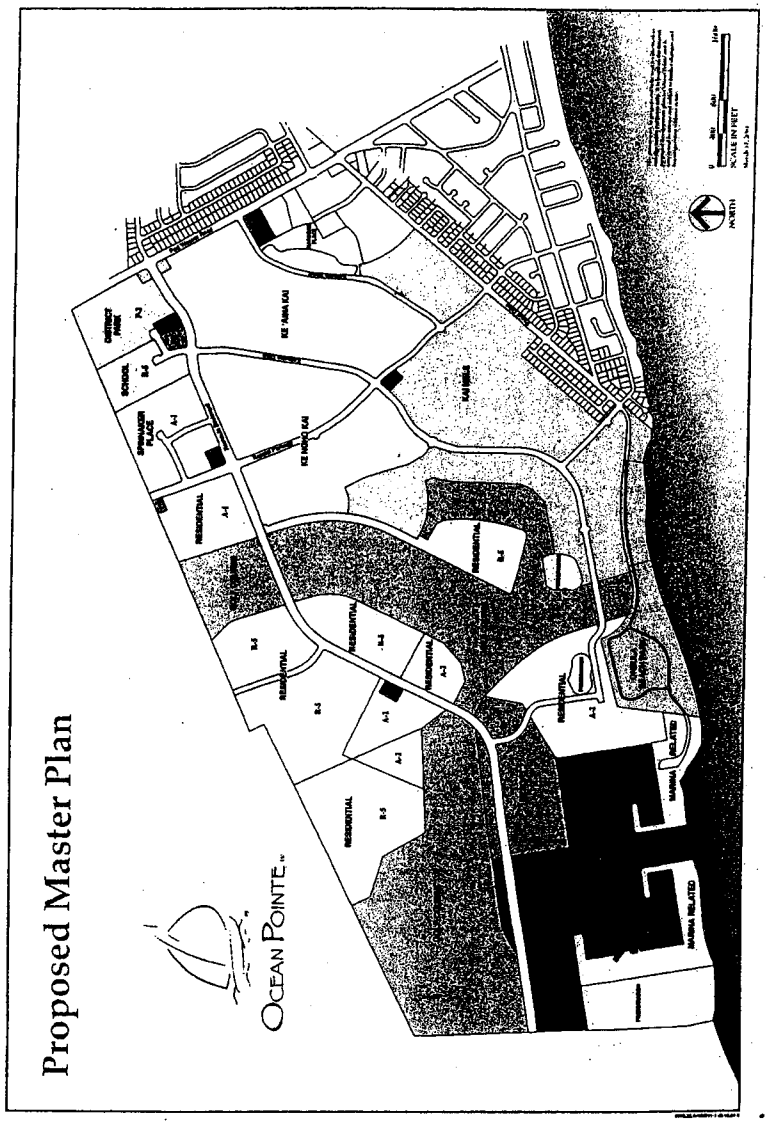

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R. M. TOWILL CORPORATION
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Planning
Engineering
Environmental Services
Photogrammetry
Surveying
Construction Management

December 2, 2005

Mr. Henry Eng, FAICP, Director
Department of Planning and Permitting
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, Hawaii 96813

Dear Mr. Eng:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Draft Environmental Impact Statement

On behalf of HASEKO (Ewa), Inc. ("HASEKO"), thank you for your letter dated February 14, 2005, concerning the subject project. In addition to your letter comments, we have had discussions with Ms. Sharon Nishiura and others of your staff about improving the quality of information provided in this environmental disclosure document. Based on both written and verbal comments received about the document in general, the Final Environmental Impact Statement (FEIS) includes expanded discussions about the regional context of the proposed project and the historical background that led to this proposal. Our responses to your specific comments are provided below (your comments have been *italicized* for reference):

> *Plans*
> *1) Figure 2.4 indicates that a portion of the project extends into the future park expansion area to the east. Other plans indicate that the drainage channel will be entirely within the existing park. This discrepancy should be rectified.*

Response: The drainage channel will be entirely within the existing beach park. However, items such as the park access road, utilities and berm slopes will extend into the park expansion area and past the sewer outfall easement. Figure 2.4, Project Relationship to Oneula Beach Park Master Plan and other figures have been revised to clarify the limits of the drainageway and extent of the project work. In addition, we have provided an expanded discussion about this project's relation to, and impact on, the One'ula Beach Park Master Plan. (See Sections 1.4.3, 2.2.1, 2.2.2, 2.3, and 5.9 of the FEIS). For example, we have clarified that the location and development of the park access road and installation of utilities have been authorized as part of the One'ula Beach Park Master Plan, which is supported by a Final Environmental Assessment, for which a Finding of No Significant Impact was issued.

> *Plans*
> *2) Generally the conceptual plans do not provide sufficient definitive detail regarding the proposed improvements. The Final EIS should include the following plans:*
> *-A typical cross section taken midway between the mauka and makai project boundary.*

> *-Cross-sections showing the transition from the golf course to the residential Ocean Pointe developments to the east and west of the golf course. (These plans will provide a clear picture of how the topography of upland areas will transition to the proposed drainage channel.) If possible, the Final EIS should describe any planned/proposed fences and walls at the perimeter of the golf course and/or between the golf course and the park.*
> *-A detail cross section of the channel banks showing the existing and proposed elevations including the raised banks referred to in the last paragraph of page 2-3. Will the outside slope of these raised banks be the same as that along the banks inside the channel i.e. 1 to l0?*
>
> *Plans should show property lines, the existing and proposed park access road (where applicable), existing and proposed elevations and should be drawn to scale.*

Response: The information you have requested is contained in the FEIS, Appendix G, Concept Plan, which includes: (1) a typical cross-section midway between the mauka and makai extents of the project; (2) a cross-section at the point of transition between the golf course and the Ocean Pointe residential areas to the east and west of the golf course; (3) a representative drawing showing areas which are proposed to be fenced or walled at the perimeter of the golf course and park; and (4) a cross-section of the drainage channel banks indicating the existing and proposed elevations. Property lines, elevations and other information including the park access road are also included.

To clarify the bank slopes within and outside the channel, Section 2.2.1 has been amended to add the following information:

> The outside slopes of the raised banks will be approximately 5% (20:1) along the outside of the east bank and 20% (5:1) along the outside of the west bank. The west bank has a steeper slope in order to minimize the amount of fill that will be placed over the existing Honouliuli sewer outfall (fill will be required only at the park access road to maintain a maximum 5% longitudinal slope for ADA accessibility purposes). Final design plans will be prepared for agency review and approval following completion of the EIS.

Some of this information is repeated in Section 4.2.

> *Park Usage*
> *The discussion on the project impacts to Oneula Beach Park, park usage and future development should be expanded.*

Response: We have provided an expanded discussion about this project's relation to, and impact on, the One'ula Beach Park Master Plan. (See Sections 1.4.3, 2.2.1, 2.2.2, 2.3, and 5.9.) Constructing the drainage channel through One'ula Beach Park constitutes a significant modification of the One'ula Beach Park Master Plan. However, the proposed project has been designed to minimize the impact on park usage and the Master Plan. The channel through the park will be wide and shallow with gently sloping banks, suitable for passive recreational uses, and will be relatively indistinguishable from the surrounding park areas. Moreover, the drainage channel will be located a considerable distance to the east of the ball field, and, thus, will have no impact on the active elements of the park.

The One'ula Beach Park Master Plan describes the park as having both active and passive features. The drainage channel has been located in an area slated for passive recreation and will have no impact on the active elements of the park (e.g., the ball field).

Pedestrian Path
We understand the stated 10:1 slope does not meet either Park Dedication standards for active recreational park space or ADA requirements for pedestrian use. The Final EIS should clearly describe how this slope would impact the proposed pedestrian paths shown in the Oneula Beach Park Master Plan. Page 1-12 states a portion of the proposed pedestrian path will be relocated. The Final EIS should show the location of the relocated pedestrian path.

Response: As noted above, Appendix G, Concept Plan, identifies the location of the pedestrian paths. Pedestrian paths are proposed to be located along the park access road and lateral along the makai side of the park. In order to comply with ADA requirements, longitudinal slopes along the park access road will not exceed 5%. The channel banks will be graded to slopes of 5% to 20%. The pedestrian pathway will be aligned to traverse these banks with a longitudinal slope of not steeper than 5% and a transverse slope of not steeper than 2%. To meet ADA slope requirements, the unpaved pedestrian path depicted in the One'ula Beach Park Master Plan will need to be slightly modified by a slight meander around the two outer banks of the drainageway. The general location of the pedestrian pathway, however, has not been altered.

Pedestrian Path
The proposed pedestrian access ways, shown on Figure 2-4 should be consistent with those of the revised Ocean Pointe Master Plan for Area 3.

Oneula Beach Park Master Plan
We are aware that the Oneula Beach Park Master Plan has been modified with the relocation of parking (now located along the existing internal park road) and bathhouse. Figure 2-4 should be updated to reflect these changes. The drainage way will likely result in relocation of the planned picnic area (as indicated in Figure 2-I), pedestrian way along the shoreline (as indicated on page 2-12) and possibly a portion of the mauka parking area.

If, however, park improvements, such as irrigation, parking areas, and pedestrian ways are to be developed within the footprint of the drainage channel, the Final EIS should identify design standards or measures would apply to withstand flooding.

Response: Figure 2-4, Project Relationship to Oneula Beach Park Master Plan has been corrected to depict the updated One'ula Beach Park Master Plan in the FEIS. Appendix G, Concept Plan, has also been revised to reflect the revised version of the Ocean Pointe Master Plan for Area 3.

The proposed project does not contemplate permanent irrigation facilities or parking areas within the footprint of the drainage channel. Section 2.2.2 indicates that the park access road through the drainage channel will operate as a ford structure and therefore will be constructed with concrete to prevent washout during storm flow events. The pedestrian pathway throughout the park will be unpaved in accordance with the One'ula Beach Park Master Plan. The channel design will be in accordance with the Rules Relating to Storm Drainage Standards of City and County of Honolulu. Grades within the channel will be very mild and will limit flow velocities to levels that

will minimize damage to grass and other improvements (e.g., park access road and pedestrian pathway) in the channel.

Page 4-31 indicates that the drainage way will be kept clear of trees and other features that could impede storm water flows. Will any park amenities such as picnic tables, trash receptacles, and barbeques be allowed in this area?

Response: HASEKO recommends that the drainage channel area remain clear of objects which might restrict or impede any flood flows occurring in the channel. Picnic tables and park benches are not desirable in the drainageway because of the possibility of debris lodging against them when stormwater is present. Trash cans and barbeques are also not desirable in the drainageway because the refuse contained in the receptacles could be discharged into the water during storms. For this reason, HASEKO recommends that the proposed picnic area located on the west side of the drainage channel bank be relocated to an area outside of the drainageway. In other areas of the park the sparse placement of minor and/or smaller obstructions such as sign posts is not anticipated to have a notable impact on the channel hydraulic capacity. Please refer to the Final EIS, Section 5.9, Parks and Recreation, Impacts and Mitigation Measures, that provides this discussion.

We recognize that constructing the drainage channel through One'ula Beach Park constitutes a significant modification of the One'ula Beach Park Master Plan and that the Special Management Area Use Permit (SMP) issued for implementation of the beach park Master Plan will have to be modified to accommodate this change. We anticipate that decisions regarding the placement of park amenities will be made during the SMP modification process.

~~Page 2-12 indicates that~~ HASEKO will coordinate park changes with the Department of Design and Construction (DDC) and the Department of Parks and Recreation (DPR) regarding changes to the Oneula Beach Park Master Plan and construction schedule for project and park improvements. The Final EIS should identify the changes to be made to the Master Plan as well as the progression of the proposed development with that of the Master Plan. The development schedules are important for several reasons. A graded drainage channel without irrigation or a reconstructed access road with no transition to the existing access road could have significant implications for park users.

Response: We have provided an expanded discussion about this project's relation to, and impact on, the One'ula Beach Park Master Plan. (See Sections 1.4.3, 2.2.1, 2.2.2, 2.3, and 5.9.) Although construction of the drainage channel through One'ula Beach Park constitutes a significant modification of the One'ula Beach Park Master Plan, the proposed project has been designed to minimize revisions to the master plan. The channel through the park will be wide and shallow with gently sloping banks, suitable for passive recreational uses, and will be relatively indistinguishable from the surrounding park areas. Locations of the active playing field, parking lots, park access road and the pedestrian pathway are consistent with the beach park master plan, except for a slight meander in the pedestrian pathway to meet ADA requirements. Roadside parking will likely be eliminated from the section of the park access road that crosses the channel, and a picnic area will probably have to be relocated to another area of the park. We anticipate that such decisions will be made during the SMP modification process.

In further response to your comment, the following discussion is included in Sections 2.3 and 5.9 of the FEIS:

HASEKO will coordinate work required for the subject project with DPP, DPR, and DDC regarding changes to the Oneula Beach Park Master Plan, and construction schedule for the project and park improvements, with the goal of minimizing any disruption to park users. The implementation of the drainage channel will be coordinated with development of the Oneula Beach Park improvements, both within the existing park as well as within the future park expansion area (east of the existing park).

The permanent improvements installed within the channel area (grading, grassing, access road, utilities and signage) will include, if necessary, temporary provisions and reconnections for maintaining public access and utility services. The specific construction scheduling details will be developed following completion of the EIS and plan review processes. This will involve the review of construction drawings, environmental permits, design details to meet State and City and County of Honolulu regulations and requirements (including the permanent and any temporary provisions for maintenance of public access and services to the park), and construction schedules.

The modification of the park access road to a location further makai of the present location will be designed to be consistent with the park master plan. No significant change or impact is expected because: (1) the road will remain in the same alignment as shown in the Oneula Beach Park Master Plan; and (2) work on the road will be undertaken by HASEKO as part of the drainage system improvement project.

Landscaping
Page 2-6 states, "Due to the dry conditions, grass cover in the channel may be thin and sand may be used as a supplement for ground cover." While it is clear that the project will remove the existing vegetation creating an "open space", it's not clear how or when the channel will be revegetated. The Final EIS must describe when vegetation will be replaced and irrigation installed. We are concerned that an unvegetated drainage channel could result in increased turbidity in the event of a 100-year storm.

Response: The following discussion is provided in the Final EIS, Section 2.2.4, Landscaping:

The Kaloi drainageway channel through Oneula Beach Park will be landscaped to serve as open park space, consistent with the remainder of the park. Clean sand and topsoil may have to be imported as necessary to support the establishment of grass and ground cover in the graded areas. Temporary grassing and/or hydromulching will be used as necessary, for temporary erosion control purposes during construction.

Figure 2-2 shows trees in the channel. Section 2.2.4 indicates that trees will be planted on the banks. If these trees are .not within the footprint of the drainage channel, Figure 2-2 should be revised by removing the trees in the channel.

Response: Figure 2-2, Concept Profile Views, has been revised to indicate that trees will be planted only on the upper portions of the channel banks.

Roadways
Section 2.2.2 should explicitly state that the access road would be reconstructed makai of the current location, on park lands in the location envisioned in the Oneula Beach Park Master Plan. While it is clear that the segment of the park access road crossing the channel will be relocated and reconstructed with the implementation of the channel project, it is not evident how this new road will connect to roadway segments to the east and west, be they existing or new. The Final EIS must specify how this will be accomplished and how access will be provided during the various phases of development.

Response: The Final EIS, Section 2.2.2, Park Access Road, has been revised to provide the following discussion:

Presently, access to Oneula Beach Park is from Fort Weaver Road, over Papipi Road and via a roadway easement extending from Papipi Road to the park. The roadway easement is currently located entirely on HASEKO's property. Upon conveyance by HASEKO of the 9.365-acre expansion area, the roadway will have to be relocated makai or southward of its present alignment to lie within the park boundary. As part of the Kaloi drainage improvements project, the portion of the access road that crosses the channel will be constructed in its realigned location. It is anticipated that the construction of this project will precede the realignment of the existing access road. The portion of the relocated park access road to be constructed in conjunction with this proposed drainageway project, therefore, will be carefully coordinated with DDC and DPR to ensure seamless continuity on either side when the remainder of the access road is constructed. Temporary provisions will be constructed, as necessary, to maintain public access and utility (water, power, and telephone) services to the beach park.

A detour road will also be constructed to maintain vehicular and pedestrian access to the park during construction. The preliminary location of the detour road has been identified in the Final EIS, Appendix G, Concept Plan.

The section of the Final EIS on traffic and roadways (Chapter 5 in the Draft EIS) should be revised to mention Condition 3.e.7 of 2003/PDH-3, which requires the applicant to provide roadway improvements (in conformance with the City's future park access roadway) from the Diamond Head boundary of the 9.4-acre parcel to be conveyed to the City, to Papipi Road.

Response: The following discussion has been added to Section 5.1, Traffic and Roadways.

The park access road, as it extends through the 500-foot-wide drainageway, will be realigned to meet the requirements of the proposed project and the Oneula Beach Park Master Plan to maintain access. Roadway improvements from the Diamond Head boundary along Papipi Road, for the 9.365 acres which will be dedicated to the City for park use by HASEKO, will also be accomplished at a later date in accordance with Condition 3.e.7 of 2003/PDH-3, which requires the construction of roadway improvements. Both the access road and the section of road along the 9.365 acres will be dedicated to the City for park use at a cost to be borne by HASEKO.

In so much as the secondary park access road to be located at the northwestern end of the park mitigates against inaccessibility during storm events, the location of the secondary road should be shown on the Conceptual Plan View, Figure 2-4. As has been recommended in our comments on the revised Ocean Pointe Master Plan, this roadway must be a public roadway dedicated to the City which would be available to the public when the park is open. (Paragraph three; Page 5-4, of the Draft EIS should be revised accordingly.) The Final EIS should specifically state that the cost of constructing the secondary park access road would be borne by HASEKO. Completion of this road should coincide with construction of the drainage channel improvements.

Response: Appendix G, Concept Plan, referenced above, identifies the preliminary location of the secondary road and how it would connect to the road system from Oneula Beach Park. The Final EIS, Section 5.1, Traffic and Roadways, Impacts and Mitigation Measures, states that HASEKO will provide the secondary park access road. HASEKO will further coordinate the completion date for construction of the road with DDC and DPR. The construction of the secondary access road will require completion of other roadway infrastructure within Ocean Pointe leading up to that point. An appropriate temporary secondary access will be provided for emergency purposes until the permanent City-dedicable roadways are operational.

Page 6-5, Figure 6-1 and Page 6-7, Figure 6-2: These figures differ somewhat from the "Proposed Master Plan for Ocean Pointe", dated March 17, 2004, copy attached. Specifically, the March 2004 Master Plan shows the extension of Kaileolea Drive across a portion of the golf course to the A-2 zoned Marina area, and north to connect to Keoneula Boulevard. Haseko incorporated this connection in response to our December 3, 2003 comments on an earlier draft Ocean Pointe Master Plan. For consistency, the updated March 2004 Ocean Point Master Plan should be utilized as a base layer for both Figures 6-1 and 6-2.

The Traffic Review Branch asks that figures be revised to show the current roadway master plan.

Response: Thank you, we acknowledge this point of clarification. We have used the updated March 2004 Ocean Pointe Master Plan as a base layer for a revision to Figure 6-1, Ocean Pointe Master Plan and Figure 6-2, Oneula Archaeological District.

Utilities
Sewer Line/Wastewater
According to page 5-7, there are plans to connect the planned park comfort stations to the sewer via a line which will run from the Oneula Beach Park to the existing sewer line in Papipi Road. The Final EIS should address the impact the proposal will have on the feasibility of this wastewater disposal plan. Will additional or different wastewater disposal facilities or accommodations, such as a pump station, be required? What additional cost might this incur?

Response: The FEIS has been revised to clarify that the proposed project will have no impact on wastewater facilities or plans identified in the One`ula Beach Park Master Plan.

Potable Water
Page 5-7 acknowledges the existing waterlines will have to be relocated to accommodate the channel invert. The Final EIS should indicate where the existing and new lines would be located. When will the new water line be constructed?

Response: The proposed project will include the installation of a new water line across the drainage channel to replace the existing water line. The existing water line will be removed along with the existing park access road that is presently located within Ocean Pointe. The new water line will serve the Oneula Beach Park is identified in the Final EIS, Appendix G, Concept Plan.

The final design of the water line (size and alignment) will be coordinated with DPP, BWS, DDC, and DPR. Provisions for temporary reconnections to the existing water line will be included as necessary to maintain service until permanent segments of the water line are installed in the existing and future beach park areas. We have revised Section 5.3 to include this information.

Power and Communication
The Final EA should describe the location of existing electrical and communication infrastructure and indicate whether or not they would have to be relocated (lowered) as a result of the project.

Response: The One`ula Beach Park Master Plan contemplates the eventual undergrounding of electrical power lines. (See Section 2.3.4 of the Final Environmental Assessment for the One`ula Beach Park Master Plan.) As part of this proposed project, the existing overhead electrical power and communications lines will be relocated to an underground concrete-encased conduit system across the drainage channel. Power and communications utilities affected by the proposed project are identified in the Final EIS, Appendix G, Concept Plan.

Provision for temporary reconnections to the existing overhead electrical and communication lines will be provided as needed to maintain service until the permanent lines are installed in the existing and future beach park area.

Visual Impacts
The Final EIS should describe project impacts to views from the project area. Will standing in the excavated, tree-lined channel obstruct views in different directions?

Response: The following discussion is provided in the Final EIS, Section 4.8, Visual Resources:

> Views from within the channel will be slightly affected by the height of the channel banks. At the mauka end of the project (near the park access road), the bottom of the channel will be at an elevation of 4.5 feet above msl and the top of both banks will be at an elevation of 10 feet msl for a maximum height difference of approximately 5.5 feet. Near the makai end of the channel, the bottom of the channel will be at an elevation of 4 feet above msl and the banks will be approximately 6 feet above msl for a height difference of 2 feet. The maximum grade difference between the channel bottom (4') and the top of bank (10') is 6'. Trees along the channel banks may also obstruct views looking out from inside the channel.

Clarification
The following are recommended changes to Page vi:
The Draft EIS lists the County Zoning as "P-2, Preservation". It would be more accurate to identify the zoning as P-2, General Preservation.
Page vi should be amended to note that Henry Eng, FAICP is the Acting Director of DPP.
Grading permits should be added to the list of required permits,

Response: We acknowledge your recommended changes and have revised the Final EIS, Project Summary; Section ES.9, Necessary Permits and Approvals That May be Required; and Section 8.3, City and County of Honolulu, accordingly.

Page 1-8 of the Final EIS states that the current drainage way is too small to meet the 100-year storm flow requirements. The Final EIS should describe the existing project condition including the drainage/channel improvements. The disclosure of what exists will help reviewers understand the magnitude of the potential change in the existing conditions.

Response: The FEIS provides an expanded discussion of the regional context of the proposed project and the historical background that led to this proposal, which includes further background information on the existing conditions of the site relative to the proposed action. Please refer to Section 1.4.1, Regional Drainage Needs, Section 1.4.2, Alternative Ocean Outlets, and Section 2.2, Description of the Proposed Action.

The first paragraph on page 2-2 of the Draft EIS states that a portion of the berm will be lowered. The Final EIS should identify the location of the berm.

Response: The location of the berm is identified in Appendix G, Concept Plan. The "berm" being referred to is the portion along the shoreline where sand and soil have naturally built-up over time and is presently higher than portions inland nearer to the access road.

Page 2-3 indicates that the existing shoreline berm will be lowered by approximately 2-4 feet. Figure 2-2, "Typical Channel Mouth Section" shows existing grade at 8 feet and an invert of 2.5 feet MSL, 5.5 feet lower than the existing grade. The Final EIS should clarify the depth of the excavation at the channel mouth.

Response: Grades along the shoreline berm vary between 6 and 8 feet above msl. The bottom of the channel will be excavated to an elevation of 4 feet above msl (the 2.5 feet msl as shown in the Draft EIS is incorrect). Based on these elevations, the shoreline berm will be lowered by approximately 2 to 4 feet. These grades have been clarified in the Final EIS, Section 2.2, Description of the Proposed Action.

Page 2-3 states that the banks will be raised to approximately 4-6 feet higher than the channel bottom. The Final EIS should provide a comparison between the existing grade and the top of the bank.

Response: The following information is provided in the Final EIS, Section 2.2.1, Kaloi Gulch Drainageway, and compares the existing and proposed grades relative to the elevation of the top of the drainage channel banks:

A summary of the relationship between the existing grades and the proposed project grades are as follows:

- The difference between the existing grades along the park access roadway = 10 feet (at the park property line) - 3.3 feet (about 300 feet west of the park property line) = 6.7 feet msl

- The difference between the proposed grades along the proposed park access roadway = 10 feet (top of banks near the park property line and the sewer outfall easement) - 4.5 feet (center of drainageway) = 5.5 feet msl
- The maximum grade difference in the existing emergency overflow channel = 10 feet (top of bank) - 1.8 feet (low point approximately 300 feet east of the park property line) = 8.2 feet msl
- The maximum grade difference in the proposed permanent drainageway channel = 10 feet (top of bank) - 4.0 feet (lowest excavated grade along shoreline) = 6.0 feet msl

The proposed drainage channel bottom will be higher than the existing ground in some areas because of the placement of fill. This is necessary to enable the channel to slope from the park access road (at elevation 4.5 feet) down to the ocean (at elevation 4 feet). Currently, there is a sump at elevation 1.8 feet near the access road that causes major ponding to occur during rains. Meanwhile, the shoreline berm is sitting up high at between elevation 7 and 8 feet that traps the water causing it to pond. On the east side of the channel, there is also a berm that was constructed with a top elevation of 10 feet.

Water Quality
Please identify the meaning of "TSS" used in Table 4-1 on page 4-21 of the Draft EIS. The Final EIS should address project impacts on the near shore environment such as coral reefs, the sedentary organisms that inhabit them and those organisms that depend on them for food and shelter.

Response: TSS is the abbreviation for Total Suspended Solids. It is a measure of the weight of the suspended solids present in a given volume of liquid usually expressed in micrograms per liter (µg/l) or milligrams per liter (mg/l). The Final EIS has been revised to include this information in Table 4-1, Model Run Results.

The Final EIS, Section 4.13, Marine Biology, provides additional information including potential impacts and mitigation measures for benthic macroinvertbrate, algal, and reef fish species found in the marine environment in the vicinity of the proposed project.

Water quality parameters evaluated in the Draft EIS are primarily those designated by State regulation for open coastal waters and several others. The Final EIS should explain why these constituents are the exclusive predictors of water quality and ecological impacts. Could the storm water runoff from an urban environment contain other pollutants which might adversely impact the marine environment? If so, the Final EIS should provide an analysis of these pollutants and potential environmental impacts.

Response: We believe it is appropriate to use the water quality parameters covered by State regulation as the primary basis for assessing potential environmental effects. They are designed to maintain and protect existing uses, and the extent to which an undertaking is able to comply with those standards is a key consideration in determining whether it is acceptable. The discussion in the Draft EIS focused on salinity and suspended sediments for two reasons. First, in terms of volume and potential impacts, these were the constituents deemed most likely to adversely affect nearshore waters and marine biota. Second, because the constituents are "conservative", i.e., they are not reduced by biological processes (as nutrients would be), they provide an effective means of judging the extent of the discharge's effects. When the results of the modeling showed that the

water quality perturbations caused by discharge from the proposed outlet would be both short-lived and limited in geographic extent, we found this to be a good indication that the potential for adverse effect was not great.

Having said that, we agree that compliance with the water quality standards is not the exclusive predictor of water quality and ecological impacts. That is why the Draft EIS also evaluated potential biological effects (see, for example, Section 4.13, Marine Biology). It is also the reason the numerical model included results for a conservative dye tracer which can be applied to other contaminants of interest, including those that you mention. The initial dye concentration was set to 100, while the ambient concentration was set to 0. Model results therefore directly show the extent of dilution of the discharge plume. For example, a dye concentration of 10 computed by the model indicates that the plume has diluted 90% or is 10% of its original concentration; the corresponding concentration of any conservative contaminant in the discharge can easily be calculated by multiplying 0.10 by the initial concentration of the contaminant. The results are shown in the Draft EIS, Appendix B, Numerical Modeling of Storm Drain Discharge Plume Transport.

When all factors are taken into account, including the very infrequent nature of discharges (no more than once in ten years), it becomes apparent that the storm water runoff likely to reach the ocean through the proposed Kaloi drainage channel would not have a significant adverse effect on the marine environment. In this regard, we also note that the water quality effects of very infrequent discharges into the ocean through Kaloi Gulch after most of the water has been retained in upstream basins will be substantially less than the effects of the much more frequent discharges into the Ocean Pointe marina that would occur under the original plan for the area.

Flood
We note that the Federal Emergency Management Agency's Flood Insurance Rate Map for the area was updated on November 20,2000 and suggest that references to the older maps found on pages 4-27 and 4-28 be updated.

Response: The most recent Flood Insurance Rate Map information for the project site is provided in the Final EIS, Figure 4-7, Flood Zone.

Page 4-27 states that, unlike some coastal areas, the tsunami phenomenon in this area would be attributed to rapidly rising and declining sea levels. The Final EIS should explain why this is the case.

Response: The following discussion is provided in the Final EIS, Section 4.7.1, Flood Zones:

> This is because the ocean outlet for the Kaloi drainageway does not directly contact ocean seawater nor is it tidally influenced. Tidally influenced in this situation means that under the normal rise and fall of the tide that seawater will not rise high enough to enter the Kaloi drainage channel through the ocean outlet or from groundwater seepage (in the form of brackish groundwater).
>
> A tsunami-generated wave at the proposed project site would have to first breach the normally dry ocean outlet and then move inland. The distance the wave travels will depend on the force of the wave. Because the channel will be at an elevation of 4 feet msl at the shoreline, the tsunami phenomenon would not be expected to push seawater inland

> with the same force and velocity as it would along a deeper, tidally influenced stream or river channel. Instead, the majority of the wave's tidal forces will be directed against the coastline, moving inland onto dry land according to the force of the wave.

These characteristics make the location of the Kaloi drainage channel unlike coastal areas where there are streams and rivers with a deep enough ocean outlet that directly contacts ocean seawater.

Page 4-27 states that the presence of the channel embankments is likely to lessen the potential for flooding of adjacent areas. The Final EIS should explain this statement.

Response: The following discussion is provided in the Final EIS, Section 4.7.1, Flood Zones, Impacts and Mitigation Measures:

> The presence of the channel embankments is likely to lessen the potential for flooding of adjacent areas. This is based on the drainage channel banks built up to an elevation of 10 feet msl. These banks will serve as levees during times of extreme high flows helping to contain flood flows within the channel. The containment of flood flows from the Kaloi watershed will help to protect the 'Ewa Beach area to the east (Papipi Road area) and the Oneula Beach Park to the west.

Safety
The Final EIS should address the safety for park users and vehicles if the park is used as a drainage channel. The broad width and the gentle slope of the proposed channel would make it difficult to distinguish areas of flooding from areas of safety. How might a flooded access road ford hinder evacuation and emergency/rescue services?

Response: A new section 2.2.5, entitled Public Safety, has been added to address your comment

Additionally Section 5.1 discusses the secondary access road that will be available for use when the park access road is closed. That section also notes the following:

> Because of the slow movement of runoff through the watershed, there is no possibility of unexpected floods occurring at this location. Consequently, DPR will be able to monitor storm advisories issued by the National Weather Service and decide when to close the road as a precaution. Because there would be flow in the drainageway only as a result of very large storm events (estimated as once in 10 years), the temporary road closures would occur only during very stormy conditions when beach park usage would be very low.

100 year Storm Events
The Final EIS should identify which agencies will review and approve plans for procedures, including the posting of signs, in preparation for flood events at the park. We are aware that there will need to be coordination probably with multiple agencies. Required flood precautions could dictate project modifications which should be included as part of the environmental review at this time. We recommend that the Oahu Civil Defense Agency be consulted regarding preparation of an emergency flood plan.

Response: The following is provided in the Final EIS, Section 2.2, Description of the Proposed Action:

> More detailed engineering and construction plans will be developed at the appropriate stages (after required land use permits have been obtained) in coordination with the Department of Planning and Permitting (DPP), Department of Parks and Recreation (DPR), Department of Design and Construction (DDC), Department of Transportation Services (DTS), the Department of Facilities Maintenance (DFM) and police, fire, and Emergency Medical Service (EMS) agencies.

Preliminary consultation with the Oahu[1] and State Civil Defense[2] agencies has been initiated to ascertain requirements for flood preparedness. HASEKO will continue further consultation with these agencies to prepare and implement appropriate flood preparedness measures to ensure safety of the project. (See Section 2.2.5.) We recognize that coordination with several agencies will be required and understand that this will be an on-going process that is expected to continue after the completion of the EIS process.

> *Drainage*
> *The Final EIS should expand on the sand berm scour. What is the maximum sand berm height? At this height, what storm flow rate will be necessary to break open the sand berm? Address the impact on the upstream hydraulic grade line. The drainage master plan for Ocean Pointe should also address the sand berm scour.*

Response: The following is provided in the Final EIS, Section 2.2.1, Kaloi Gulch Drainageway:

> The proposed drainageway work will lower the height of the existing shoreline berm by approximately 2 to 4 feet down to an elevation of 4 feet above msl. The grading work will allow passage of the 100-year stormflow in accordance with City requirements. If required, build-up of sand and sediments in the channel will be removed on an as-needed basis to ensure that the channel will perform adequately. Structures and other encroachments would need to be consistent with City restrictions for development within a floodway.
>
> Once the berm is lowered and all portions of the project are completed, the berm will be periodically inspected and maintained as needed to ensure that it can function adequately as a storm drainage outlet.
>
> HASEKO has been working, and will continue to work, with the appropriate City Departments and other landowners and developers in the Kaloi drainage basin to legally define the maintenance obligations for the drainageway area. Although the details and the form of memorializing the maintenance obligations have not yet been worked out, HASEKO is committed to ensuring that the drainage channel through Oneula Beach Park is kept free of large debris that may impede storm water flows through the channel, silt and other debris are removed from the channel following storm events, and the shoreline

[1] Telephone conference and e-mail transmittal of project information to Mr. Harold Buckle, Oahu Civil Defense Agency, June 9, 2005.
[2] Telephone conference with Mr. Norman Ogasawara, State Civil Defense Agency, June 9, 2005.

> berm is maintained at an elevation that enables it to function adequately as a storm drainage outlet.
>
> *The project description throughout the Final EIS should clarify that the project is for the Kaloi Gulch drainage basin 100 year storm flow outlet and not imply that it is an overflow in which storm water was always directed to the beach park.*

Response: The Final EIS includes expanded discussions about the regional context of the proposed project and the historical background of regional drainage facilities and plans, including the existing emergency overflow channel through One`ula Beach Park.

> *The Final EIS must address mitigation measures and the erosion potential of the shoreline.*

Response: The following discussion is provided in the Final EIS, Section 4.2, Topography, Impacts and Mitigation Measures:

> The existing shoreline consists mostly of coral and reef rock. At the channel excavation depth of 4 feet msl, the shoreline is anticipated to consist of coral reef rock. Erosion potential is not anticipated to be a significant factor due to the hardness of the reef rock.

Based on the expected composition of soils at the project site no adverse impacts associated with shoreline erosion are anticipated.

> *A drainage easement in favor of Haseko will be required for the maintenance of the drainage way including the access roads.*

Response: Following publication of the DEIS, Haseko has had meetings with the Department of Parks and Recreation and the Department of Facilities Maintenance in efforts to clarify maintenance responsibilities for the drainage channel. HASEKO will continue to work, with the appropriate City Departments and other landowners and developers in the Kaloi drainage basin to legally define the maintenance obligations for the drainageway area. Although the details and the form of memorializing the maintenance obligations have not yet been worked out, HASEKO is committed to ensuring that the drainage channel through Oneula Beach Park is kept free of large debris that may impede storm water flows through the channel, silt and other debris are removed from the channel following storm events, and the shoreline berm is maintained at an elevation that enables it to function adequately as a storm drainage outlet.

> *Encroachments should not be allowed within the drainage way unless it can be shown that it will not have an impact on the design hydraulic grade of the channel.*

Response: We agree that encroachments that could potentially obstruct and reduce hydraulic capacity of the drainageway should not be allowed. HASEKO, therefore, recommends that the drainage channel area remain clear of objects which might restrict or impede any flood flows occurring in the channel. Picnic tables and park benches are not desirable in the drainageway because of the possibility of debris lodging against them when stormwater is present. Trash cans and barbeques are also not desirable in the drainageway because the refuse contained in the receptacles could be discharged into the water during storms. For this reason, HASEKO recommends that the proposed picnic area located on the west side of the drainage channel bank

be relocated to an area outside of the drainageway. In other areas of the park the sparse placement of minor and/or smaller obstructions such as sign posts is not anticipated to have a notable impact on the channel hydraulic capacity. Please refer to the Final EIS, Section 5.9, Parks and Recreation, Impacts and Mitigation Measures, that provides this discussion.

We recognize that constructing the drainage channel through One'ula Beach Park constitutes a significant modification of the One'ula Beach Park Master Plan and that the Special Management Area Use Permit (SMP) issued for implementation of the beach park Master Plan will have to be modified to accommodate this change. We anticipate that decisions regarding the placement of park amenities will be made during the SMP modification process.

Development Plan
The 5-year review of the adopted Ewa Development Plan is currently underway. Proposed revisions to the plan will include updated information related to the Ocean Pointe (Ewa Marina) development and proposed drainage reconfiguration. We note that Kaloi Gulch is part of Ewa's open space and greenways network. The plan recognizes the importance of the Kaloi Gulch drainage way in Ewa.

Response: Thank you for advising us of this matter. We concur that the Kaloi Gulch is an important part of Ewa's open space and greenways network. The proposed project is designed to be consistent with this designation. As indicated above, the FEIS provides an expanded discussion of the entire Kaloi Gulch drainage basin and its importance to the development of the Ewa region.

Unresolved Issues
Page-5 of the Draft EIS states that no significant unresolved issues have been identified which would result in the potential for negative adverse environmental impacts. The Final EIS should identify, provide the status and possibly resolutions for all significant issues whether or not they would result in potential negative impacts.

The following is only intended to highlight several possible unresolved issues:

Maintenance
Page 2-6 of the Draft EIS states that maintenance will be done by either the golf course operator or an entity designated by HASEKO. The Final EIS should identify the City agencies or any other entity which would be a party to the proposed maintenance agreement. (We note your December 8, 2004 letter states the agreement will be drawn to the satisfaction of the Department of Parks and Recreation. We suggest you also consult with the Department of Facilities Maintenance and the Oahu Civil Defense Agency.)

Modification to the Park
As recommended above, specific changes to the Oneula Beach Park Master Plan should be described in the Final EIS. To the extent that specific details are not forthcoming, they should be identified as unresolved issues.

Response: The Final EIS, has been revised and further discussion of unresolved issues has been incorporated. These sections include:

ES.8 Unresolved Issues
ES.8.1 Maintenance of Kaloi Drainageway Improvements;

ES.8.2 Project Modifications to Oneula Beach Park Master Plan;
ES.8.3 Final Engineering Design Plans; and
ES.8.4 Unresolved Issues Summary.

Alternatives
Please address the alternative of lower slopes that would meet park dedication and ADA standards for pedestrian access.

Response: The area of the drainageway is on park land that is already owned by the City and would therefore not require dedication. The proposed channel design, however, will allow for installation of ADA-compliant pedestrian paths along the access road and lateral along the makai side of the park. Longitudinal slopes will not exceed 5% and transverse slopes will not exceed 2%. Conceptual site and grading plans have been included in Appendix G, Concept Plan, to reflect the alignment and grades of the pedestrian paths.

We appreciate this opportunity to respond and hope we have sufficiently addressed your concerns. Should you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: HASEKO (Ewa), Inc.
Morihara Lau & Fong LLP

DEPARTMENT OF DESIGN AND CONSTRUCTION
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MUFI HANNEMANN
MAYOR

WAYNE M. HASHIRO, P.E.
ACTING DIRECTOR

DEPUTY DIRECTOR

93759

February 14, 2005

2005 FEB 15 AM 9 45
DEPT OF PLANNING
and PERMITTING
CITY & COUNTY OF HONOLULU

TO: HENRY ENG, FAICP, ACTING DIRECTOR
DEPARTMENT OF PLANNING AND PERMITTING

ATTENTION: ARDIS SHAW-KIM

FROM: WAYNE M. HASHIRO, P.E., ACTING DIRECTOR

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT
KALOI GULCH DRAINAGEWAY IMPROVEMENTS AT
ONEULA BEACH PARK

Thank you for the opportunity to review and provide comments to the referenced report. We have reviewed the report and have the following comments.

The report substantially addresses the comments we submitted from the previous solicitation for the Environmental Impact Statement (EIS) Preparation Notice. Two new questions arise with publication of the draft EIS which need to be more specifically addressed.

The shoreline pedestrian path is described as nonpaved, which is consistent with the original park master plan. We would like to know what configuration and materials might be used for this path to be compatible with the area's dual use as a park/drainageway and also meet handicapped accessibility requirements. A slope of 1:10, as proposed in the report's profiles, would require handrails. A slope of half that steepness, or less, would avoid the need for handrails. Also, the path would need to be constructed in such a way that it would not impede water flow when exceptional drainage conditions prevail. Similar design concerns apply to the paved ford to be constructed for vehicular circulation.

The City desires that the obligation of the developer, or its designee, to maintain the drainageway in perpetuity, as promised in the report, be formalized in a legal agreement(s) of some kind. At the very least, an easement agreement is needed to legally define the drainageway area and describe the rights and responsibilities of the parties involved.

If there are any questions, please contact Mr. Terry Hildebrand, planner, at extension 4696.

WMH:ei

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MUFI HANNEMANN
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TIMOTHY E. STEINBERGER, P.E.
ACTING DIRECTOR

WAYNE M. HASHIRO, P.E.
DEPUTY DIRECTOR

CDD-A 05-0013

January 24, 2005

MEMORANDUM

TO: MR. HENRY ENG, ACTING DIRECTOR
DEPARTMENT OF PLANNING AND PERMITTING

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

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT, KALOI GULCH DRAINAGE IMPROVEMENTS AT ONEULA PARK

We reviewed the subject document and have no comments at this time. It is our understanding your department is checking for drainage capacity and the ultimate drainage design.

Should you have any questions, please call Keith Sugihara at Extension 5896.

KS:FK:pto

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R. M. TOWILL CORPORATION
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December 2, 2005

Mr. Wayne M. Hashiro, P.E., Director
Department of Design and Construction
City and County of Honolulu
650 South King Street, 11th Floor
Honolulu, Hawaii 96813

Dear Mr. Hashiro:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Draft Environmental Impact Statement

On behalf of HASEKO (Ewa), Inc., thank you for your letters dated January 24 and February 14, 2005 to the Department of Planning and Permitting. We acknowledge there were no comments on January 24, 2005 and confirm we have been reviewing drainage capacity and design concerns of the proposed project.

We appreciated the opportunity to discuss your letter comments of February 14 with Mr. Terry Hildebrant, of your staff prior to preparation of our response which is provided below (your comments have been *italicized* for reference):

> Comment 1:
> *"The shoreline pedestrian path is described as nonpaved, which is consistent with the original park master plan. We would like to know what configuration and materials might be used for this path to be compatible with the area's dual use as a park drainageway and also meet handicapped accessibility requirements. A slope of 1:10, as proposed in the report's profiles, would require handrails. A slope of half that steepness, or less, would avoid the need for handrails. Also, the path would need to be constructed in such a way that it would not impede water flow when exceptional drainage conditions prevail. Similar design concerns apply to the paved ford to be constructed for vehicular circulation."*

Response: We confirm that the drainageway slopes will be designed at a slope of approximately 1:10. The configuration of the pedestrian path and vehicle access roadway will be designed at a slope of 1:20 or flatter to accommodate use by pedestrians and vehicles while meeting sufficient drainage requirements. The configuration and types of materials to be used for both the pedestrian path and access roadway will be determined during the final design of these facilities. HASEKO intends to coordinate this effort with your Department as well as the Departments of Parks and Recreation, and Planning and Permitting to meet regulatory and safety requirements.

> Comment 2:
> *"The City desires that the obligation of the developer, or its designee, to maintain the drainageway in perpetuity, as promised in the report, be formalized in a legal agreement(s)*

> *of some kind. At the very least, an easement agreement is needed to legally define the drainageway area and describe the rights and responsibilities of the parties involved."*

Response: As you know, subsequent to publication of the Draft EIS, HASEKO has continued to work with the appropriate City Departments and other landowners and developers in the Kaloi drainage basin to legally define the maintenance obligations for the drainageway area. Although the details and the form of memorializing the maintenance obligation has not yet been worked out, HASEKO is committed to ensuring that the drainage channel through Oneula Beach Park is kept free of large debris that may impede storm water flows through the channel, silt and other debris are removed from the channel following storm events, and the shoreline berm is maintained at an elevation that enables it to function adequately as a storm drainage outlet.

We appreciate your comments. Should you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Henry Eng, FAICP, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Morihara Lau & Fong LLP

FAX TRANSMITTAL SHEET

ENVIRONMENTAL CENTER
University of Hawaii
2500 Dole Street, Krauss Annex 19, Honolulu, HI 96822
Telephone: (808) 956-7361 Fax: (808) 956-3980

DATE: 2/8/2005

FROM: John Harrison

TO: Nelson W.G. Lee, Haseko (Ewa) Inc. (689-5757)
Ardis Shawn-Kim, DPP (527-6743)
Brian Takeda, R.M. Towill Corp. (842-1937)
OEQC (586-4186)

SUBJECT: DEIS
Oneula Beach Park--Drainageway Improvements

Pgs: 4

FEB-08-2005 TUE 01:26 PM UH-ENVIRONMENTAL CNTR. 9856398O P. 01

UNIVERSITY OF HAWAI'I AT MĀNOA
Environmental Center

February 8, 2005
RE: 0746

Mr. Nelson W.G. Lee
Haseko (Ewa) Inc
91-1001 Kaimalie Street, Suite 205
Ewa Beach, Hawai'i 96706

Dear Mr. Lee:

Draft Environmental Impact Statement (DEIS)
Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Ewa, Oahu

Haseko (Ewa), Inc. proposes to improve the existing Kaloi Gulch drainage way through the Oneula Beach Park in 'Ewa Beach, Oahu. HASEKO is financing the project due to their recent construction of the Ocean Pointe community and the additional storm water runoff corresponding to that project. These improvements include enlarging the existing drainage way to provide flood control for the communities within the Kaloi Gulch Watershed.

The Environmental Center conducted this review with the assistance of Robert Whittier, Water Resources Research Center; Paul Ekern, Emeritus Agriculture and Soil Science; Landin Johnson, Environmental Center; and Kerry Halford, Environmental Center.

General Comments

The present Draft EIS relating to the proposal to improve drainage conditions in the Kaloi Gulch system temporally coincides with a separate Environmental Assessment considering the project entitled Papipi Road Drainage Improvements. Upon consideration of these two documents, our reviewers note that these projects are essentially connected, and that the latter amounts to a phased or segmented element of the wider consideration of drainage in the region related to various HASEKO development activities. These project activities should not be separated, but considered together, as specified in the Hawai'i Administrative Rules (HAR §11-200-7) which states:

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FEB-08-2005 TUE 01:26 PM UH-ENVIRONMENTAL CNTR. 9856398O P. 02

(ref. §11-200-7 HAR) Multiple or phased applicant or agency actions. A group of actions proposed by an agency or an applicant shall be treated as a single action when:

(1) The component actions are phases or increments of a larger total undertaking;
(2) An individual project is a necessary precedent for a larger project;
(3) An individual project represents a commitment to a larger project, or;
(4) The actions in question are essentially identical and a single statement will adequately address the impacts of each individual action and those of the group of actions as a whole.

Our reviewers feel that the drainage way improvement project is both an increment of the larger drainage channel widening project and represents a commitment to this larger project.

Concerning this EIS, our thoughts serve precedence with the lack of clarity in certain terminology cited throughout the document. Our reviewers note that the insufficiency of pertinent information regarding the shoreline berm and the inaccurate definitions of the caprock in the 'Ewa area require reconsideration in the final EIS. A study related to the shoreline berm's inert properties should be undertaken. The definition of caprock in the draft EIS is incorrect and should be corrected according to the US Geological Survey cited*.

Berm

In section 2.2.1, Kaloi Gulch Drainageway, a brief description of the existing shoreline berm to be lowered is discussed. However, the description is vague and does not account for the mechanism of berm reformation. For example, if the berm is naturally formed by the ocean, then the probability of the berm reforming is highly likely. A discussion of the berm's origin and return rate should be included in the final EIS.

Caprock

In section 4.4 entitled Groundwater, the description of caprock states *that it is relatively impermeable and taken as a single unit. This caprock also has a permeability that is much lower than the basalt, which forms the basal aquifer that is beneath the caprock.* However, caprock is very heterogenous and on the low end, has both marine muds that have very low permeablility, as well as coral formations which have permeability that may exceed that of the basalt *. The key factor that mitigates any impact on the basal aquifer from any construction activities at the caprock surface is that basal aquifer water is under a positive pressure caused by the confining nature of the caprock. This means that water flow is upward from the basal aquifer, not down from the ground surface (or shallow excavation).

The issues stated above should be more clearly represemted in the final EIS. The Environmental Center as well as the HAR §11-200-7 implores HASEKO to incorporate all of the upcoming drainage way improvements in the Oneula beach area into the final EIS. The cumulative impacts of all related projects should be assessed thoroughly in the final EIS.

Thank you for the opportunity to review this Draft EIS.

Sincerely,

John T. Harrison, Ph.D.
Environmental Coordinator

cc: OEQC
DPP
R.M. Towill Corp
James Moncur, WRRC
Robert Whittier, WRRC
Paul Ekern, SS
Landin Johnson
Kerry Halford

* see Oki et al, Numerical Analysis of Ground-Water Flow and Salinity in the Ewa Area, Oahu, Hawaii, U.S. Geological Survey

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December 2, 2005

Dr. John T. Harrison, Environmental Coordinator
Environmental Center
University of Hawaii at Manoa
2500 Dole Street, Krauss Annex 19
Honolulu, Hawaii 96822-2323

Dear Dr. Harrison:

Kalo'i Gulch Drainageway Improvements at Oneula Beach Park
Draft Environmental Impact Statement

On behalf of HASEKO (Ewa), Inc., thank you for your letter dated February 8, 2005 (your reference RE: 0746), concerning the subject project. We appreciate the time you and your staff spent reviewing the document and providing written comments. Item-by-item responses (reproduced for your convenience in *italics* before each response) are provided below.

> ***General Comments***
> *The present Draft EIS relating to the proposal to improve drainage conditions in the Kalo'i Gulch system temporally coincides with a separate Environmental Assessment considering the project entitled Pāpipi Road Drainage Improvements. Upon consideration of these two documents, our reviewers note that these projects are essentially connected, and that the latter amounts to a phased or segmented element of the wider consideration of drainage in the region related to various HASEKO development activities. These project activities should not be separated, but considered together, as specified in the Hawai'i Administrative Rules (ref §11-200-7 HAR) Multiple or phased applicant or agency actions. A group of actions proposed by an agency or an applicant shall be treated as a single action when:*
> *(1) The component actions are phases or increments of a larger total undertaking;*
> *(2) An Individual project is a necessary precedent for a larger project;*
> *(3) An individual project represents a commitment to a larger project, or;*
> *(4) The actions in question are essentially identical and a single statement will adequately address the impacts of each individual action and those of the group of actions as a whole.*
> *Our reviewers feel that the drainage way improvement project is both an increment of the larger drainage channel widening project and represents a commitment to this larger project.*

Response: Thank you for talking with Mr. Perry White of Planning Solutions, Inc., the firm that prepared the Draft Environmental Assessment for the Pāpipi Road Drainage Improvements, about this comment. He appreciated your openness and willingness to discuss the points you raised.

As Mr. White has indicated, we believe that the action covered by the Draft Environmental Assessment for the Pāpipi Road Drainage Improvements is not connected to the Kalo'i Gulch project in any way except for HASEKO's involvement in addressing drainage concerns. The bases of this conclusion are outlined below, and it is my understanding from Mr. White that you are in general agreement with them.

Taking the items specified in HAR 11-22-7 for treating actions as part of a group of actions proposed as a single action one by one:

> *(1) Is the Pāpipi Road Drainage Project a phase or increment of the Kalo'i Drainageway Improvement project?*

Answer: No, the Pāpipi Road Drainage Project is not an increment of the Kalo'i Gulch Drainageway Project. The two drainage projects serve different, albeit adjacent, watersheds. The fact that the environmental review is coincident in time is purely by chance.

The area that would be served by the Pāpipi Road Drainage Project does not drain into Kalo'i Gulch. The great majority of the area has had no ocean outlet; instead, rainfall has ponded until it was able to infiltrate into the ground. The exception is a narrow strip right along the shoreline that drained directly into the Pacific Ocean. Nearly all of the area that would be served by the Pāpipi Road Drainage Project is on land that HASEKO does not own (e.g., neighboring residential lots and roadways) or has already committed to turn over to the City and County of Honolulu for expansion of One'ula Beach Park. Whether or not the Pāpipi Road Drainage Project is completed will not affect the amount or quality of stormwater that enters the Kalo'i Gulch Drainageway.

> *(2) Is the Pāpipi Road Drainage Project a necessary precedent for the Kalo'i Drainageway Improvement project?*

Answer: No, the Pāpipi Road Drainage Project is not a necessary precedent of the Kalo'i Gulch Drainageway Project. The Kalo'i Gulch Drainageway Project can proceed whether or not the Pāpipi Road Drainage Project is implemented. Neither will any decision concerning one project affect the design, feasibility, or effects of the other project.

> *(3) Is a decision concerning the Pāpipi Road Drainage Project a commitment to the Kalo'i Drainageway Improvement project or vice versa?*

Answer: No, a decision to proceed with the Pāpipi Road Drainage Project in no way commits any party to proceed with the Kalo'i Gulch Drainageway Project. The same is true in reverse, i.e., a decision to proceed with the Kalo'i Gulch Drainageway Project in no way commits any party to proceed with the Pāpipi Road Drainage Project.

> *(4) Are the actions in question essentially identical and would a single statement adequately address the impacts of each individual action and those of the group of actions as a whole?*

Answer: The two actions in question are not essentially identical. In fact, they are quite different. The Kalo'i Gulch Drainageway Project is a regional drainage improvement designed to accommodate flows from a nearly 7,000-acre watershed, 90 percent of which is owned by parties other than HASEKO. With the implementation of upland storage basins in the watershed, discharges from the improved Kalo'i Gulch drainageway outlet would occur perhaps once in 10 years. In contrast, the Pāpipi Road Drainage Project is a local roadway drainage improvement that serves less than 50 acres. HASEKO has proposed it in order to fulfill a promise it made to the community to help solve pre-existing drainage problems off its property. Combining the two projects into a single environmental document statement would therefore not be appropriate, and would make it difficult or impossible to focus on the issues that are unique and important to each.

In summary, your reviewers' sense that the Pāpipi Road Drainage Project is both an increment of the larger Kalo'i drainage channel project and represents a commitment to this larger project was incorrect. We are pleased that the information that Mr. White provided clarified this point and that the Environmental Center no longer believes that it is appropriate to cover the two actions in a single environmental document.

Berm
In section 2.2.1, Kaloi Gulch Drainageway, a brief description of the existing shoreline berm to be lowered is discussed. However, the description is vague and does not account for the mechanism of berm reformation. For example, if the berm is naturally formed by the ocean, then the probability of the berm reforming is highly likely. A discussion of the berm's origin and return rate should be included in the final EIS.

Response: The Final EIS, Section 2.2.1, Kaloi Gulch Drainageway, has been revised to address your comment and includes the following:

> "The berm was probably formed naturally over an extended period of time, when heavy waves would occasionally transport sand and silt up to its present location. Stormwater discharges during periods of heavy rainfall, flowing from the Kaloi Gulch and out to sea, may also have been responsible for depositing sediments which now form the surface of the berm. Although the rate at which this berm was formed is not known, it is not unreasonable to suggest that this took a period of several decades, if not longer, to occur. Based on the archaeological evaluation of the berm, no significant cultural deposits or artifacts including bones of human origin were discovered.
>
> It is expected that the same wave and runoff forces that formed the berm in the past could reform the berm in the future. However, as with the existing berm, the rate at which reformation is expected to occur is not known."

HASEKO, through its contractor, will lower the height of the existing shoreline berm by approximately 2 to 4 feet. Once the berm is lowered and all portions of the project are completed, the berm will be periodically inspected and maintained to ensure that it can function adequately as a storm drainage outlet.

Caprock
*In section 4.4 entitled Groundwater, the description of caprock states that it is relatively impermeable and taken as a single unit. Caprock also has a permeability that is much lower than the basalt, which forms the basal aquifer that is beneath the caprock. However, caprock is very heterogenous and on the low end, has both marine muds that have very low permeability, as well as coral formations which have permeability that may exceed that of the basalt *. The key factor that mitigates any impact on the basal aquifer from any construction activities at the caprock surface is that basal aquifer water is under a positive pressure caused by the confining nature of the caprock. This means that water flow is upward from the basal aquifer, not down from the ground space (or shallow excavation).*

Response: Thank you for providing this point of clarification. We have revised the Final EIS to include the information you have provided in Section 4.4, Groundwater.

We appreciate the time you have taken to provide your thoughtful comments and hope we have sufficiently addressed your concerns. Should you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Henry Eng, FAICP, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Morihara Lau & Fong LLP

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MUFI HANNEMANN
MAYOR

EDWARD Y. HIRATA
ACTING DIRECTOR

TP12/04-87691R

February 7, 2005

MEMORANDUM

TO: HENRY ENG, FAICP, ACTING DIRECTOR
DEPARTMENT OF PLANNING AND PERMITTING

FROM: EDWARD Y. HIRATA, ACTING DIRECTOR

SUBJECT: KALOI GULCH DRAINAGEWAY IMPROVEMENTS AT ONEULA BEACH PARK- 2004/ED-12(ASK)

As requested, we have reviewed the draft environmental impact statement prepared for the subject project and offer the following comment.

The document Section 5.1, TRAFFIC AND ROADWAYS, should include a discussion of the short-term traffic impacts of the project on surrounding City roadways during construction and measures proposed to mitigate these impacts.

Should you have any questions regarding this matter, please contact Faith Miyamoto of the Transportation Planning Division at Local 6976.

EDWARD Y. HIRATA

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Engineering
Environmental Services
Photogrammetry
Surveying
Construction Management

December 2, 2005

Mr. Alfred Tanaka
Acting Director
Department of Transportation Services
650 South King Street, 3rd Floor
Honolulu, Hawaii 96813

Dear Mr. Tanaka:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Draft Environmental Impact Statement (DEIS)

On behalf of HASEKO (Ewa), Inc., thank you for your letter dated February 7, 2005, to the Department of Planning and Permitting, requesting a discussion on potential short-term traffic impacts and proposed mitigation measures on surrounding City roadways during construction. The forthcoming Final EIS will address this concern in Section 5.1, Traffic and Roadways, which will contain the following:

> "Construction activities involving use of Papipi Road and Fort Weaver Road to mobilize equipment, machinery and personnel to the project site may temporarily affect traffic. Potential for increased traffic however, will be limited to the 6 to 12 month duration of the project to establish the drainageway, access roads, utilities, and appurtenant features. Measures to minimize traffic congestion will include: (1) if the use of Papipi Road and Fort Weaver Road cannot be avoided, the scheduling of heavy truck traffic will be arranged to avoid peak morning and afternoon traffic hours; and (2) the contractor may also arrange to access Oneula Beach Park from the adjoining Ocean Pointe property. This will allow the movement of heavy equipment and machinery so that local roads such as Papipi Road are not adversely affected.
>
> Upon completion of the project all construction related machinery, equipment and vehicles will be removed with no further impacts to local area traffic."

We appreciate your review of the subject DEIS. Should you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Henry Eng, FAICP, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Morihara Lau & Fong LLP

FEB 8 PM 4 00
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OEQC
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February 7, 2005

COMMENTS
Kaloi Gulch Drainageway Improvements at Oneula Beach Park DEIS

Thank you for the opportunity to comment on this DEIS.

1. The proposed improvements at Oneula Beach Park are an integral part of two far larger projects: a) the Kaloi Gulch Regional Drainage Plan; and b) the Ocean Pointe Development.

a) The Kaloi Gulch Regional Drainage Plan should be, but is not appended to this DEIS. Currently, I believe, there is much storm water detention and retention capacity in the Kaloi Gulch Drainage Region. The intention is to abandon that detention capacity and funnel storm waters to Oneula Beach, thus "necessitating" the proposed improvements. The "no project alternative" would rightly involve not increasing the upstream run-off.

b) The City has accepted three EISs and a final supplemental environmental assessment for the Ocean Pointe Development; the Army Corps of Engineers has accepted an EIS as well for the Ocean Pointe Marina. Each of those documents examined an Ocean Pointe Project with drainage from Kaloi Gulch going into the Marina. Each stressed the value of the Marina as a settling basin for sediments coming down Kaloi Gulch.

This DEIS does not only concern Oneula Beach Park; rather it is a major revision of the project that was examined by the more extensive, earlier accepted environmental documents. Another supplemental environmental assessment needs be done for the whole Ocean Pointe Development. The proffered DEIS only looks at a little part of the whole.

2. The DEIS fails to properly consider alternatives. One alternative, to have the Kaloi Gulch drainage go into the Marina "was eliminated from further consideration because of environmental concerns and the potential for operational impacts during construction." At 3-3.

The DEIS cites "issues of concern that were raised in the *Honouliuli Sewage Outfall Relocation, Conceptual Engineering Feasibility Study* conducted by Limtiaco and Associates (May 2000)." That study is not appended to the DEIS. It needs to be.

The gloss of the *Honouliuli Sewage Outfall Relocation* that is in the DEIS is dreadfully inaccurate. The study actually says that it was based upon information that it received from the client, Haseko, that it had not checked; that a 3-foot minimum depth of burial was unnecessary, that 1 ½-foot was enough if the pipe were protected; that the relocation would cost nine or sixteen million dollars; **and that there were no significant environmental concerns to relocating the outfall.**

3. When I called the City's Environmental Services department, they said that the sewage outfall line was five feet deep, not the three feet four inches that is represented on page 3-5 of the DEIS or the three feet that Haseko told the *Honouliuli Sewage Outfall Relocation* study consultants.

If the sewer line is actually five feet deep and a Kaloi Gulch floodway would only have to be four feet deep, it might be possible to armor the sewer line in place and pass the storm drainage over it.

4. The analysis of storm run off to the beach and ocean is inadequate. It seeks only to justify the project and does not examine the effects of the sediments on limu, swimming or surfing. All the previous EISs (when the intent was to sent the drainage to the Marina) expressed concern about the sediments. This DEIS just says, "No problem." The environmental impacts and proposed mitigations as to the sediments expressed in the previously accepted EISs should be presented in this DEIS.

5. It appears that the proposed action has commenced prior to the acceptance of a needed EIS. Haseko, I believe, has already graded drainage to this beach outflow.

Sincerely yours

Carl Foytik

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Environmental Services
Photogrammetry
Surveying
Construction Management

December 2, 2005

Mr. Carl Foytik, Esquire
1417 B-1 Alexander Street
Honolulu, Hawaii 96822

Dear Mr. Foytik:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Draft Environmental Impact Statement

On behalf of HASEKO (Ewa), Inc., thank you for your comment letter dated February 7, 2005, to the Department of Planning and Permitting (DPP). We have prepared the following response to your comments (referenced in *italics*):

> ***Comment:*** *"1. The proposed improvements at Oneula Beach Park are an integral part of two far larger projects: a) the Kaloi Gulch Regional Drainage Plan; and b) the Ocean Pointe Development."*
>
> *"a) The Kaloi Gulch Regional Drainage Plan should be, but is not appended to this DEIS. Currently, I believe, there is much storm water detention and retention capacity in the Kaloi Gulch Drainage Region. The intention is to abandon that detention capacity and funnel storm waters to Oneula Beach, thus "necessitating" the proposed improvements. The "no project alternative" would rightly involve not increasing the upstream run-off."*

Response: Your comments are well-taken. We have, therefore, added a discussion of the regional context of this proposed project in Section 1.4.1 of the Final EIS (FEIS). Also, we have added a discussion of the alternative of retention of storm water flows within upland properties in Section 3.4 of the FEIS.

> *"b) The City has accepted three EISs and a final supplemental environmental assessment for the Ocean Pointe Development; the Army Corps of Engineers has accepted an EIS as well for the Ocean Pointe Marina. Each of those documents examined an Ocean Pointe Project with drainage from Kaloi Gulch going into the Marina. Each stressed the value of the Marina as a settling basin for sediments coming down Kaloi Gulch."*
>
> *"This DEIS does not only concern Oneula Beach Park; rather it is a major revision of the project that was examined by the more extensive. earlier accepted environmental documents. Another supplemental environmental assessment needs [sic] be done for the whole Ocean Pointe Development. The proffered DEIS only looks at a little part of the whole."*

Response: Your point is well-taken that there should be a fuller discussion of the role of the proposed project in the context of an area larger than the One`ula Beach Park. We note, however, that the proposed action involves the construction of a drainage improvements project designed to

meet regional drainage requirements and not simply the needs of the Ocean Pointe development. Section 1.4.1 of the FEIS, therefore, expands on the discussion of the project need in the context of the entire Kaloi Gulch drainage basin

As to the Ocean Pointe project, if the proposed drainage channel through One`ula Beach Park is approved, Haseko will be required to make some master plan changes that may raise the issue of environmental assessment requirements. At such time, the responsible government agencies will have the opportunity to determine whether additional environmental disclosure documents are required to process the proposed Ocean Pointe project changes.

> ***Comment:*** *"2. The DEIS fails to properly consider alternatives. One alternative, to have the Kaloi Gulch drainage go into the Marina "was eliminated from further consideration because of environmental concerns and the potential for operational impacts during construction." At 3-3."*
>
> *"The DEIS cites "issues of concern that were raised in the Honouliuli Sewage Outfall Relocation, Conceptual Engineering Feasibility Study conducted by Limtiaco and Associates (May 2000)." That study is not appended to the DEIS. It needs to be."*
>
> *"The gloss of the Honouliuli Sewage Outfall Relocation that is in the DEIS is dreadfully inaccurate. The study actually says that it was based upon information that it received from the client, Haseko, that it had not checked; that a 3-foot minimum depth of burial was unnecessary, that 1 ½-foot was enough if the pipe were protected: that the relocation would cost nine or sixteen million dollars:* ***and that there were no significant environmental concerns to relocating the outfall."***

Response: You correctly note that directing regional drainage into the marina should be, and still is, an alternative to the proposal to expanding the drainage channel through the beach park even though there is a major concern with the potential for negative adverse environmental impacts associated with construction and operation of a lowered sewer outfall. Chapters 1 and 3 have been amended to reflect this.

The issues of concern you reference were raised during and following completion of the Limtiaco and Associates, Conceptual Engineering Feasibility Study (Limtiaco Study). In subsequent discussions with agencies, the study authors, and HASEKO, and as described in Section 3.3, Lower the Honouliuli Sewer Outfall to Allow a Regional Drainage Channel to Cross Over the Outfall and Exit Through the Marina, the possible problems that could be encountered in construction of the lowered outfall would be noxious odors, construction damage, spills, introduction of sediments, and use of a holding pit during construction. Further, and assuming that the lowered outfall alternative was implemented, there were additional concerns that the lowered outfall would be susceptible to erosion and scour damage caused by the flows of storm water over the pipe, requiring impracticable remedial measures as described in our response to your comment 3, below. Given these concerns, there was a consensus that alternatives be explored.

The Limtiaco Study is not appended to the FEIS as this document is available at the Office of Environmental Quality Control (OEQC). We also understand from Haseko's attorney that you have obtained and did not need to pay for a copy of this report.

> ***Comment:*** *"3. When I called the City's Environmental Services department, they said that the sewage outfall line was five feet deep. not the three feet four inches that is represented on page 3-5 of the DEIS or the three feet that Haseko told the Honouliuli Sewage Outfall Relocation study consultants."*
>
> *"If the sewer line is actually five feet deep and a Kaloi Gulch floodway would only have to be four feet deep. it might be possible to armor the sewer line in place and pass the storm drainage over it."*

Response: As noted in the Limtiaco Study, City standards require a three-foot cover over the outfall pipe. Because the outfall pipe would underlie a significant drainage channel subject to scour and erosion during storm events, the City indicated that the pipe would have to be armored with a concrete jacket approximately 12 inches thick. Clearly, your suggestion that storm drainage be directed over the sewer line in its present location is not feasible.

> ***Comment:*** *"4. The analysis of storm run off [sic] to the beach and ocean is inadequate. It seeks only to justify the project and does not examine the effects of the sediments on limu, swimming or surfing. All the previous EISs (when the intent was to sent the drainage to the Marina) expressed concern about the sediments. This DEIS just says, "No problem." The environmental impacts and proposed mitigations as to the sediments expressed in the previously accepted EISs should be presented in this DEIS."*

Response: The stormwater analysis presented in the Draft EIS was not an effort to justify the project. It was a thorough and objective analysis of the way that the infrequent discharges that are expected would behave and the effects that they would have on the nearshore environment. The environmental studies conducted for the Draft EIS include coastal water quality analyses and a predictive modeling analysis describing the behavior and quality of storm water discharges along the coastline. It uses the forecast water quality to assess potential impacts on marina biota.

The proposed project is a regional drainage solution that is more advantageous from a water quality standpoint than the original proposal.

The prior design alternative that routed stormwater into the marina did not include the large retention capacity in the present project. As a result, stormwater would have discharged into the marina on a frequent basis and would have carried with it far higher sediment loading than is the case with the present design. In essence, HASEKO has substituted a golf course with specially designed retention areas for the marina. The result is a reduced discharge of stormwater to State waters. This follows and is in accordance with the State's policy of minimizing such discharges.

> ***Comment:*** *"5. It appears that the proposed action has commenced prior to the acceptance of a needed EIS. Haseko, I believe, has already graded drainage to this beach outflow."*

Response: The FEIS clarifies that the proposed project is a modification and expansion of a currently existing temporary emergency storm drainage channel through One`ula Beach Park that was constructed by the City to provide emergency flood relief to Ewa Village until a permanent ocean outlet is constructed. See Sections 1.4 and 2.2.1 of the FEIS.

We appreciate this opportunity to respond. Should you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Henry Eng, FAICP, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Morihara Lau & Fong LLP

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MUFI HANNEMANN
Mayor

ERIC S. TAKAMURA, Ph.D, P.E.
Acting Director

KENNETH A. SHIMIZU
Deputy Director

PRO 05-004

February 7, 2005

VIA FAX: 527-6743
MEMORANDUM

TO: HENRY ENG, FAICP, ACTING DIRECTOR
DEPARTMENT OF PLANNING AND PERMITTING

FROM: Dr. ERIC S. TAKAMURA, P.E., ACTING DIRECTOR
DEPARTMENT OF ENVIRONMENTAL SERVICES

SUBJ: KALOI GULCH DRAINAGEWAY IMPROVEMENTS AT ONUELA BEACH PARK,
DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)

We have reviewed the subject Draft Environmental Impact Statement (EIS), which was transmitted via your memo, ref. # 2004/ED-12(ASK), and have the following comments:

1. The EIS does not adequately address safety, who will be responsible for maintenance of the drainageway, and the public health, safety and welfare of the drainageway during a 100-year flood.

Safety: The EIS states that the road will be designed for a 10-year storm and any overflow will be allowed to pass over the road with a warning system for traffic. Children will walk or bicycle to Oneula Beach and use the park facilities within the drainageway. Additionally, as it may be the only fully landscaped part of the park, it will be heavily used. Describe how the warning system will address their safety, especially if they miss or are not able to read the warning signs.

100-Yr Flood: The Rules Relating Storm Drainage Standards require design for a 100-year storm for areas larger than 100 acres. Section 14-12.10 of the ordinances state that **"open drainways ... shall not be covered or modified except when the chief engineer determines that such covering or modification of the open drainways will not be dangerous to the public health, safety and welfare."** The Draft EIS does not address flow conditions (depth, width, and velocity) during the 100-year flood.

Maintenance: In memos to DPP dated June 9, 2004 and June 10, 2004, both the Department of Facility Maintenance and Department of Parks and Recreation state that they will not be responsible for maintenance of the 500-foot drainageway. Will Haseko be responsible for maintenance?

2. Appendix B – Numerical Modeling of Storm Drain Discharge Plume Transport

General: Ocean monitoring should continue through completion of construction and a period of a minimum of one year after construction.

3. Appendix B, p. 8, Sec 4.6 - Storm Discharge:

Since the sediment deposited is dependent on the drainage, more detail on the existing and proposed drainage should be provided. Describe and provide a map of the drainage basin and drainage system (including size of detention facility), and basis for discharge. There is a large difference between the 10-year and 20-year storm discharges.

10-year storm 13 cubic meters/sec (470 cfs)
20-year storm 98 cubic meters/sec (3,450 cfs)

What was the basis for determining discharge rate and volume for the November 1996 storm. Where was the rain gage located? Were readings compared to other events and gages in the area? What was the maximum reading for rain gages in the drainage basin? As part 1, Hydrologic Criteria of the "Rules Relating to Storm Drainage Standards" require design to a 100-year recurrence interval, the 100-year storm needs to be addressed.

Normally, design storms are described as 10-year 6 hour, 10-year 24-hour, etc. What were the 24-hour peak discharges for the various storms? Include a graph or table showing anticipated rainfall for 2, 10, 20, 50 and 100-year events.

As the channel will be grassed, will the velocity be low enough (less than 5 feet per second) to prevent scour? What is the design depth, width and velocity?

4. Appendix B, Pg 9, Sec 4.7 - Suspended Sediment Discharge

The report states that sediment discharges are approximately 56 metric tons for the 10-year storm and 1,703 metric tons for the 20-year storm. Provide basis and calculations for these. Address land use, soil type, sediment generated and sediment transport, detention basin volumes, detention times and settlement.

Statement on page 9 that the 10-year storm represents the approximate threshold for discharge from the Ocean Pointe system conflicts with 56 metric ton discharge described in the report. Which is correct?

Report states that **"50 and 100-year flows would be catastrophic and would result in widespread discharge all around the island, and a continual discharge plume from multiple sources."** Describe what is meant by "catastrophic" and "continual discharge plume" at Ewa, and address measures that could mitigate this.

Should you have any questions, please call Jack Pobuk, Program Coordinator, at 692-5727, or Gerald Takayesu, Storm Water Quality Branch, at 692-5579.

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December 2, 2005

Dr. Eric S. Takamura, P.E.
Director
Department of Environmental Services
1000 Uluohia Street, Suite 308
Kapolei, Hawaii 96707

Dear Dr. Takamura:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Draft Environmental Impact Statement

On behalf of HASEKO (Ewa), Inc., thank you for your letter dated February 7, 2005, to the Department of Planning and Permitting, concerning the subject document. We have prepared the following in response to your comments (referenced in *italics*):

1. *The EIS does not adequately address safety, who will be responsible for maintenance of the drainageway, and the public health, safety and welfare of the drainageway during a 100-year flood.*

   ***Safety:** The EIS states that the road will be designed for a 10-year storm and any overflow will be allowed to pass over the road with a warning system for traffic. Children will walk or bicycle to Oneula Beach and use the park facilities within the drainageway. Additionally, as it may be the only fully landscaped part of the park, it will be heavily used. Describe how the warning system will address their safety, especially if they miss or are not able to read the warning signs.*

Response: Initially, please note that pursuant to discussions with the Department of Parks and Recreation and the Department of Facilities Management after publication of the Draft EIS, the Final EIS clarifies that landscaping of the drainage channel will be consistent with the remainder of the park. See Section 2.2.4 of the FEIS. In other words, it will not stand out as "the only fully landscaped part of the park."

In response to your comment about safety, the Final EIS, Section 5.1 Traffic and Roadways, Impacts and Mitigation Measures, contains the following expanded discussion of the means that will be used to inform the public of possible flood hazards on the ford that will be used to carry the relocated Oneula Beach Park Access Road across the Kaloi drainageway:

"Appropriate signage will be prepared by HASEKO in consultation with DPR and the City Departments of Facility Maintenance (DFM); Planning and Permitting (DPP); and Design and Construction (DDC), to advise the public of the presence of the drainageway and to exercise

caution during periods of heavy rainfall in the region. The signs will be posted on either side of the proposed ford crossing to warn the public that they are crossing a flood prone area. Signs will also be installed that contain both words and pictorial warnings of the flood danger.

Because of the slow movement of runoff through the watershed, there is no possibility of unexpected floods occurring at this location. Consequently, DPR will be able to monitor storm advisories issued by the National Weather Service and decide when to close the road as a precaution. Because there would be flow in the drainageway only as a result of very large storm events (estimated as once in 10 years), the temporary road closures would occur only during very stormy conditions when beach park usage would be very low."

We note that the proposed use of a broad swale through the park to accommodate excess stormwater runoff from exceptionally large storm events is common in Hawai'i. Examples include the Hilo Municipal Park, which uses soccer fields, and the Waimea Bay Beach Park, which contains a drainageway leading to the ocean from the Waimea Stream.

> ***100-Yr Flood:** The Rules Relating Storm Drainage Standards require design for a 100-year storm for areas larger than 100 acres. Section 14-12.10 of the ordinances state that "open drainways ... shall not be covered or modified except when the chief engineer determines that such covering or modification of the open drainways will not be dangerous to the public health, safety and welfare." The Draft EIS does not address flow conditions (depth, width, and velocity) during the 100-year flood.*

Response: The proposed project is intended to satisfy the City and County of Honolulu's requirement to provide an outlet to the ocean capable of accommodating the 100-year storm peak flow from Kaloi Gulch as calculated using Plate 6 of the City and County of Honolulu Storm Drainage Standards. The flow conditions (depth, width and velocity) for the Plate 6 flow are described in the drainage master plan for the Ocean Pointe project, which the Department of Planning and Permitting has reviewed and approved. As indicated in that submission, the depth, width, and velocity of the flow with a recurrence interval of 100 years as calculated using Plate 6 is as follows:

Maximum water depth at Ford crossing = 3.7 feet
Width at ford crossing = 500 feet
Peak flow velocity at ford crossing = 6 feet per second

> ***Maintenance:** In memos to DPP dated June 9,2004 and June 10,2004, both the Department of Facility Maintenance and Department of Parks and Recreation state that they will not be responsible for maintenance of the 500-foot drainageway. Will Haseko be responsible for maintenance?*

Response: HASEKO has been working, and will continue to work, with the appropriate City Departments and other landowners and developers in the Kaloi drainage basin to legally define the maintenance obligations for the drainageway area. Although the details and the form of memorializing the maintenance obligations have not yet been worked out, HASEKO is committed to ensuring that the drainage channel through Oneula Beach Park is kept free of large debris that may impede storm water flows through the channel, silt and other debris are removed from the channel following storm events, and the shoreline berm is maintained at an elevation that enables it to function adequately as a storm drainage outlet.

2. *Appendix B - Numerical Modeling of Storm Drain Discharge Plume Transport*
General: Ocean monitoring should continue through completion of construction and a period of a minimum of one year after construction.

Response: HASEKO will continue to monitor water quality as required by the State Department of Health (DOH).

3. *Appendix B, p. 8, Sec 4.6 - Storm Discharge:*
Since the sediment deposited is dependent on the drainage, more detail on the existing and proposed drainage should be provided. Describe and provide a map of the drainage basin and drainage system (including size of detention facility), and basis for discharge.

Response: Appendix B-2, Kaloi Gulch Watershed Hydrologic and Sediment Study, has been added to the Final EIS.

There is a large difference between the 10-year and 20-year storm discharges.
10-year storm 13 cubic meters/sec (470 cfs)
20-year storm 98 cubic meters/sec (3,450 cfs)

Response: Yes, there is a large difference between the two recurrence intervals. The large amount of stormwater storage present in the watershed means that discharges do not occur as a result of storm events smaller than once in ten years. Once the storm size exceeds the storage capacity, as it does with a 20-year storm event, most of the additional runoff appears as flow in the channel.

What was the basis for determining discharge rate and volume for the November 1996 storm. Where was the rain gage located?

Response: The basis for the 1996 storm is from rainfall measured at the National Weather Service (NWS) precipitation gage at the Kunia Substation (HI12).

Were readings compared to other events and gages in the area?

Response: Yes, rainfall data were also obtained for NWS Lualualei Gage (HI105) and non-official gages, including the Ewa Villages Golf Course, Ewa Gentry Station 2a, Ewa Gentry Station 9, and Ewa International Golf Course, for comparison.

What was the maximum reading for rain gages in the drainage basin?

Response: The maximum 24-hour rainfall occurred on November 5, 1996. Readings at the various gages were as follows:

Kunia Substation	9.08 inches
Lualualei	6.19 inches
Ewa Gentry Station 2A	9.46 inches
Ewa Gentry Station 9	10.62 inches
Ewa Villages Golf Course	11.09 inches
Ewa International Golf Course	5.4 inches

As part 1, Hydrologic Criteria of the "Rules Relating to Storm Drainage Standards" require design to a 100-year recurrence interval, the 100-year storm needs to be addressed.

Response: The 100-year storm in accordance with Plate 6 of the "Rules Relating to Storm Drainage Standards" is being addressed by improving the capacity of the outlet to accommodate this flow capacity.

Normally, design storms are described as 10-year 6 hour, 10-year 24-hour, etc. What were the 24-hour peak discharges for the various storms? Include a graph or table showing anticipated rainfall for 2, 10,20, 50 and 100-year events.

Response: The design storm required by the City is the 100-year storm peak flow as defined by Plate 6 of the City's "Rules Relating to Storm Drainage Standards." The Plate 6 method is not based on storm duration.

As the channel will be grassed, will the velocity be low enough (less than 5 feet per second) to prevent scour? What is the design depth, width and velocity?

Response: Yes, the slope of the channel (approximately 0.2 percent) will be low enough to prevent scour (maximum channel shear stress will be less than 0.5 pounds per square foot (psf), which is acceptable for grass lining) at a flow of 10,800 cfs.

4. *Appendix B, Pg 9, Sec 4.7 - Suspended Sediment Discharge*
The report states that sediment discharges are approximately 56 metric tons for the 10-year storm and 1,703 metric tons for the 20-year storm. Provide basis and calculations for these. Address land use, soil type, sediment generated and sediment transport, detention basin volumes, detention times and settlement.

Response: The basis and calculations for the tonnages (including land use, soil type, sediment detention basins and settlement) have been included in Appendix B-2, Kaloi GulchWatershed Hydrologic and Sediment Study, in the Final EIS.

Statement on page 9 that the 10-year storm represents the approximate threshold for discharge from the Ocean Pointe system conflicts with 56 metric ton discharge described in the report. Which is correct?

Response: Both are correct. Storm events with recurrence frequencies of less than 10 years are not expected to produce a discharge from the Kaloi outlet. The slightly larger storm that has a recurrence frequency of once in ten years would produce a discharge, and that discharge would contain an estimated 56 tons of material.

Report states that "50 and 100-year flows would be catastrophic and would result in widespread discharge all around the island, and a continual discharge plume from multiple sources." Describe what is meant by "catastrophic" and "continual discharge plume" at Ewa, and address measures that could mitigate this.

Response: Storm events with recurrence intervals of 50 and 100 years are extreme events that typically produce very large discharges from streams and drainage outlets along large parts of the

island coastline. The term "catastrophic" was intended to stress the extreme nature of such an event, but we acknowledge that in retrospect that this term was poorly chosen. We have removed it from the rest of the Final EIS. The term "continual discharge plume" refers to the fact that the many discharges into the ocean that would result along most or all of the island shoreline would join and intermingle, making an analysis of a single discharge point of little use. These discharges and intermingling are natural events that have historically occurred along Oahu's shoreline. We know of no way to completely eliminate them.

We appreciate the time you have taken to review and comment on the Draft EIS. Should you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Henry Eng, FAICP, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Morihara Lau & Fong LLP

LINDA LINGLE
GOVERNOR OF HAWAII

RECEIVED
'05 FEB -9 A11 :05
DEPT OF PLANNING
AND PERMITTING
CITY & COUNTY OF HONOLULU

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
235 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186
E-mail: oeqc@health.state.hi.us

GENEVIEVE SALMONSON
DIRECTOR

February 7, 2005

Mr. Henry Eng, Director
Department of Planning and Permitting
City and County of Honolulu
650 South King Street
Honolulu, Hawai'i 96813

Dear Mr. Eng:

Subject: Draft Environmental Environmental Impact Statement for the Kaloi Gulch Drainageway Improvements at Oneula Beach Park, O'ahu

Thank you for the opportunity to review and comment on the subject project. We have the following comments.

1. In the summary section, please describe the significant adverse impacts, mitigation measures and compatibility with land use plans.

2. Please describe in detail the best management practices (BMP) that will be implemented throughout the watershed to minimize the volume of water and pollutants that overflow into the proposed drainage channel. Who is responsible for implementing, monitoring and enforcing the BMPs?

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

Sincerely,

Genevieve Salmonson
Director

c: Haseko
RM Towill

420 Waiakamilo Road
Suite 411
Honolulu Hawaii 96817-4941
Telephone 808 842 1133
Fax 808 842 1937
eMail rmtowill@hawaii.rr.com

R. M. TOWILL CORPORATION
SINCE 1930

Planning
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Photogrammetry
Surveying
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December 2, 2005

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

Dear Ms. Salmonson:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Draft Environmental Impact Statement

On behalf of HASEKO (Ewa), Inc., thank you for your letter dated February 7, 2005. We have prepared the following in response to your comments (*italicized* for reference):

> *"(1) In the summary section, please describe the significant adverse impacts, mitigation measures and compatibility with land use plans"; and*

Response: We acknowledge your request. This information has been prepared and is included in the Final EIS as Table ES-1, Summary of Potential Impacts and Mitigation Measures, and Table ES-2, Summary of Land Use Plans Policies and Controls.

> *"(2) Please describe in detail the best management practices (BMP) that will be implemented throughout the watershed to minimize the volume of water and pollutants that overflow into the proposed drainage channel. Who is responsible for implementing, monitoring and enforcing the BMPs?"*

Response: Information on BMPs is included in the Final EIS, in Section 4.6.3, Discussion of Water Quality, Mitigation Measures. Implementation of the BMPs will be the responsibility of HASEKO through its construction contractor. Compliance monitoring and enforcement of the BMPs is the responsibility of the State Department of Health.

We appreciate the time you have taken to comment and this opportunity to respond. Should you have any further comments or questions please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda
Planning Project Coordinator

cc: Mr. Henry Eng, FAICP, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Morihara Lau & Fong LLP

THE OUTDOOR CIRCLE
1314 South King St., Suite 306 • Honolulu, HI 96814
Phone: 808-593-0300 Fax: 808-593-0525

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CITY & COUNTY OF HONOLULU

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BRANCHES
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HAWAI'I
Ka'u
Kona
Waikoloa Village
Waimea
KAUA'I
MAU'I
GARDEN CIRCLE
Lani-Kailua

February 7, 2005

Ms. Ardis Shaw-Kim
Department of Planning & Permitting
City & County of Honolulu
850 S. King Street, 7th Floor
Honolulu, HI 96813

Re: **Draft Environmental Impact Statement for Kaloi Gulch Drainageway Improvements at Oneula Beach Park**

Dear Ms. Shaw-Kim:

On behalf of The Outdoor Circle I would like to thank you for including our organization as a consulted party in the above referenced Draft Environmental Impact Statement (DEIS). Our comments and questions are listed below:

- Will the coconut palms which line the mauka edge of the park be impacted by construction? If so, please provide a copy of the tree protection plan which will preserve these coconut palms during construction.
- Under Section 4.11, the DEIS states that "the area will be revegetated following the end of construction, and the introduced vegetation will be maintained." Please provide a landscaping plan which indicates what kind of vegetation will be planted in the construction zone. Also describe the maintenance plans that will be required to ensure that the new landscaping thrives in the dry and windy conditions ever-present in this area.

Thank you for the opportunity to comment. We look forward to receiving your reply.

Sincerely,

Kimberly Hillebrand
Certified Arborist
Landscape & Planting Project Manager

Cc: Lester K. Chang, Department of Parks & Recreation
Brian Takeda, R. M. Towill Corporation
Nelson W. G. Lee, HASEKO
Office of Environmental Quality Control

420 Waiakamilo Road
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Environmental Services
Photogrammetry
Surveying
Construction Management

December 2, 2005

Ms. Kimberly Hillebrand, Certified Arborist
Landscaping and Planting Project Manager
The Outdoor Circle
1314 South King Street, Suite 306
Honolulu, Hawaii 96814

Dear Ms. Hillebrand:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Draft Environmental Impact Statement

On behalf of HASEKO (Ewa), Inc., thank you for your letter dated February 7, 2005 to the Department of Planning and Permitting. We have prepared the following in response to your comments (italicized for reference):

> *"Will the coconut palms which line the mauka edge of the park be impacted by construction? If so, please provide a copy of the tree protection plan which will preserve these coconut palms during construction", and*
>
> *"Under Section 4.11, the DEIS states that "the area will be revegetated following the end of construction, and the introduced vegetation will be maintained." Please provide a landscaping plan which indicates what kind of vegetation will be planted in the construction zone. Also describe the maintenance plans that will be required to ensure that the new landscaping thrives in the dry and windy conditions ever-present in this area."*

Trees lining the mauka edge of the park may be impacted based on the extent of work that is required to construct the proposed improvements to the drainage channel. This will be determined during the design and plan review process when the specific details (e.g., landscaping plan and tree protection) will be available for review. We expect that this will occur following completion of the EIS process.

The Final EIS, Section 4.11, Flora, has been revised to provide the following additional details:

> "During grading and following construction of the Kaloi Gulch drainageway improvements, the removal of existing vegetation will be followed by replanting. However, whenever possible, trees will be left in place to provide shade, visual relief, and public enjoyment. Trees located within the drainage channel, however, will require removal to ensure against debris lodging against them when stormwater is present.
>
> The selection of grass and plant materials used will be based on the existing dry and windy conditions of the site. Accordingly, species that are tolerant of drought and salty and windy conditions will be selected. Species that require heavy staking, protection from the wind, or excessive irrigation for establishment and future survival would not be appropriate for use. If trees are planted they will be planted in groups as much as practicable to work together in shielding some of the force of the wind. Use of native species appropriate for these conditions will be considered.

We appreciate the time you have taken to provide your written comments. Should you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Henry Eng, FAICP, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Morihara Lau & Fong LLP

FAX

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'05 FEB -7 P3:08

DEPT OF PLANNING
AND PERMITTING
CITY & COUNTY OF HONOLULU

ATTN. DPP

Fax Number 5276743

Phone Number

FROM

Fax Number

Phone Number

SUBJECT COMMENTS TO KALOI GULCH EIS

Number of Pages 4

Date 2/7/2005

MESSAGE

TO: DPP (ACCEPTING AUTHORITY FOR A DRAFT EIS)

RECEIVED

'05 FEB -7 P3:08

DEPT OF PLANNING
AND PERMITTING
CITY & COUNTY OF HONOLULU

February 6, 2005

Department of Planning and Permitting
City and County of Honolulu
650 South King St. 7th floor
Honolulu, HI 96813

To Whom It May Concern:

Having thoroughly read the draft EIS for Kaloi Gulch, I find that it is unacceptable, insufficient and full of deficiencies. I can see absolutely that rejection of this EIS is clearly the action that is required.

This EIS should not be accepted due to inadequacies in the scope of the EIS. The EIS is obviously limited to the project site and does not adequately take into account the cumulative effect of this action upon the surrounding environment and the existing community which this action will affect. The law and guidelines prescribe that this EIS must account for the effects that the action proposed will have in combination with the overall project and not just the project site. This is something that the applicant for this project has consistently failed to do. That the size and enormity of this project has been divided up into piece-mill sections and at least seven previous EA's have been done, none of which took into account the entire project, which has lead to some serious and devastating environmental concerns. Among these concerns are that the overall project is contributing to the dying aquaculture at Oneula Beach. Also, non-source pollution will be allowed to exit Kaloi Gulch without proper study of the amount and type of toxins that will reach the ocean and affect what is already visibly distressed and including possible contamination of algae and limu, which is an edible food source.

This draft EIS states that there is no requirement for a federal EIS as this storm water falls just shy of entering the ocean. This is a fallacy. The fact is that the storm water run-off will not be totally absorbed in the sand (some pollution and residue will be absorbed, and this needs further studies), and will in fact enter the ocean and navigable waters within the United States.

Some of the deficiencies that are obvious at a glance are to include but not limited to the fact that underwater vegetation is currently being adversely affected and dying. I believe this is due to a change in the salinity content of the aquifer. The draft EIS acknowledges that loss of irrigation waters and development has caused this change but notes that it sees no adverse affect. This is untrue. I know that the aquifer rises in the ocean bottom; this is a visible effect which can be seen while swimming. Sometimes, you may even see bubbles rising from the sea floor, or taste the change in the salinity of the ocean and feel the effects in buoyancy. This is an undisputed scientific fact that the aquifer does leak into the ocean, and that the visible effects of dying algae and limu and loss of feeder fish due to the salinity change requires a comprehensive study which has not been done. Furthermore, non-source pollution which will be engine oil, break fluid and break dust which contains many contaminates and carcinogenic (lead, nickel, cadmium, chromium, just to name a few) will on discharge flow into the ocean. Its effects on vegetation and sea life cause serious health concerns and needs to be studied.

Again, something this EIS has failed to properly address. What needs to be examined is the amount of projected vehicles and trash accumulation that will occur in the future and whether or not the cumulative affect of this enormous amount of estimated non-source pollution will have a destructive and detrimental affect on the environment, to include contamination of an edible food source.

Since these contaminates will flow directly onto the beach and then into the ocean and since many of these are surface which float on the water, in concentrated amounts, it is reasonable to suspect that they may have a disastrous effect that will not be filtered out by the suggestive retention/detention ponds. This concern since it includes navigable waters and shoreline beach requires both Federal and State examinations. DNRL is an agency which needs to be consulted and contrary to what this EIS has stated, I believe an Army Corp of Engineer EIS is required. The EIS done for the marina is no longer adequate or valid. Changes in the size of the golf course from 27 to 18 holes, loss in the number of waterways, and filtration ponds, and a redesigned horizontal to vertical in the golf course which is noted to be a ground filtration system has been sufficiently altered to make the statement that by law previous EA's are no longer valid.

Another concern that even in this limited project site grade changes and a retention wall will be made. This retention wall is sufficiently close to the beach that occasionally high surf may break upon it and more often foam and wash will reach this wall. It is questionable whether or not this wall reaches the legal definition of a sea wall and will require a separate EIS, but should definitely be included in this draft EIS, it is not. Among one of the concerns is that this wall may have an adverse affect in lives and property in the event of a tsunami. Ground elevation and costal inundation zones when matched clearly show the possibly that in a tsunami waters will be held at a level of nine feet drowning my home and community. This is evidently shown by the videotape of the recent tsunami in Indonesia. The aforementioned wall may cause a change in the force and direction which will create further devastation to the existing community.

Another discrepancy in this draft EIS is that the draft EIS mentions a study that was prepared for Haseko and furthers the claim that this study cites that changing the sewer line is unfeasible. However, the study is not included in the EIS and upon examining this study, the study clearly states that all alternative plans to change the sewer line, rather it be inverted siphon or double line are feasible.

For these reasons alone, acceptance of the draft EIS borders on criminal negligence to due diligence and taken into account recent convictions of numerous contractors and architects for campaign contributions and non enforcement of building code violations, along with premature issuance of permits suggests a pattern of complicity that acceptance of this EIS will be the final evidence needed to show complicity in conspiracy to violate environmental laws and commit crimes against the interest of the United States.

I do believe that the City and County of Honolulu and the State of Hawaii has determined that for the greater good and prosperity this project will bring in short term financial gain has caused the Planning and Permitting Department to turn a blind eye to the future destruction of a delicate eco-system and the sacrifioing the lives, health and welfare of an existing community for the sake of the state at whole. Fortunately, federal laws restrict this and clearly mandate that it is not just civil but criminal.

Sincerely,

Craig Smallwood

420 Waiakamilo Road
Suite 411
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Telephone 808 842 1133
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R. M. TOWILL CORPORATION
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Environmental Services
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Surveying
Construction Management

December 2, 2005

Mr. Craig Smallwood
91-623 Papipi Road
'Ewa Beach, Hawaii 96706

Dear Mr. Smallwood:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Draft Environmental Impact Statement

On behalf of HASEKO (Ewa), Inc., thank you for your letter dated February 6, 2005, to the Department of Planning and Permitting, describing your concerns. We have prepared the following response to your comments (referenced in *italics*):

> ***Comment:*** *"This EIS should not be accepted due to inadequacies in the scope of the EIS. The EIS is obviously limited to the project site and does not adequately take into account the cumulative effect of this action upon the surrounding environment and the existing community which this action will affect. The law and guidelines prescribe that this EIS must account for the effects that the action proposed will have in combination with the overall project and not just the project site. This is something that the applicant for this project has consistently failed to do."*

Response: A more extensive discussion of the surrounding environment and existing communities that will be affected by this proposed project has been provided in Chapter 1 of the Final EIS (FEIS).

> ***Comment:*** *"That the size and enormity of this project has been divided up into piece-mill [sic] sections and at least seven previous EA's have been done, none of which took into account the entire project, which has lead to some serious and devastating environmental concerns. Among these concerns are that the overall project is contributing to the dying aquaculture at Oneula Beach."*

Response: By its context, we understand "this project" to mean the Ocean Pointe development, and not the Kaloi Gulch Drainageway Improvements at One`ula Beach Park. As you note, a number of environmental disclosure documents relating to the Ocean Pointe development have been published. These include:

- MSM & Associates, Inc., by Group Architects Collaborative, Inc, February 1981, Environmental Impact Statement, Ewa Marina Community, Ewa, Oahu, Hawaii.
- MSM & Associates, Inc., by GACI, Inc., March 1984, Ewa Marina Community Supplemental Environmental Impact Statement, Increment 1.

- MSM & Associates, Inc., by Dames & Moore, December 1985, Final Environmental Impact Statement, Increment II, Proposed Ewa Marina Community, Ewa, Oahu, Hawaii.
- Haseko (Ewa) Inc., by Tyrone T. Kusao, Inc., April 1991, Final Environmental Impact Statement, Ewa Marina, Phase II.
- Haseko (Ewa) Inc., by Wilson Okamoto & Associates. April 1992. Final Supplemental Environmental Impact Statement, Ewa Marina, Phase I, Increment 2.
- U.S. Army Corps of Engineers, Honolulu District, April 1993. Final Environmental Impact Statement, U.S. Department of the Army Permit Application, Proposed Ewa Marina, Ewa Beach, Oahu, Hawaii.
- Haseko (Ewa) Inc., by Oshima Chun Fong & Chung, LLP, June 2001. Final Supplemental Environmental Assessment, Ocean Pointe Master Plan (Revised).

Every one of these documents included a discussion of the impacts of the Ocean Pointe development on the nearshore environment and marine biota.

> ***Comment:*** *"Also, non-source pollution will be allowed to exit Kaloi Gulch without proper study of the amount and type of toxins that will reach the ocean and affect what is already visibly distressed and including possible contamination of algae and limu, which is an edible food source."*

Response: Upland properties contributing to storm water discharge through the proposed project will have residential, commercial and agricultural uses. As no heavy industrial uses are proposed, toxins that may contaminate edible limu are not anticipated.

> ***Comment:*** *"This draft EIS states that there is no requirement for a federal EIS as this storm water falls just shy of entering the ocean. This is a fallacy. The fact is that the storm water run-off will not be totally absorbed in the sand (some pollution and residue will be absorbed, and this needs further studies), and will in fact enter the ocean and navigable waters within the United States."*

Response: The Draft EIS does **not** state that storm water discharges *"falls just shy of entering the ocean."* Please refer to the following sections of the Draft EIS that describes anticipated storm water discharges to the ocean: Chapter 2, Project Description; Chapter 4, Affected Environment, Potential Impacts and Mitigation Measures; and Appendix B, Numerical Modeling of Storm Drain Discharge Plume Transport. Also see our response to the Department of the Army Corps of Engineers, dated December 8, 2004, in Chapter 12, Comments and Responses to the EIS Preparation Notice. The reason that a federal National Environmental Policy Act (NEPA) document or EIS is not required is because the work that is needed is situated inland of navigable waters.

> ***Comment:*** *"Some of the deficiencies that are obvious at a glance are to include but not limited to the fact that underwater vegetation is currently being adversely affected and dying. I believe this is due to a change in the salinity content of the aquifer. The draft EIS acknowledges that loss of irrigation waters and development has caused this change but*

notes that it sees no adverse effect. This is untrue. I know that the aquifer rises in the ocean bottom; this is a visible effect which can be seen while swimming. Sometimes, you may even see bubbles rising from the sea floor, or taste the change in the salinity of the ocean and feel the effects in buoyancy. This is an undisputed scientific fact that the aquifer does leak into the ocean, and that the visible effects of dying algae and limu and loss of feeder fish due to the salinity change requires a comprehensive study which has not been done. Furthermore, non-source pollution which will be engine oil, break [sic] fluid and break [sic] dust which contains many contaminates and carcinogenic (lead, nickel, cadmium, chromium, just to name a few) will on discharge flow into the ocean. Its effects on vegetation and sea life cause serious health concerns and needs to be studied."

Response: We agree fresh water is present within the nearshore coastal waters of 'Ewa. However, the conclusion that the proposed project will *"...have a destructive and detrimental affect on the environment, to include contamination of an edible food source"*, is in error. The reasons for this are: (1) it is the cessation of irrigation on the 'Ewa plain that has affected the salinity of the aquifer and the rate of discharge of freshwater into the ocean along the shoreline. This is an existing condition and has nothing to do with the proposed action; (2) the large retention capacity that HASEKO is building into its project will facilitate increased freshwater recharge of the caprock. Although it is clear that this will not result in fresh water aquifer levels approaching those that existed during large-scale agricultural irrigation, it does promote groundwater recharge; and, (3) using the Kaloi outlet in combination with retention within the golf course will lead to more recharge of the aquifer and, therefore, groundwater discharge along the shoreline at levels higher than would have existed under the approved plan of discharging into the marina without this same level of retention.

***Comment**: "Again, something this EIS has failed to properly address. What needs to be examined is the amount of projected vehicles and trash accumulation that will occur in the future and whether or not the cumulative affect of this enormous amount of estimated non-source pollution will have a destructive and detrimental affect on the environment, to include contamination of an edible food source."*

Response: We understand your comment as addressing overall development on the `Ewa Plain. Such analysis is far beyond the scope of this EIS. Your concerns are more appropriately addressed in other processes, such as amending the `Ewa Development Plan.

***Comment:** "Since these contaminates will flow directly onto the beach and then into the ocean and since many of these are surface which float on the water, in concentrated amounts, it is reasonable to suspect that they may have a disastrous effect that will not be filtered out by the suggestive retention/detention ponds. This concern since it includes navigable waters and shoreline beach requires both Federal and State examinations. DNRL [sic] is an agency which needs to be consulted and contrary to what this EIS has stated, I believe an Army Corp of Engineer EIS is required. The EIS done for the marina is no longer adequate or valid. Changes in the size of the golf course from 27 to 18 holes, loss in the number of waterways, and filtration ponds, and a redesigned horizontal to vertical in the golf course which is noted to be a ground filtration system has been sufficiently altered to make the statement that by law previous EA's are no longer valid."*

Response: We note a number of erroneous conclusions in this comment and offer the following points in response: (1) It is unreasonable *"...to suspect that they [pollutants in the discharge from Kaloi Gulch] may have a disastrous effect that will not be filtered out by the suggestive retention/detention ponds."* The analyses and data described in the Draft EIS strongly supports

the conclusion that the once in 10 year discharge that is expected to occur will have no such detrimental effect;

(2) *"I believe an Army Corp of Engineer EIS is required."* The Department of the Army, Corps of Engineers, confirmed in writing on July 12, 2004, that a Department of the Army Permit is not required if the proposed development is confined to the seasonally dry areas of the Kaloi Gulch drainageway. This is exactly the location of the proposed project. Hence, there is no NEPA trigger for this action; and

(3) *"Changes in the size of the golf course from 27 to 18 holes, loss in the number of waterways, and filtration ponds, and a redesigned horizontal to vertical in the golf course which is noted to be a ground filtration system has been sufficiently altered to make the statement that by law previous EA's [sic] are no longer valid."* Change in the size of the golf course has not decreased its utility as a drainage facility. In its horizontal configuration, the golf course provided limited on-site drainage benefit. Because of the way drainage from upland properties are designed to enter the Ocean Pointe property, the marina waterways east of the sewer outfall were to receive storm water flows. When the eastern portion of the marina was eliminated, the golf course had to be reconfigured to provide the pathway for regional drainage. Storm water flows that reach State waters would be of better water quality having passed through the golf course than it would be if discharged directly into the marina. We have included a discussion of this matter in Section 1.4.2 of the FEIS.

Finally, copies of all letters documenting comments received for this project by the Department of the Army, Corps of Engineers (COE); State Department of Land and Natural Resources (DLNR); and other governmental agencies and public and private parties have been included in the project Final EIS.

***Comment:** "Another concern that even in this limited project site grade changes and a retention wall will be made. This retention wall is sufficiently close to the beach that occasionally high surf may break upon it and more often foam and wash will reach this wall. It is questionable whether or not this wall reaches the legal definition of a sea wall and will require a separate EIS, but should definitely be included in this draft EIS, it is not. Among one of the concerns is that this wall may have an adverse affect in lives and property in the event of a tsunami. Ground elevation and costal [sic] inundation zones when matched clearly show the possibly [sic] that in a tsunami waters will be held at a level of nine feet drowning my home and community. This is evidently shown by the videotape of the recent tsunami in Indonesia. The aforementioned wall may cause a change in the force and direction which will create further devastation to the existing community."*

Response: We understand the concerns that the recent Southeast Asian tsunami may have raised. However, we find that the tsunami effects you describe are without a reasonable basis for support. This is because: (1) The project does not involve the kind of retention wall you describe; (2) The drainage channel walls associated with the proposed project are perpendicular to the shoreline and would not stand in the way of water movement from a tsunami should one occur along this coastline; (3) The proposed project does not involve construction of a sea wall; and (4) There is no basis for the conclusion that "*...ground elevation and costal [sic] inundation zones [which] when matched clearly show the possibly [sic] that in a tsunami waters will be held at a level of nine feet drowning my home and community.*"

Initially, it should be noted that the Flood Insurance Rate Map for the 'Ewa shoreline as depicted in the City's Geographic Information System (GIS) shows that your home is outside the tsunami inundation area. Further, there is no evidence to suggest that any work on the proposed Kaloi outlet (which is located more than a half mile from your home) would have any effect on flooding at your home.

We sincerely hope that all of our neighbors in 'Ewa will never face the kind of tsunami that has affected Southeast Asia. However, because preparedness and early warning remains an important defense we have identified Ilima Intermediate School and James Campbell High School as the Civil Defense Agency's designated evacuation shelters for this area.

> ***Comment:*** *"Another discrepancy in this draft EIS is that the draft EIS mentions a study that was prepared for Haseko and furthers the claim that this study cites that changing the sewer line is unfeasible. However, the study is not included in the EIS and upon examining this study, the study clearly states that all alternative plans to change the sewer line, rather it be inverted siphon or doubt line are feasible."*

Response: You correctly note that the Limtiaco Study concludes that relocation of the outfall pipe, whether by an inverted siphon or either of the steep slope alternatives, is technologically feasible. The concerns raised with respect to relocation of the sewer outfall pipe involved are the risks of accidents or mishaps during construction and the added operations and maintenance requirements and costs involved with the relocation.

> ***Comment:*** *"For these reasons alone, acceptance of the draft EIS borders on criminal negligence to due diligence and taken into account recent convictions of numerous contractors and architects for campaign contributions and non enforcement of building code violations. along with premature issuance of permits suggests a pattern of complicity that acceptance of this EIS will be the final evidence needed to show complicity to violate environmental laws and commit crimes against the interest of the United States."*
>
> *"I do believe that the City and County of Honolulu and the State of Hawaii has [sic] determined that for the greater good and prosperity this project will bring in short term financial gain has caused the Planning and Permitting Department to turn a blind eye to the future destruction of a delicate eco-system and the sacrificing the lives, health and welfare of an existing community for the sake of the state at whole. Fortunately, federal laws restrict this and clearly mandate that it is not just civil but criminal."*

Response: Although we respect your right to express your opinion, we strongly disagree with your assertion that the regulatory agencies entrusted to protect public health, safety, and our environment are being anything other than diligent in fulfilling their statutory mandate.

We appreciate this opportunity to respond. Should you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Henry Eng, FAICP, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Morihara Lau & Fong LLP

DEPARTMENT OF ENVIRONMENTAL SERVICES
CITY AND COUNTY OF HONOLULU
1000 ULUOHIA STREET, SUITE 308, KAPOLEI, HI 96707
TELEPHONE: (808) 692-5156 FAX: (808) 692-5159 WEBSITE: http://www.co.honolulu.hi.gov

MUFI HANNEMANN
Mayor

ERIC S. TAKAMURA, Ph.D., P.E.
Director

KENNETH A. SHIMIZU
Deputy Director

PRO 05-050

November 30, 2005

VIA FAX: 527-6743
MEMORANDUM

TO: HENRY ENG, FAICP, DIRECTOR
DEPARTMENT OF PLANNING AND PERMITTING

FROM: Dr. ERIC S. TAKAMURA, P.E., DIRECTOR
DEPARTMENT OF ENVIRONMENTAL SERVICES

SUBJ: KALOI GULCH DRAINAGEWAY IMPROVEMENTS AT ONUELA BEACH PARK, DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)

This memo is to confirm our previous memos on the subject drainageway, dated July 6, 2000, and February 7, 2005. Copies of these memos are attached for your reference. To clarify our February 7, 2005, comments, we do object to the alternative proposed in the draft EIS. The issues raised in our comments on this alternative need to be resolved.

From our July 6, 2000 memo, please note that we do not object to the concept of directing the drainage flow over our existing outfall and into the marina, whether this requires the outfall to be lowered or not. Our approval of this alternative would be contingent on satisfactory answers to our concerns during the preliminary engineering and engineering design phases.

Should you have any questions, please call me at 692-5159.

attachments

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Planning
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December 15, 2005

Dr. Eric S. Takamura, P.E., Director
Department of Environmental Services
City and County of Honolulu
1000 Uluohia Street, Suite 308
Kapolei, Hawaii 96707

Dear Dr. Takamura:

Memorandum of November 30, 2005
Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Draft Environmental Impact Statement

On behalf of HASEKO (Ewa), Inc., we acknowledge your memorandum to the Department of Planning and Permitting, stating your objection to the proposed alternative and your comment that the issues raised by your Department must be resolved. Please note that we have responded to the February 7, 2005 letter concerning the Draft Environmental Impact Statement (EIS) in a separate letter that is included in the Final EIS.

As noted in Chapter 3 of the Final EIS, directing regional drainage into the marina by lowering the sewer outfall pipe is an alternative to the proposal of discharging storm waters through an ocean outlet located within One`ula Beach Park. We are cognizant that there are issues involved with either alternative, as well as with other alternatives identified in the FEIS. Given the assessment of a number of different factors, not the least of which is the time it would take to permit and construct any of the alternative outlets and the impact on the stakeholders in the region, the applicant is at this time pursuing the alternative of discharging storm water through the beach park. Should the issues associated with this alternative become insurmountable, or should this alternative otherwise appear impractical, other alternatives will be pursued, including lowering the outfall.

Thank you for this opportunity to respond. Should you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Henry Eng, FAICP, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Morihara Lau & Fong LLP

HAWAII COMMUNITY DEVELOPMENT AUTHORITY
KAKAAKO KALAELOA

Linda Lingle
Governor

James S. Kometani
Chairperson

Daniel Dinell
Executive Director

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Ref. No.: PL KALAELOA 17.3.4

CITY & COUNTY HONOLULU

February 5, 2005

Mr. Henry Eng
Director of Planning & Permitting
City & County of Honolulu
650 South King Street, 7th Floor
Honolulu, Hawaii 96813

Dear Mr. Eng:

Subject: Draft Environmental Impact Statement
Kaloi Gulch Drainageway Improvements at Oneula Beach Park

Thank you for your letter requesting Hawaii Community Development Authority's (HCDA) comments on the Draft Environmental Impact Statement (EIS) for the Kaloi Gulch Drainageway Improvements at Oneula Beach Park, submitted by Haseko (Ewa) Inc.

HCDA has reviewed the Draft EIS and finds that the proposed drainageway improvements as well as the effects of the anticipated storm water discharge do not appear to pose adverse impacts to the Kalaeloa Community Development District.

Please contact Mr. Stanton Enomoto, Director of Planning & Development for Kalaeloa at (808) 587-8156 should you have any questions or need additional information.

Sincerely,

Daniel Dinell
Executive Director

DD:ske

420 Waiakamilo Road
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eMail rmtowill@hawaii.rr.com

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December 2, 2005

Mr. Daniel Dinell
Executive Director
Hawaii Community Development Authority (HCDA)
677 Ala Moana Boulevard, Suite 1001
Honolulu, Hawaii 96813

Dear Mr.Dinell:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Draft Environmental Impact Statement

On behalf of HASEKO (Ewa), Inc., thank you for your letter dated February 5, 2005, to the Department of Planning and Permitting, stating that HCDA finds that the proposed project and storm water discharge does not appear to pose adverse impacts to the Kalaeloa Community Development District.

We appreciate your comments. Should you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda
Planning Project Coordinator

cc: Mr. Henry Eng, FAICP, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Morihara Lau & Fong LLP

NRCS
Natural Resources Conservation Service
P.O. Box 50004
Honolulu, HI 96850
808-541-2600

United States Department of Agriculture

Our People...Our Islands...In Harmony

2005 FEB 4 AM 8 33

CITY & COUNTY OF HONOLULU

February 2, 2005

Mr. Eric G. Crispin
Director of Planning and Permitting
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, Hawaii 96813

Subject: Draft Environmental Impact Statement of the Kaloi Gulch Drainageway Improvements at Oneula Beach Park, Ewa, Oahu

Dear Mr. Crispin,

We have reviewed the above mentioned document and have no comment to offer at this time.

Thank you for the opportunity to comment.

Sincerely,

LAWRENCE T. YAMAMOTO
State Conservationist

The Natural Resources Conservation Service provides leadership in a partnership effort to help people conserve, maintain, and improve our natural resources and environment.

An Equal Opportunity Provider and Employer

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Construction Management

December 2, 2005

Mr. Lawrence T. Yamamoto
State Conservationist
Natural Resources Conservation Service
P.O. Box 50004
Honolulu, Hawaii 96850

Dear Mr. Yamamoto:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Draft Environmental Impact Statement (DEIS)

On behalf of HASEKO (Ewa), Inc., thank you for your letter dated February 2, 2005, to the Department of Planning and Permitting, stating that you have no comments to offer at this time.

We appreciate your review of the subject DEIS. Should you have any comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Henry Eng, FAICP, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Morihara Lau & Fong LLP

Hawaii's Thousand Friends

305 Hahani St., PMB 282 • Kailua, HI 96734 • Phone/Fax: (808) 262-0682 E-mail: htf@lava.net

2005 FEB 3 AM 10 55

CITY ... HONOLULU

February 1, 2005

Department of Planning and Permitting
650 South King Street
Honolulu, Hawai'i 96813

RE: DEIS - Kaloi Gulch –Drainageway Improvements at Oneula Beach Park

ES.5.2 Lower the Honouliuli sewer outfall to allow a regional drainage channel to cross over the outfall

a. According the DEIS Plans I and II, that received all the required County, State and Federal approvals and permits and had begun, were stopped because of "possible odor that could result from a spill or during construction of the cross over period; possible complications (e.g. construction damage); possible sewage spills during construction and permanently; possible unforeseen circumstances during or after construction could create the need to shut down the outfall and possible sediments entering the deep ocean outfall."
b. If the crossover and minimum separation are major concerns they must have been pointed out in a May 2000 Limtiaco and Associates report. If so, why were all the required permits granted in 2001?
c. What changed from 2001 to 2004 that makes the accepted drainageway corridor unacceptable?

ES.5.4 Improve the existing Kaloi Gulch Drainageway across a portion of Oneula Beach Park

a. What other criterion besides the 100-year flow must the drainageway meet?
b. Under this alternative what short and long-term concerns of modifying and crossing over a major sewer outfall would be eliminated?

ES.7 Unresolved Issue

a. When the drainageway is "improved" to accommodate runoff overflow from the watershed within a public park by a private corporation who assumes the legal responsibility? At a depth of 4 to 6 feet the drainageway posses a hazard when filled with either flowing or ponding water.
b. What is the status of the acquisition of the agreed upon 9.365 acres of land for park purposes and access to that land from Papipi Road and a road easement into the park?

1.4 Background

a. It is unclear why an 84-inch sewer outfall pipe would have to be modified if the watershed drains into the proposed Ocean Pointe Marina but such modification would not be required if runoff is directed into the public beach and Oneula Park. Explain the difference?
b. Does his alternative require new or modified sewer outfall pipes?
c. Where does the "existing outfall" drain? If this alternative is selected will the "existing outfall" remain in use or will all drainage go through the new Oneula Beach Park drainageway?

d. Since the **first plan** to construct a new drainage channel into the marina was approved by the City in the early 1990s and HESEKO began design and implementation work what are the reasons this alternative was not pursued?
e. What environmental, social and economical concerns did changing the path of the drainageway address that made it a better choice? It seems that operational and maintenance reasons are a private concern that once a project receives permit approval should not involve government.
f. If the **second plan** was approved in 2001 and obtained the required County, State and Federal permits and work begun what were the "operational, maintenance and environmental concerns" that stopped the project and called for the new drainageway? Who raised those concerns?
g. Under the first and second plans did government ever stop work? If so, identify the agency issuing the stop order; provide the stop order dates and reasons why work was requested to cease.
h. If all government permits were given then the plan(s) and project(s) must have met environmental and cultural objectives and concerns. What issues were not addressed in the previous governmental permitting process that caused revision of the plan?
i. Who, government or private interests, raised "concerns" regarding any modification of an existing 84-inch sewer outfall pipe? What were/are those "concerns?"
j. What governmental approvals, if any, has HASEKO received to cross over the existing outfall?

1.4.3 Oneula Beach Park Master Plan

Neither Phase I nor II of the 2001 approved master plan addresses the issue of drainage through the beach park. Since this is a new issue with new impacts the Oneula Beach Park Master Plan must be revised to address health, safety issues including the ability to provide all proposed improvements.

2.2.1 Kaloi Gulch Drainageway

a. If HASEKO has received approvals for two previous plans that direct drainage to the proposed marina why is it now better to direct ALL drainage through the beach park?
b. Was splitting drainage between the natural drainage system and though the marina ever considered? It seems to better protect human health, safety and the marine environment by not allowing all pollutants and silt to be concentrated.
c. Is the 500-foot-long section of the existing shoreline berm created naturally by accretion or is it man made? Who, government or a private party, will be responsible for ensuring that the berm remains at the desired height?
d. Who will be responsible for maintaining the channel through the park and beach?
e. Who will be responsible for replenishing the sand if and when the berm is washed away?
f. Who is responsible for opening the berm so that water can drain into the ocean?
g. Who is responsible for monitoring water quality behind the berm, water flowing through the drainage channel and the ocean receiving waters?
h. Who will be responsible for maintaining the finished elevation of the enlarged drainageway channel?
i. What improvements will the mauka end of proposed drainageway channel tie into? What is the expected volume of drainage once the connection is made and the area is fully developed?
j. Will the increase volume from this tie in require a new Environmental Impact Statement? If so, when? If not, why?
k. What types of chemicals will be used on the golf course? Since a golf course will be built in the drainageway what affect will these chemicals have on people, wildlife and limu during heavy rains when water flows into the ocean?
l. Where will the excavated10, 000 cubic yards of soil and sandy material be taken? Will it be used for beach replenishment or removed from the site?

m. Where will the "temporary pedestrian routes" across the drainageway be located during construction?
n. What part of the drainageway is "chosen entity" responsible to maintain?
o. If a private entity creates and maintains certain aspects of the drainageway that goes through public property who is liable should accidents occur?
p. This DEIS fails to identify **any** environmental issues or impacts to the coastal environment from human manipulation of the berm.

2.2.2Park Access Road

a. Who is responsible to build and maintain the new access road and ford?
b. Who is legally responsible for accidents that occur in the ford section of the channel?
c. Who is responsible for the cost of relocating existing utilities that will need to be moved for construction of the road and/or drainageway?
d. Will the access road be a public or private road? What hours will the road be open?
e. In Figure 2-1 it appears that the access road is adjacent to the golf course. What measures are in place to protect motorists and pedestrians from errant golf balls?

2.2.2 Secondary Park Access Road

a. Without knowing the location and design of the secondary park access road it is impossible to evaluate environmental, social and economic impacts of the road.
b. Will the road be publicly or privately owned?
c. What are the hours the road will be open?
d. Will the road be located within the Shoreline Management Area? If so, is a separate SMAP required.

2.2.4 Landscaping

Who will be responsible for maintaining the landscaping and irrigation system along the drainageway?

2.3 Oneula Beach Park Master Plan

The FEIS must show the final location of the main and secondary roads and disclose any environmental and social impacts.

2.3 Construction Activities

The DEIS fails to provide a time-line on construction activities.

a. What is the anticipated construction time for: 1) the drainageway, 2) the ocean channel, 3) the access road, 4) the concrete ford, 5) drainageway landscaping 6) undefined temporary vehicle and pedestrian access routes and 7) undefined secondary access road.

The DEIS does not mention environmental impacts from construction such as:

b. How much dirt and sand will be removed per project? How will the removed dirt and sand be used since it is public property?
c. How much sand and dirt will be brought in/taken out per project?
d. What are the grading requirements of each project?
e. How much heavy equipment and machinery will be required on site for each project?
f. What "environmental controls" will be used to prevent runoff from construction areas into the ocean for each project?
g. What "environmental controls" will be used to prevent oil and other pollutants from heavy equipment and machinery from going into coastal waters?

4.5 Surface (inland) Water and Kaloi Gulch Drainageway

a. Pg. 4-11 Are the statements " that under fully developed conditions there would be total watershed storage of 300 acre-feet for retention" and " 800 acre-feet for detention among all developments within the watershed" assumptions, or part of a City accepted drainage plan? Identify the Plan and how these figures were reached. Is the drainageway expected to provide 800 acre-feet of detention?
b. According to the DEIS the watershed model estimated how often overflow would be expected into the Kaloi drainageway channel through Oneula Beach Park under developed watershed conditions yet "developed" was not defined. Does this refer to ALL development within the watershed or just HASEKO land and projects?
c. Pg. 4-13 What data was used to reach the conclusion that "upland developments" would incorporate "storm water storage provisions to hold and infiltrate runoff within their developments" thus reducing frequency ocean discharges? Will new developments hook up to a drainage system that drains into the Kaloi Gulch Drainageway? If so, how much is the volume of water deposited into the ocean expected to increase? Will a new environmental impact statement be required for additional drainage systems?

4.6 Coastal Water Quality

a. Figure 4-5 Shows that four out of the five monitoring stations are monitoring water quality off the proposed marina with only one station KA 4, 5, 6 is off Oneula Beach Park. Why weren't more stations sited off the beach park?
b. When was monitoring at KA 4,5,6 begun? How many times was data collected from this station in the last decade?
c. What is the historical record over the last decade for KA 4,5,6?
d. Why isn't there a monitoring station on the Diamond Head side of the drainageway?
e. What data substantiates the conclusion "The exceedances are not related to activities on the Ocean Point site?"
f. Projected water quality impacts of the project are limited to comparisons with an "ambient" total suspended solids (TSS) concentration of10 mg/l. at a "control" site located about 700 m west of the proposed entry channel of the Ocean Pointe marina and 1700 m west of the Kaloi Gulch project. The main problem with this definition of acceptable water quality impact is that the 10 mg/l "ambient" TSS level is associated with numerous violations of Hawaii's water quality standards for nitrate (NO3), ammonium (NH3), total nitrogen (TN), turbidity, and chlorophyll-a. These violations are documented in the DEIS, Appendix A, Tables 5, 6. Wouldn't a more appropriate estimate of "ambient" TSS be the 3 or 4 mg/l TSS found at water quality sampling locations 500 m offshore (DEIS, Appendix A, Table 4)? Don't the violations of water quality standards disappear at these locations?
f. Won't all of the constituents in excess of water quality standards be found in the storm water discharged by the proposed project? Won't the proposed project therefore be adding to the water quality violations that already exist?
g. The water quality sampling site portrayed as the "control" site in the DEIS is not a control site in the normal scientific understanding of the concept, i.e., a site free from influence of the project or project-related activities. The discharge plume modeling described in Appendix B (also summarized in DEIS, Table 4-1) finds the water quality influence of a discharge plume can extend as far as 5,500 m to the west of the discharge location. Doesn't the area 5,500 m (3.4 miles) east of the "control" site include storm runoff discharges from Oneula Beach Park, Kaloi Gulch, Ewa Beach and the Ocean Pointe development? How is the "control" site therefore free

from the influence of development-related activities? Isn't this influence evident in the water quality data in Appendix A, Tables 4, 5, and 6, where water quality varies primarily with distance from shore at all monitoring sites, rather than between sites? Isn't this also consistent with the DEIS observation that "In general, the plume generated by storm runoff at the project site stays relatively close to the shoreline" (DEIS, p. 4-21)?

h. The ocean areas covered by the discharge plumes described in the DEIS, Table 4.1 and Appendix are substantial. The plume area, 1,400 m x 4,200m, in model run no. 2, for example, covers an offshore area of more than 2 square miles. Even for the 10-year storm "threshold" event (run no. 7), the discharge plume covers nearly one-half square mile. These areas are based on the DEIS-assumed plume boundary of 10 mg/l TSS. If the plume boundary is defined by the actual ambient condition 3 – 4 mg/l TSS, where water quality standards are less likely to be violated, won't the plume areas be significantly even larger?

k. The DEIS attributes violations of water quality standards in the project area principally to "groundwater efflux at the shoreline off the Ocean Pointe site" and "not related to activities on the Ocean Pointe site." (DEIS, p. 4-17, 18). A groundwater influence might be found in the horizontal gradient for silica, but aren't the higher shore line concentrations of nitrate, ammonium, organic nitrogen, total nitrogen, turbidity, chlorophyll-a, and particularly total suspended solids, more indicative of surface discharges, e.g., storm runoff, that are related to development activities?

k. Do the sediment depths in Table 4.1 include the likely water content (at least 90%) of the silt sediment? If not, shouldn't the indicated sediment depths be at least 10-times greater than indicated?

4.7 Natural Hazards

a. Who is responsible for putting in and maintaining the warning signage along the public road and in Oneula Beach Park?

b. Who is legally responsible should an accident occur while someone is crossing the ford or in the channel during a flood event?

4.11 Terrestrial Flora

a. Are any native kipukai, pohuehue or 'aki'aki plants within the existing drainageway? Are any of these plants within the proposed expansion? If so, what measures will be taken to protect them?

b. Who is responsible for replanting of vegetation after completion of the project?

Terrestrial Fauna and Avifauna

a. It is our understanding that the endangered Hawaiian Coot 'Alae ke'o ke'o and Hawaiian Stilt Ae'o are seen frequently in this area and especially the salt marsh area. Why isn't the presence of these endangered birds noted in the DEIS?

b. What measures will be taken to protect, their feeding grounds and habitat?

4.13 Marine Biology

a. What data shows that sediment from construction and drainageway discharges will not negatively impact making it uneatable?

b. This section is silent on impacts during construction to limu and the Green Sea Turtle. Identify what precautions will be taken during construction to prevent negative impacts to Green Sea Turtles and coastal limu?

5.1 Traffic and Roadways

a. Why is the proposed drainageway not shown in Figure 5-1 Oneula Beach Park Master Plan?

b. Was the drainageway realigned to go through the park after the Master Plan was approved? If so, will an addendum to the existing master plan be required?

c. It has been understood that a bridge would cross over the drainageway? When was the change made to a ford and why?

5.2 Wastewater

Will sewer lines have to cross or go under the drainageway to connect to future sewer hookups for the comfort stations and multi-purpose center?

5.3 Potable Water

a. Who is responsible for relocating the existing water main that supplies potable water to the park?

c. During what phase of construction of the drainageway will the water main be relocated? How long will it take and will water be provided to the park?

6.6. Traditional Cultural Practice

a. What are the impacts to limu and Green Sea turtles from runoff carrying chemicals from the golf course when the drainageway empties into the ocean?

b. The DEIS fails to identify where public access and public parking to all archaeological sites will be provided during and after completion of the drainageway. The FEIS must provide this information.

7.2.2 Hawai'i State Plan (pg. 7-6)

a. Why would the original drainageway into the marina require the reconfiguration of the Honouliuli Wastewater Treatment Plant Sewer Outfall?

b. What environmental and construction impacts for the original design were determined to be unacceptable, who made the determination and when?

c. Why would there be sewage spills if the drainageway only requires excavation and the location of existing pipes is known?

d. What is the connection between the sewage outfall and the drainageway that requires reconfiguration of the sewer main and the "premature expansion of the outfall?"

Looking at the drainageway in isolation and not in relation to the larger total development/drainage picture does not give the reader an understanding of why this expanded drainageway is needed. This is another example of segmenting development and piecemealing within the coastal zone, which is prohibited by law.

CC:

Office of Environmental Quality Control

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December 2, 2005

Hawaii's Thousand Friends
305 Hahani St., PMB 282
Kailua, Hawaii 96734

Dear Sir/Madam:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Draft Environmental Impact Statement

On behalf of HASEKO (Ewa), Inc. ("HASEKO"), thank you for your letter dated February 1, 2005, concerning the subject project. We have prepared the following in response to your comments. Your comments have been italicized for reference:

> *"ES.5.2 Lower the Honouliuli sewer outfall to allow a regional drainage channel to cross over the outfall*
> *a. According the DEIS Plans I and II, that received all the required County, State and Federal approvals and permits and had begun, were stopped because of "possible odor that could result from a spill or during construction of the cross over period, possible complications (e.g. construction damage); possible sewage spills during construction and permanently; possible unforeseen circumstances during or after construction could create the need to shut down the outfall and possible sediments entering the deep ocean outfall."*
> *b. If the crossover and minimum separation are major concerns they must have been pointed out in a May 2000 Limtiaco and Associates report. If so, why were all the required permits granted in 2001?*
> *c. What changed from 2001 to 2004 that makes the accepted drainageway corridor unacceptable?"*

Response: a. We wish to clarify that land use plans incorporating the concept of a drainage channel to the marina obtained discretionary land use approvals from federal, state and county agencies. These discretionary permits are not approvals for lowering the outfall. The permits and approvals that are needed to lower the outfall would have to be obtained from the Department of Environmental Services, which is the owner of the outfall, and the Department of Planning and Permitting, for approval of the construction-related permits. HASEKO does not have those authorizations.

b. & c. Subsequent to publication of the Draft EIS, it has been clarified that the option of lowering the outfall is not yet foreclosed. Thus, it is identified as an alternative in Chapter 3 of the Final EIS (FEIS). However, because of the concerns with lowering the outfall, HASEKO has been asked to explore alternatives, such as the proposed outlet through One'ula Beach Park.

> *"ES.5.4 Improve the existing Kaloi Gulch Drainageway across a portion of Oneula Beach Park*
> *a. What other criterion besides the 100-year flow must the drainageway meet?*
> *b. Under this alternative what short and long-term concerns of modifying and crossing over a major sewer outfall would be eliminated?"*

Response: a. The primary criterion for improving the drainageway through Oneula Beach Park is the 100-year flow capacity requirement as set forth by the City in their current drainage standards.

b. The concerns that would be eliminated with the preferred alternative have been identified in the Draft EIS, Page 3-3, and include the following:

- Odor that results from a spill or during construction of the cross-over period;
- Possible complications (e.g. construction damage) involving need to maintain operations of the outfall for the duration of construction;
- The possibility of sewage spills both during construction and in its permanent condition;
- Possible complications with sediments entering the deep ocean outfall and impacting the diffuser outlet; and,
- Possible unforeseen circumstances during or after construction could create the need to shut down the outfall. Honouliuli Wastewater Treatment Plant services most of Central and Leeward Oahu and such an occurrence may result in a catastrophic overland spill followed by a major loss of service.

> *"ES.7 Unresolved Issue*
> *a. When the drainageway is "improved" to accommodate runoff overflow from the watershed within a public park by a private corporation who assumes the legal responsibility? At a depth of 4 to 6 feet the drainageway posses a hazard when filled with either flowing or ponding water.*
> *b. What is the status of the acquisition of the agreed upon 9.365 acres of land for park purposes and access to that land from Papipi Road and a road easement into the park?"*

Response: a. HASEKO has been working, and will continue to work, with the appropriate City Departments and other landowners and developers in the Kaloi drainage basin to legally define the maintenance obligations for the drainageway area. Although the details and the form of memorializing the maintenance obligations have not yet been worked out, HASEKO is committed to ensuring that the drainage channel through Oneula Beach Park is kept free of large debris that may impede storm water flows through the channel, silt and other debris are removed from the channel following storm events, and the shoreline berm is maintained at an elevation that enables it to function adequately as a storm drainage outlet.

b. Under the Unilateral Agreement attached to Ordinance 93-94, HASEKO is obligated to convey the approximately 9.365 acres for expansion of Oneula Beach Park when all the grading permits for the golf course have been obtained. That event has not yet occurred. Nevertheless, when the City was developing the Oneula Beach Park Master Plan and obtaining permits necessary for implementation of the Master Plan, the 9.365 acres was included with HASEKO's consent. According to the Master Plan, improvements to the existing beach park will precede development of the expansion area. HASEKO has been coordinating with the City to assure that conveyance of the 9.365 acres is in accord with the City's development schedule for Oneula Beach Park.

"1.4 Background
a. It is unclear why an 84-inch sewer outfall pipe would have to be modified if the watershed drains into the proposed Ocean Pointe Marina but such modification would not be required if runoff is directed into the public beach and Oneula Park. Explain the difference?"

Response: a. The sewer outfall is located on the west side of the Kaloi Gulch drainageway. If regional drainage from the large Kaloi watershed were to flow into the marina, it must cross the sewer outfall. Because of the relative elevations of the outfall pipe and the surrounding lands, plus invert elevations that have already been established by developments mauka of Ocean Pointe, the outfall pipe has to be lowered to enable storm runoff to be discharged into the marina. Keeping the regional drainage to the east of the Honouliuli Wastewater Treatment Plant outfall by creating an overflow channel through Oneula Beach Park eliminates the need to alter this existing outfall pipe. Section 1.4 of the FEIS provides a fuller discussion of this matter.

"b. Does his alternative require new or modified sewer outfall pipes?"

Response: b. The preferred alternative does not require any modification of the existing sewer outfall.

"c. Where does the "existing outfall" drain? If this alternative is selected will the "existing outfall" remain in use or will all drainage go through the new Oneula Beach Park drainageway?"

Response: c. The "existing outfall" refers to the existing Honouliuli Wastewater Treatment Plant sewer outfall; it has nothing to do with the stormwater runoff that would be carried in the proposed drainage channel. The existing outfall pipe originates at the City's Honouliuli Wastewater Treatment Plant inland of HASEKO's property and terminates on the seafloor in deep water, more than 1.5 miles offshore. The purpose for avoiding the sewer outfall is to allow it to remain operational and not be affected by the project. Drainage from the Kaloi Gulch watershed will go through the Oneula Beach Park drainageway and avoid any interaction with the sewer line.

d. Since the first plan to construct a new drainage channel into the marina was approved by the City in the early 1990s and HESEKO began design and implementation work what are the reasons this alternative was not pursued?

Response: d. As a point of clarification, the concept of using the marina as part of the regional drainage infrastructure was planned long ago and in 1980 (long before HASEKO acquired the Ocean Pointe project), the City approved the concept of an inverted siphon. After acquiring Ocean Pointe, HASEKO diligently pursued land use and other permits required to implement these plans. In the mid-1990s, in response to growing public awareness and concern over environmental issues associated with sewer facilities in general, the City reassessed its earlier approvals and asked HASEKO to explore alternatives that would lower the risks involved in siphoning the outfall. When it was concluded that there is no alternative to an inverted siphon to accommodate navigability over the outfall, in view of the City's concerns, HASEKO agreed to eliminate the marina waterways east of the outfall.

The intent remained, however, for the marina to serve as the final basin for most of the Kaloi Gulch storm water runoff. This plan necessitated lowering the sewer outfall pipe due to the relative elevations of the outfall and the surrounding lands. Initially, HASEKO and the City

agreed upon a method of lowering the outfall, and in 2002 HASEKO obtained rezoning and other approvals to eliminate the eastern portion of the marina and accommodate Ocean Pointe's revised master plan. Not long thereafter, as HASEKO embarked on pre-construction work required for lowering the outfall, the City raised a number of environmental, operational, and maintenance concerns that clearly implied a desire to not lower the outfall. Based on these concerns, HASEKO and the City discussed, and HASEKO agreed to explore alternatives to lowering the outfall.

This discussion has been included in Section 1.4.2 of the FEIS.

e. What environmental, social and economical concerns did changing the path of the drainageway address that made it a better choice? It seems that operational and maintenance reasons are a private concern that once a project receives permit approval should not involve government.

Response: e. Although the cost of lowering the outfall will be privately financed, the entire outfall, including the lowered section, would remain the property of the City and the Department of Environmental Services would have the responsibility for operating and maintaining the sewer outfall.

Please note that with the elimination of the eastern portion of the marina, lowering the outfall serves only a regional drainage purpose, and the Ocean Pointe development would not derive a benefit over and above what other developments in the Kaloi drainage basin would. (In contrast, navigability of the marina waterways east of the outfall would have created significant economic benefit to the Ocean Pointe project not shared by other developments in the region.) As the City is, by statute, responsible for drainageways and for the Honouliuli sewer system, it is incorrect to say that operations and maintenance are private, and not government, concerns

The social and economical concerns with lowering the outfall are provided in Section 3.3 of the FEIS. A discussion of the background and history leading up to this proposed project is included in Chapter 1.

f. If the second plan was approved in 2001 and obtained the required County, State and Federal permits and work begun what were the "operational, maintenance and environmental concerns" that stopped the project and called for the new drainageway? Who raised those concerns?

Response: f. See the response to 1.4 d., above.

g. Under the first and second plans did government ever stop work? If so, identify the agency issuing the stop order; provide the stop order dates and reasons why work was requested to cease.

Response: g. No. Stop work orders were never issued because HASEKO had continual contact with City agencies and responded to concerns before arriving at the point where stop work orders had to be issued.

h. If all government permits were given then the plan(s) and project(s) must have met environmental and cultural objectives and concerns. What issues were not addressed in the previous governmental permitting process that caused revision of the plan?

Response: h. See the response to 1.4 d., above.

i. Who, government or private interests, raised "concerns" regarding any modification of an existing 84 inch sewer outfall pipe? What were/are those "concerns?"

Response: i. These concerns were raised in discussions with the Department of Environmental Services as HASEKO attempted to obtain information about, and to assess, the sewer pipeline in order to develop preliminary engineering plans for lowering the outfall. The concerns are included in Section 3.3 of the FEIS.

j. What governmental approvals, if any, has HASEKO received to cross over the existing outfall?

Response: j. In 1980, long before HASEKO acquired the Ocean Pointe project, the City had approved the concept of an inverted siphon in the sewer outfall pipe to accommodate navigability over the outfall. In 2000, when HASEKO agreed to eliminate the waterways east of the outfall, the Department of Environmental Services agreed to a method for lowering the outfall, contingent upon review and approval of detailed preliminary engineering and engineering design phases. In the process of developing preliminary engineering plans, HASEKO had to work closely with the City Departments of Environmental Services and Planning and Permitting. During that process, the City indicated its desire to HASEKO to explore other alternatives.

1.4.3 Oneula Beach Park Master Plan
Neither Phase I nor II of the 2001 approved master plan addresses the issue of drainage through the beach park. Since this is a new issue with new impacts the Oneula Beach Park Master Plan must be revised to address health, safety issues including the ability to provide all proposed improvements.

Response: We concur. The Special Management Area Use Permit for implementation of the One`ula Beach Park Master Plan will have to be modified before this drainage channel can be constructed. Health and safety issues with respect to the beach park will surely be addressed in the SMP process.

2.2.1 Kaloi Gulch Drainageway
a. If HASEKO has received approvals for two previous plans that direct drainage to the proposed marina why is it now better to direct ALL drainage through the beach park?

Response: a. As a point of clarification, under the proposed plan a relatively small amount of drainage generated from Kalaeloa and parts of the Ocean Pointe project will go to the marina. Most of the flows, however, will be discharged through the Kaloi gulch drainage outlet. In response to your comment, please refer to the response to 1.4.d, above.

b. Was splitting drainage between the natural drainage system and though the marina ever considered? It seems to better protect human health, safety and the marine environment by not allowing all pollutants and silt to be concentrated.

Response: b. The proposed plan does split stormwater runoff from the Ocean Pointe site between the proposed Kaloi channel and the marina. In the present design approximately 40 percent of the 1,100-acre Ocean Pointe property will drain into the marina. Additionally, some storm water flows from the Barbers Point golf course will be discharged into the marina. The far greater flow amounts, however, will come from upland properties and directed into the Kaloi

channel which will discharge into the ocean through One`ula Beach Park. Drainage infrastructure that is already in place (and over which HASEKO has no control) dictated entry onto Ocean Pointe property east of the outfall and limited the drainage options available. In Section 3.4 of the FEIS we identify the possible alternative of directing some of the flows elsewhere.

c. Is the 500-foot-long section of the existing shoreline berm created naturally by accretion or is it man made? Who, government or a private party, will be responsible for ensuring that the berm remains at the desired height?
d. Who will be responsible for maintaining the channel through the park and beach?

Response: c. The berm is an existing natural feature of the shoreline. The proposed system functions with any berm height.

d. Please see our response to your comment under ES.7 Unresolved Issue, item a, on page 2 of this letter.

e. Who will be responsible for replenishing the sand if and when the berm is washed away?

Response: e. The existing sand berm must be disturbed during construction of the channel in order to remove hard material that underlies it. Most of that sand will be returned once the hard material has been removed. A small portion of the berm may be left at a reduced elevation to facilitate the channel's opening during the rare rainfall events that will produce a discharge. To the extent that it proves necessary, periodic removal of sand buildup may be required, but most of the channel clearing that would be needed to bring the channel to its full flow capacity would occur as a result of natural forces. HASEKO has committed to assist the City in maintaining the channel as provided by law.

f. Who is responsible for opening the berm so that water can drain into the ocean?

Response: f. Initially, the work will be done by HASEKO. As to maintaining the opening in the berm, please see our response to your comment under ES.7 Unresolved Issue, item a, on page 2 of this letter.

g. Who is responsible for monitoring water quality behind the berm, water flowing through the drainage channel and the ocean receiving waters?

Response: g. It is important to remember that water will rarely discharge through the channel. HASEKO anticipates that the State Department of Health will establish the stormwater and water quality monitoring requirements for the project as part of the permitting process. This monitoring will complement the extensive water quality monitoring program that HASEKO has conducted for more than a decade in accordance with the requirements of the 401 Water Quality Certification that it has received for the Ocean Pointe Marina.

h. Who will be responsible for maintaining the finished elevation of the enlarged drainageway channel?

Response: h. Please see our response to your comment under ES.7 Unresolved Issue, item a, on page 2 of this letter.

i. What improvements will the mauka end of proposed drainageway channel tie into? What is the expected volume of drainage once the connection is made and the area is fully developed?

Response: i. The mauka end of the drainageway will connect to the golf course associated with the Ocean Pointe development. With respect to the expected volume of stormwater once the connection is made and the Kaloi watershed is fully developed, that will depend on what occurs upstream of the Ocean Pointe property. HASEKO is providing more than sufficient retention capacity to accommodate all of the stormwater that originates from rainfall on its site. Developments within the Kaloi watershed inland of Ocean Pointe have incorporated storm water storage basins to offset increases in runoff caused by urbanization (e.g. Ewa Villages Golf Course and Gentry Coral Creek Golf Course). Currently, no more than 2,500 cfs of channelized storm water flow is allowed to be discharged from upland properties into Ocean Pointe and the emergency drainage channel through One`ula Beach Park. Ultimate drainage volumes will depend drainage infrastructure included in future developments on upland properties.

HASEKO has no control over the amount of storm water runoff that exits, or the manner in which it exits upland properties. City drainage standards require the drainage channel through Ocean Pointe to be designed to accommodate a 100-year design flow (10,800 cubic feet per second at this location). HASEKO alone is not in a position to change the expected volume of storm water flow that is eventually discharged into the ocean. The proposed project EIS addresses the potential for this future "worst-case" condition. Please see Section 3.4 in the FEIS for an expanded discussion of this matter.

j. Will the increase volume from this tie in require a new Environmental Impact Statement? If so, when? If not, why?

Response: j. The answer is no, the proposed project EIS addresses this future condition.

k. What types of chemicals will be used on the golf course? Since a golf course will be built in the drainageway what affect will these chemicals have on people, wildlife and limu during heavy rains when water flows into the ocean?

Response: k. All upland developments including the golf course are required to comply with provisions of the federal Clean Water Act and state regulations governing water quality found in Hawaii Administrative Rules, Chapter 11-54, Water Quality Standards, and Chapter 11-55, Water Pollution Control.

A golf course management plan for the Ocean Pointe golf course, designed to prevent adverse effects from the application of fertilizers and other agricultural chemicals, will also be prepared and submitted to the Department of Health for review and approval. As discussed in the water quality section of the FEIS (Section 4.6), the stormwater discharge would not have a significant adverse effect on people, wildlife or limu.

l. Where will the excavated 10,000 cubic yards of soil and sandy material be taken? Will it be used for beach replenishment or removed from the site?

Response: l. The excavated materials will be placed as embankment on-site. Excess excavated materials, if any, will be removed and disposed of at a suitable location off the park site by the Contractor. Beach sand disturbed during construction of the channel will be left within the active beach zone. The mixture of sand and soil that is present in the area away from the active beach is inappropriate for beach replenishment use.

m. Where will the "temporary pedestrian routes" across the drainageway be located during construction?

Response: m. The ability of pedestrians to move laterally along the shoreline will be maintained at all times. Excavation of the channel will be limited to material that is at least 4 feet above sea level. Sand and other material that is below that elevation will not be excavated. The portion of the existing beach that is between sea level and the channel bottom elevation (+4 feet) will be undisturbed and can be used by pedestrians walking along the beach except during extremely high surf conditions or during brief periods when construction equipment operation might make this hazardous. During such periods, HASEKO will provide alternate routes around the construction area. The location for temporary pedestrian access will be determined based on the location of active construction at the time and will be made in consultation with appropriate agencies including the Departments of Planning and Permitting, Parks and Recreation, and Design and Construction. We anticipate these locations will be based on construction staging requirements and where designated will be clearly marked with safety tape or other means to maintain public safety.

n. What part of the drainageway is "chosen entity" responsible to maintain?

Response: n. The part of the drainageway to be maintained in Oneula Beach Park is the portion between the tops of the channel banks. Please see our response to your comment under ES.7 Unresolved Issue, item a., found on page 2 of this letter, concerning who will be responsible for maintenance.

o. If a private entity creates and maintains certain aspects of the drainageway that goes through public property who is liable should accidents occur?

Response: o. Questions on liability are virtually impossible to answer in the abstract because so much is dependent on particular facts of each case. For example, did the victim embark on an unreasonable risk, ignore warnings, etc? If the accident was the result of drainage being blocked, was it due to lack of routine maintenance or did some third party create an unanticipated condition, such as dumping large amounts of debris in the drainageway? HASEKO has been working and will continue to work, with the appropriate City departments and other landowners and developers in the Kaloi drainage basin to legally define the maintenance obligations for the drainageway area. Although the details and the form of memorializing the maintenance obligations have not yet been worked out, HASEKO is committed to ensuring that the drainage channel through One`ula Beach Park is kept free of large debris that may impede storm water flows through the channel, silt and other debris are removed from the channel following storm events, and the shoreline berm is maintained at an elevation that enables it to function adequately as a storm drainage outlet.

p. This DEIS fails to identify any environmental issues or impacts to the coastal environment from human manipulation of the berm.

Response: p. Environmental effects from removal of the sand berm are discussed in Section 4.2 of the FEIS, and the impact of the project, generally, including the removal of the berm, on nearshore water quality and marine biota are discussed in Sections 4.6.2 and 4.13, respectively. The sand that forms the existing berm will be temporarily removed during construction to allow the contractor to remove the beach rock and other hard material beneath it (approximately +4 feet above mean sea level). The sand will then be returned and the berm reformulated. The only forces

that are expected to disturb it are extreme storm events, which could push some or all of the finer material aside, and exceptionally high storm waves, which could have the same effect. Since the berm has persisted over many years in the face of storm waves, there is no reason to believe that it would not behave in the same way in the future. While the effect of stormwater outflow from the proposed Kaloi channel (should it occur) would represent a new force, wave action is expected to rebuild the berm.

2.2.2Park Access Road
a. Who is responsible to build and maintain the new access road and ford?

Response: a. HASEKO will construct and install the new access road and ford. As to maintenance of the road and ford, see our response to your comment under ES.7 Unresolved Issues, item a, on page 2 of this letter.

b. Who is legally responsible for accidents that occur in the ford section of the channel?

Response: Please see our response to your comment under Section 2.2.1 Kaloi Gulch Drainageway, item o., on page 8 of this letter.

c. Who is responsible for the cost of relocating existing utilities that will need to be moved for construction of the road and/or drainageway?

Response: c. HASEKO will pay for the relocating of existing utilities.

d. Will the access road be a public or private road? What hours will the road be open?

Response: d. The access road will belong to the City. As a road within a City park, it will be subject to the park's rules and regulations (including hours it will be open).

c. In Figure 2-1 it appears that the access road is adjacent to the golf course. What measures are in place to protect motorists and pedestrians from errant golf balls?

Response: Although the golf course boundary extends down to the park, the closest golf play area will be over 400 feet from the park boundary. Errant balls are not anticipated to affect the park and access road.

2.2.2 Secondary Park Access Road
a. Without knowing the location and design of the secondary park access road it is impossible to evaluate environmental, social and economic impacts of the road.
b. Will the road be publicly or privately owned?
c. What are the hours the road will be open?
d. Will the road be located within the Shoreline Management Area? If so, is a separate SMAP required.

Response: a. The road you are referring to is for emergency use only. It will not be used for regular park access and has been proposed in response to a specific request from the City. The proposed location of the secondary park access road is identified in the Final EIS, Appendix G, Concept Plan. Inasmuch as it will be a roadway within the Ocean Pointe development, the environmental, social and economic impacts have been addressed in other environmental disclosure documents and other permitting processes in the context of the Ocean Pointe development project.

b. It is intended that the secondary park access road, similar to most of the roadways within the Ocean Pointe development, will eventually be dedicated to the City.

c. Access into the park over this secondary access road will be determined by the City Department of Parks and Recreation.

d. At its currently planned location at the northernmost part of One`ula Beach Park, the secondary park access road will be outside of the Special Management Area. Should the location propose to be changed, an evaluation of the permitting requirements will be done at that time. As we noted in an earlier response, the Special Management Area Use Permit for the implementation of the One`ula Beach Park master plan will have to be amended before this project can be constructed. Any portion of the secondary park access road that lies within One`ula Beach Park will have to be a part of the amended SMP.

2.2.4 Landscaping
Who will be responsible for maintaining the landscaping and imgation system along the drainageway?

Response: Please see our response to your comment under ES.7 Unresolved Issue, item a.

2.3 Oneula Beach Park Master Plan
The FEIS must show the final location of the main and secondary roads and disclose any environmental and social impacts.

Response: The general location of the access road and secondary access road is provided in the Final EIS, Appendix G, Concept Plan. Potential for impacts and mitigation measures are described in Section 5.1, Traffic and Roadways, Impacts and Mitigation Measures.

2.3 Construction Activities
The DEIS fails to provide a time-line on construction activities.
a. What is the anticipated construction time for: 1) the drainageway, 2) the ocean channel, 3) the access road, 4) the concrete ford, 5) drainageway landscaping 6) undefined temporary vehicle and pedestrian access routes and 7) undefined secondary access road.

Response: a. Section 2.5 of the FEIS notes that the length of time for completion of all of the separate items you identify is approximately 6 to 12 months. Commencement date for construction will depend on when all the requisite permits and approvals are received.

The DEIS does not mention environmental impacts from construction such as:
b. How much dirt and sand will be removed per project? How will the removed dirt and sand be used since it is public property?
c. How much sand and dirt will be brought in/taken out per project?
d. What are the grading requirements of each project?

Response: b., c. & d. Section 2.2.1 of the FEIS has been clarified to indicate that the project will involve approximately 7,110 cubic yards of excavation and approximately 7,873 cubic yards of fill or embankment for the channel banks. The additional fill material will obtained off-site by the Contractor. Work within the Kaloi drainageway involves approximately 3.25 acres and work within the Kaloi drainageway banks involves approximately 4.30 acres.

e. How much heavy equipment and machinery will be required on site for each project?

Response: e. For the grading work, we anticipate the use of a bulldozer, front-end loader, and dump truck. Construction of the road (ford) crossing work will require use of a back-hoe, grader, front-end loader, roller compactor, dump truck, and concrete truck. The use of this equipment may be modified as required by the contractor to meet construction requirements.

f. What "environmental controls" will be used to prevent runoff from construction areas into the ocean for each project?
g. What "environmental controls" will be used to prevent oil and other pollutants from heavy equipment and machinery from going into coastal waters?

Response: f. & g. The contractor will be required to implement best management practices and obtain a National Pollutant Discharge Elimination System stormwater permit for construction. It is anticipated that silt fences and berms will be used to prevent construction storm water from entering the ocean. The contractor will also be required to follow spill prevention precautions, such as refueling and lubricating equipment in designated contained areas to prevent pollution. See Section 4.6.3 of the FEIS.

4.5 Surface (inland) Water and Kaloi Gulch Drainageway
a. Pg. 4 1 1 Are the statements " that under fully developed conditions there would be total watershed storage of 300 acre-feet for retention" and " 800 acre-feet for detention among all developments within the watershed" assumptions, or part of a City accepted drainage plan? Identify the Plan and how these figures were reached. Is the drainageway expected to provide 800 acre-feet of detention?

Response: a. These storage volumes were based on a review of the Ewa Villages Drainage Master Plan, Ewa by Gentry Drainage Master Plan and the East Kapolei Drainage Master Plan. The Ewa Villages and Ewa by Gentry plans have been accepted by the City and have been implemented. The East Kapolei Drainage Master Plan has not been accepted by the City and has not been implemented.

For modeling purposes, it was assumed that 800 acre-feet of detention will be provided in the watershed. Except for Ocean Pointe, HASEKO has no control over developments in the Kaloi Gulch drainage basin, and, therefore, is not in a position to positively declare the total amount of detention that will actually be provided in the watershed.

b. According to the DEIS the watershed model estimated how often overflow would be expected into the Kaloi drainageway channel through Oneula Beach Park under developed watershed conditions yet "developed" was not defined. Does this refer to ALL development within the watershed or just HASEKO land and projects?

Response: "Developed" conditions refers to all developments within the Kaloi watershed. If only Ocean Pointe were considered, there would be no discharge since HASEKO provides sufficient on-site retention capacity to absorb all runoff from its property that would otherwise flow into the Kaloi drainageway. See Section 3.4 of the FEIS.

c. Pg. 4-13 What data was used to reach the conclusion that "upland developments" would incorporate "storm water storage provisions to hold and infiltrate runoff within their developments" thus reducing frequency ocean discharges? Will new developments hook up to a

drainage system that drains into the Kaloi Gulch Drainageway? If so, how much is the volume of water deposited into the ocean expected to increase? Will a new environmental impact statement be required for additional drainage systems?

Response: The conclusion of upland storage development was based on the proposed plans for watershed development, including drainage plans for East Kapolei Drainage, Ewa Villages, Ewa by Gentry, Ewa Makai-West, and Ocean Pointe. Environmental Assessments (EAs) and/or EISs have been prepared and accepted for all of these areas.

The purpose of the proposed project is to accommodate the anticipated storm water flows resulting from upland developments. The current regional drainage master plan proposes that nearly all of the channelized drainage from the entire Kaloi Gulch drainage basin be discharged through one ocean outlet, either the marina, or, as proposed here, through One`ula Beach Park. We do note in Section 3.4 of the FEIS, however, that other alternatives, over which HASEKO has no control, may be available.

4.6 Coastal Water Quality
a. figure 4-5 Shows that four out of the five monitoring stations are monitoring water quality off the proposed marina with only one station KA 4,5,6 is off Oneula Beach Park. Why weren't more stations sited off the beach park?

Response: The four stations you are referring to were established more than a decade ago as part of the long-term water quality monitoring program that HASEKO is carrying out in compliance with its water quality certification for the marina. These, in combination with the fifth station that was established more recently, provide all of the information needed to adequately characterize water quality in the area that would be affected by the very infrequent discharges that are expected from the Kaloi drainage channel. Data from additional stations are not needed to adequately characterize potential effects.

b. When was monitoring at KA 4,5,6 begun? How many times was data collected from this station in the last decade?

Response: Monitoring of all of the stations along the KA transect (i.e., stations KA-1 through KA-7) began in December 2003. There are seven sampling stations along the "KA" transect. Samples at the five outermost stations along the transect are collected at two depths (near the surface and near the bottom), making a total of twelve samples for each monitoring event. The monitoring is done quarterly. Consequently, as of the end of 2004, a total of 60 samples have been collected and tested along the KA transect.

c. What is the historical record over the last decade for KA 4,5,6?

Response: As noted above, monitoring of all stations along the KA transect began in December 2003. A total of 5 surveys up to November 2004 were conducted since it was established. The attached table, Sampling Transect KA, Water Chemistry of Selected Constituents (Marine Research Consultants, 2005), presents the monitoring results.

d. Why isn't there a monitoring station on the Diamond Head side of the drainageway?

Response: The station was purposely placed in the center of the proposed discharge point so that it would record the highest concentrations. Monitoring at a station farther to the east was started

in the third quarter of 2004 as part of another project, and the data from that will be included in future reports submitted to the Department of Health. Please note that the additional data are not needed to adequately assess the potential impacts of the proposed project.

e. What data substantiates the conclusion 'The exceedances are not related to activities on the Ocean Point site?"

Response: The exceedances existed before any development occurred on the Ocean Pointe project site and, as indicated on page 15 of the March 2004 water quality monitoring report reproduced in Appendix A of the Draft EIS, results "...continue to indicate that there is no discernible effect to the nearshore ocean from the ongoing construction activity associated with the project."

f. Projected water quality impacts of the project are limited to comparisons with an "ambient" total suspended solids (TSS) concentration of10 mg/l. at a "control" site located about 700 m west of the proposed entry channel of the Ocean Pointe marina and 1700 m west of the Kaloi Gulch. The main problem with this definition of acceptable water quality impact is that the 10 mg/l "ambient" TSS level is associated with numerous violations of Hawaii's water quality standards for nitrate (N03), ammonium (NIB), total nitrogen (TN), turbidity, and chlor&hyll-a. These violations are documented in the DEIS, Appendix A, Tables 5,6. Wouldn't a more appropriate estimate of "ambient" TSS be the 3 or 4 mgA TSS found at water quality sampling locations 500 m offshore (DEIS, Appendix A, Table 4)? Don't the violations of water quality standards disappear at these locations?

Response: The answer to both of the questions posed in the last two sentences of this comment is "no". We disagree emphatically that your statement that "*...water quality impacts of the project are limited to comparisons with an "ambient" total suspended solids (TSS) concentration of 10 mg/l at a "control" site located about 700 m west of the proposed entry channel of the Ocean Pointe marina and 1700 m west of the Kaloi Gulch*". The discussion in the Draft EIS addresses water quality effects from a number of standpoints, and the graphics in the report depict anticipated concentrations along the entire affected shoreline for a range of possible effects.

With respect to whether the "*...appropriate estimate of 'ambient' TSS be the 3 or 4 mg/l TSS found at water quality sampling locations 500 m offshore*" (as you state, or the higher figure discussed in the Draft EIS analysis), we believe that the value used is a much more appropriate criterion for the comprehensive range of locations and conditions that we discussed. Even if you disagree with that, the Draft EIS contains more than enough information about concentrations at the 500 meter offshore distance that you discussed to allow readers to evaluate potential adverse effects.

Finally, your assertions neglect to recognize two other important facts. First, the "*numerous violations* [exceedances] *of water quality standards*" that you refer to have nothing to do with anything occurring with the Ocean Pointe development. The same exceedances were observable in the early 1990s, well before any development had occurred on the Ocean Pointe site and at a time when urban development of the 'Ewa plain was just beginning.

Second, discharges from the proposed Kaloi outlet will be very rare events (once-in ten years, on average). Consequently, it is inappropriate to compare water quality during and immediately following such an event with long-term averages and draw conclusions from that comparison. The State water quality standards recognize that elevated levels of suspended sediment and other

pollutants will inevitably occur as a result of periodic storm water discharges and have established frequency-based numerical standards (geometric mean, do not exceed more than 10% of the time, and do not exceed more than 2% of the time). The frequency of discharge from the proposed Kaloi outlet would be on the order of one day in +3,000 (once in ten years), and the resulting discharge plume would disappear within approximately a day. Because of this, the discharge does not have the potential to violate State water quality standards.

f. Won't all of the constituents in excess of water quality standards be found in the storm water discharged by the proposed project? Won't the proposed project therefore be adding to the water quality violations that already exist?

Response: Yes, all of the constituents noted above in item "f" are likely to be present in stormwater that is discharged from the proposed outlet. Every significant storm drainage outlet in the State carries similar or higher levels of suspended sediment when it reaches the ocean. Many have high nutrient levels as well. This is a natural occurrence, not one that is solely produced by human activity. In the case of the proposed Kaloi discharge, the anticipated frequency of discharge is very low, the large retention capacity that has been built into golf courses and retention basins throughout the watershed, and the other best management practices that are being incorporated in planning for the Ocean Pointe project minimize the amount of sediment that would reach state waters.

g. The water quality sampling site portrayed as the "control" site in the DEIS is not a control site in the normal scientific understanding of the concept, i.e., a site free from influence of the project or project-related activities. The discharge plume modeling described in Appendix B (also summarized in DEIS, Table 41) finds the water quality influence of a discharge plume can extend as far as 5,500 m to the west of the discharge location. Doesn't the area 5,500 m (3.4 miles) east of the "control" site include storm runoff discharges from Oneula Beach Park, Kaloi Gulch, Ewa Beach and the Ocean Pointe development? How is the "control" site therefore free from the influence of development-related activities? Isn't this influence evident in the water quality data in Appendix A, Tables 4,5, and 6, where water quality varies primarily with distance from shore at all monitoring sites, rather than between sites? Isn't this also consistent with the DEIS observation that "In general, the plume generated by storm runoff at the project site stays relatively close to the shoreline" (DEIS, p. 4-21)?

Response: There are a number of misconceptions and errors in the paragraph above. First, it appears from this comment that there is a misunderstanding regarding the terminology that was used in reporting the potential water quality effects. The "control" stations that were established for the long-term water quality monitoring program were intended to help establish water quality in areas away from the proposed marina channel and to help distinguish possible future changes in water quality that might result from construction of the Ocean Pointe Marina from changes that originated from other, external sources. Had these stations been established so far away that they were never influenced by water leaving the marina, it would have been difficult to know if they adequately characterized water in the areas closer to the marina entrance channel that were of particular concern.

Second, with respect to the question as to whether "*...the area 5,500 m (3.4 miles) east of the "control" site include(s) storm runoff discharges from Oneula Beach Park, Kaloi Gulch, Ewa Beach and the Ocean Pointe development?*", the answer is that the water area you mentioned receives water from only a few of these. There is virtually no runoff from Oneula Beach Park, the Kaloi channel does not exist (and the present area is part of the aforementioned Oneula Beach

Park), and the Ocean Pointe project does not presently have an ocean discharge. Consequently, the only point source discharges in the area are the small existing storm drains that serve the single-family residential subdivisions along the 'Ewa Beach shoreline. Those discharges are small, and, based on modeling done for another similar project, do not produce discharge plumes that would overlap that resulting from one of the rare discharge events at Kaloi.

Finally, concerning an explanation of the reasons "*...the 'control' site [is] therefore free from the influence of development-related activities?*", implies you believe that this is not the case. The question is asked whether the water quality data in Appendix A, Tables 4, 5, and 6, which shows that water quality varies primarily with distance from shore at all monitoring sites, does not prove that stormwater discharge from on-land development, is the cause of elevated concentrations of some constituents identified in the data tables. Finally, it is suggested that the modeling results summarized on page 4-21 of the Draft EIS also point to runoff from development activities as being a problem.

The line of reasoning in this set of questions appears to be based on the expectation that ongoing development, of the area in general and the Ocean Pointe project in particular, has caused deterioration in water quality. This is most decidedly not the case. Instead, the long-term monitoring data show just the opposite. The exceedances of State water quality standards existed long before development in this area was initiated and have not increased over time despite the tremendous increase in development that has occurred over the past dozen years. **There are currently no surface water discharge points along the shoreline area fronting the Ocean Pointe Project or Oneula Beach Park, which means that it is inconceivable that development of these areas are the sources of the elevated levels of some constituents.**

> *h. The ocean areas covered by the discharge plumes described in the DEIS, Table 4.1 and Appendix are substantial. The plume area, 1,400 m x 4,200m, in model run no. 2, for example, covers an offshore area of more than 2 square miles. Even for the 10-year storm "threshold" event (run no. 7), the discharge plume covers nearly one-half square mile. These areas are based on the DEIS assumed plume boundary of 10 mg/l TSS. If the plume boundary is defined by the actual ambient condition 3 - 4 mg/l TSS, where water quality standards are less likely to be violated, won't the plume areas be significantly even larger?*

Response: For reasons discussed above, we believe that 10 mg/l TSS is a far better level to use for the kind of discussion that was presented than the lower level that you suggested. The geometric means of ambient total suspended solids concentrations in the nearshore waters in the vicinity of the proposed Ocean Pointe Marina, determined from sampling between 1998 to 2004, range from 3.09 to 13.26 mg/l. Sixty water quality measurements taken along 5 transects in the area on March 16, 2004 showed TSS values ranging from 5 to 73 mg/l, with an average of 11 mg/l. A value of 10 mg/l was therefore selected as a reasonable indicator of a TSS plume generated during a 10-year storm event. Model results showed that plume TSS concentrations diminish to backgrounds levels within a day after the end of the discharge.

> *k. The DEIS attributes violations of water quality standards in the project area principally to "groundwater efflux at the shoreline off the Ocean Pointe site" and "not related to activities on the Ocean Pointe site." (DEIS, p. 4-17, 18). A groundwater influence might be found in the horizontal gradient for silica, but aren't the higher shore line concentrations of nitrate, ammonium, organic nitrogen, total nitrogen, turbidity, chlorophyll-a, and particularly total suspended solids, more indicative of surface discharges, e.g., storm runoff, that are related to development activities?*

Response: Absolutely not. As previously discussed, there are **no** surface water discharges from ongoing development activities in the area. Hence, they cannot possibly be a factor in the levels that are observed in the monitoring data. It is worth mentioning again that the monitoring data do not show a change in concentrations over time, something that strongly supports the belief that there is no effect.

> *k. Do the sediment depths in Table 4.1 include the likely water content (at least 90%) of the silt sediment? If not, shouldn't the indicated sediment depths be at least 10-times greater than indicated?*

Response: The sediment depths presented in the table do account for the water content in them. The "minimum of 90 percent water content" estimate cited is unrealistically high, particularly for a relatively high energy environment along this shoreline. The water content of marine sediments varies widely, ranging from 20 to 80% depending on grain size, packing geometry, sorting and depositional environments. Sediments deposited in sheltered environments typically exhibit greater water contents than deposits in more energetic environments. Analysis of over 4,000 sediment cores from the Chesapeake Bay showed water contents most typically in the range of 30 to 70%. Given the highly energetic environment that exists at the project site, a water content of 40% was used in the modeling analysis. In short, the calculated sediment depths are reasonable estimates of possible deposition given the prevailing oceanic conditions at the project site.

> *4.7 Natural Hazards*
> *a. Who is responsible for putting in and maintaining the warning signage along the public road and in Oneula Beach Park?*

Response: See Section 5.1 of the FEIS for a discussion of the content, placement, and maintenance of warning signs along the beach access road.

> *b. Who is legally responsible should an accident occur while someone is crossing the ford or in the channel during a flood event?*

Response: Please see our response to your comment under Section 2.2.1 Kaloi Gulch Drainageway, item o., on page 8 of this letter.

> *4.1 1 Terrestrial Flora*
> *a. Are any native kipukai, pohuehue or 'aki'aki plants within the existing drainageway? Are any of these plants within the proposed expansion? If so, what measures will be taken to protect them?*
> *b. Who is responsible for replanting of vegetation after completion of the project?*

Response: a. Flora present in the area that would be affected by the proposed drainageway is described in detail in the Draft EIS, Appendix C, Botanical Resources Assessment Study. The listing includes kipukai (*Heliotropium curassavicum* or salt heliotrope), pohuehue (*Ipomoea pes-caprae* or Morning Glory), and 'aki'aki plants (*Sporobolus virginicus* or seashore rushgrass). None of these are threatened or endangered. The botanical assessment report concludes that "there are no botanical reasons to impose any restrictions, conditions, or impediments to the proposed drainage improvements."

b. HASEKO will be responsible for replanting of vegetation. This will be started during the construction process and not after. This is to ensure against soil erosion during rainfall events.

Terrestrial Fauna and Avifauna
a. It is our understanding that the endangered Hawaiian Coot 'Alae ke'o ke'o and Hawaiian Stilt Ae'o are seen frequently in this area and especially the salt marsh area. Why isn't the presence of these endangered birds noted in the DEIS?
b. What measures will be taken to protect, their feeding grounds and habitat?

Response: The presence of these species in the area were not detected during the period of assessment as noted in Appendix D, Avian Assessment of the Proposed Kaloi Drainageway Improvements at Oneula Beach Park Project, of the Draft EIS. The Final EIS however, does take into consideration the potential presence of other threatened or endangered avifaunal species in Section 4.12, Terrestrial Fauna and Avifauna, Impacts and Mitigation Measures, and provides that:

The potential for negative impacts to the Black-necked Stilt are not anticipated. Wetland habitat suitable for this species and others such as the Hawaiian Coot, Hawaiian Stilt, and/or Kolea are located nearby on 22 acres of coastal marsh habitat which have been set aside by HASEKO. This area will remain undisturbed to protect any threatened or endangered species that rest, forage, and possibly nest in the marsh wetland.

4.13 Marine Biology
a. What data shows that sediment from construction and drainageway discharges will not negatively impact making it uneatable?
b. This section is silent on impacts during construction to limu and the Green Sea Turtle. Identify what precautions will be taken during construction to prevent negative impacts to Green Sea Turtles and coastal limu?

Response: a. & b. Construction will be limited to areas that are at an elevation of 4 feet above mean sea level or higher, and the work area will be protected to prevent material disturbed during the work from accidentally entering the ocean. Consequently, there is no mechanism through which construction could affect limu. There is no evidence that sea turtles come ashore in the area that would be disturbed during construction of the proposed drainage outlet. In the unlikely event that turtles should come ashore along this stretch of shoreline, the temporary construction fencing that will be erected around the work area during the few weeks it will take to excavate the channel will prevent them from being harmed or from laying eggs in an area that might be disturbed.

As discussed at length in the Draft EIS and in earlier items in this letter, stormwater discharges from the proposed drainage channel will be extremely rare. When they do occur their effect on water quality will be short-lived, and they will deposit only small amounts of sediment on the bottom. The turbidity that may be caused will be well within the limits already experienced on a frequent basis by the limu that grow along this shoreline. Hence, there is no reason to believe that limu growth would be adversely affected.

5.1 Traffic and Roadways
a. Why is the proposed drainageway not shown in Figure 5-1 Oneula Beach Park Master Plan?
b. Was the drainageway realigned to go through the park after the Master Plan was approved? If so, will an addendum to the existing master plan be required?

c. It has been understood that a bridge would cross over the drainageway? When was the change made to a ford and why?

Response: a. The Oneula Beach Park Master Plan was completed in 2001. The proposal to expand the drainageway through One`ula Beach Park was conceived after that. See Section 1.4.2 for background as to how this project came about.

b. The Special Management Area Use Permit authorizing the implementation of the One`ula Beach Park master plan will have to be amended before this project can be constructed.

c. A bridge will cross the drainageway along Kaileolea Road (approximately 500 feet mauka of the beach park). The park roadway was always proposed as a ford crossing.

5.2 Wastewater
Will sewer lines have to cross or go under the drainageway to connect to future sewer hookups for the comfort stations and multi-purpose center?

Response: Sewer lines will not be required to cross beneath the drainageway. The comfort station to the west of the drainageway will be served by a City planned infiltrator field. The comfort station and multi-purpose center will be served by connection to an existing 24-inch sewer line that is located along Papipi Road.

5.3 Potable Water
a. Who is responsible for relocating the existing water main that supplies potable water to the park?
c. During what phase of construction of the drainageway will the water main be relocated? How long will it take and will water be provided to the park?

Response: a. HASEKO will perform and pay for the relocation work.

c. The relocation will likely be done in the early phases, along with other underground utility work. Surface work (paving, grading and grassing) will be done in the subsequent phases. Work on the water line is anticipated to take about 3 weeks. Periods of disruption to water service will be limited to a few hours during non-park hours of operation or water service will be maintained through the use of temporary lines or with water trucks.

6.6. Traditional Cultural Practice
a. What are the impacts to limu and Green Sea turtles from runoff carrying chemicals from the golf course when the drainageway empties into the ocean?
b. The DEIS fails to identify where public access and public parking to all archaeological sites will be provided during and after completion of the drainageway. The FEIS must provide this information.

Response: a. No impacts to limu, the green sea turtle or other marine resources are expected from the golf course based on responsible and legal use of chemicals. The presence of the drainageway will not prevent HASEKO from providing access (including parking) to the archaeological preservation area that is located adjacent to it.

b. The Final EIS, Section 6.6, Traditional Cultural Practices, notes that roadway access to Oneula Beach Park will be maintained at all times during construction of the proposed improvements. Portions of the park through which the channel will pass will be cordoned off during some parts of the construction to allow heavy construction vehicles and equipment to work without endangering the public. Parking is expected to remain unaffected and no major park improvements are located within the affected area, e.g., they are lightly used.

7.2.2 Hawai'i State Plan (pg. 7-6)
a. Why would the original drainageway into the marina require the reconfiguration of the Honouliuli Wastewater Treatment Plant Sewer Outfall?

Response: a. The lowering of the sewer outfall to create an inverted siphon was initially needed to complete a portion of the marina plan that required a navigable channel in the area of the present proposed drainageway improvements project. Section 1.4 of the FEIS includes an expanded discussion of the factors that drive regional drainage decisions and background on past, current and proposed regional drainage plans, including the role that the sewer outfall plays in directing these plans.

b. What environmental and construction impacts for the original design were determined to be unacceptable, who made the determination and when?
c. Why would there be sewage spills if the drainageway only requires excavation and the location of existing pipes is known?
d. What is the connection between the sewage outfall and the drainageway that requires reconfiguration of the sewer main and the "premature expansion of the outfall?"

Response: b. Please refer above to our reference to the Draft EIS, starting on Page 3-3, which itemizes the concerns that were considered. The determination of the unacceptability of a lowered sewer outfall to create an inverted siphon was made by the Department of Environmental Services and HASEKO.

c. The alternative of lowering the 7 foot diameter sewer outfall does not only involve excavation. The outfall pipe would need to be cut and replaced with a new section of pipe in a new alignment. During this procedure a number of concerns, including potential for spills, were identified that introduce increased environmental risk. These are the concerns that are presented in the Draft EIS.

d. The reconfiguration of the sewer outfall would have resulted in the creation of a dip or bend which reduces the hydraulic efficiency of the outfall. This loss of efficiency could eventually require a sooner than anticipated replacement of the outfall to meet discharge flow requirements. This sooner than anticipated replacement would constitute the need for a premature expansion of the outfall.

Looking at the drainageway in isolation and not in relation to the larger total development/drainage picture does not give the reader an understanding of why this expanded drainageway is needed. This is another example of segmenting development and piecemealing within the coastal zone, which is prohibited by law.

Response: The FEIS expands the discussion of this proposed project in the context of development and drainage in the entire Kaloi Gulch drainage basin. Segmentation is not involved here because the proposed project is expected to be the ocean outlet for nearly all of the storm

water flows being discharged from the Kaloi drainage basin. However, your comment (and similar comments made by others) aptly indicated that a fuller discussion of the context and background of this project was needed. Please see chapters 1 and 3 of the FEIS for this purpose.

We appreciate this opportunity to respond. Should you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

Attachment

cc: HASEKO (Ewa), Inc.
Morihara Lau & Fong LLP

Attachment

Sampling Transect KA
Water Chemistry of Selected Constituents
Marine Research Consultants, 2005

Geometric means of water chemistry measurements collected from the Kalo'i Site off Ocean Pointe during surveys conducted between December 2003 and November 2004 (5 surveys). For calculation of geometric means, detection limits were used for sample data below the detectable limit. Abbreviations as follows: S=surface; D=deep; DFS=distance from shore.

NO.	DFS	PO4	NO3	NH4	Si	TOP	TON	TP	TN	TURB	SAL*	CHL a	TEMP**	pH***
	(m)	(µM)	(µM)	(µM)	(µM)	(µM)	(µM)	(µM)	(µM)	(ntu)	(ppt)	(µg/L)	(deg C)	
1S	0.1	0.07	0.12	0.23	7.63	0.43	11.38	0.51	11.79	1.9	34.34	0.92	25.7	8.2
2S	1	0.08	0.1	0.16	6.81	0.52	10.92	0.61	11.3	1.2	34.32	0.96	25.7	8.2
3S	5	0.06	0.15	0.2	6.62	0.47	12.75	0.53	13.27	1.75	34.33	1.01	25.7	8.19
3D	5	0.09	0.14	0.22	6.38	0.62	12.38 I	0.73	12.79	1.37	34.33	1.08	25.7	8.19
4S	10	0.06	0.21	0.19	6.66	0.43	11.7	0.49	12.26	1.25	34.33	1.07	25.7	8.19
4D	10	0.12	0.21	0.28	6.43	0.57	12.11	0.71	12.87	1.58	34.35	1.18	25.7	8.19
5S	50	0.1	0.09	0.21	6	0.37	9.26	0.48	9.66	1.09	34.41	0.69	25.7	8.17
5D	50	0.12	0.08	0.24	5.53	0.49	10.72	0.61	11.34	0.95	34.42	1.1	25.6	8.17
6S	100	0.06	0.1	0.09	2.85	0.24	8.41	0.31	8.67	0.42	34.53	0.65	26	8.15
6D	100	0.06	0.1	0.07	2.96	0.23	8.69	0.3	9.01	0.46	34.56	0.69	25.9	8.16
7S	500	0.06	0.11	0.08	2.83	0.19	7.08	0.26	7.34	0.25	34.53	0.54	26.2	8.16
7D	500	0.06	0.09	0.06	2.66	0.19	7.05	0.26	7.26	0.21	34.58	0.51	26.2	8.18

*Salinity shall not vary more than ten percent from natural or seasonal changes considering hydrologic input and oceanographic conditions.
** Shall vary no more that 1 °C from "ambient conditions"
*** Shall not deviate more than 0.5 units from a value of 8.1

January 31, 2005

Mr. Eric Crispin, Director
Department of Planning and Permitting
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

2005 FEB 4 PM 4 19

CITY & COUNTY OF HONOLULU

Dear Mr. Crispin:

This letter is intended to comment on the Draft EIS statement prepared by R.M Towill Corporation for Haseko Corporation regarding improvements to the Kaloi Gulch Drainage Way at Oneula Beach Park. After reviewing the draft the following concerns were developed.

1. It is noted on page 2-6 that the drainage channel may have little grass cover and "sand may be used as a supplement for ground cover". The concern for this remedy is that the sand may increase the turbidity of near shore waters (see enhancement 05- 01).

2. At the present time it is unclear if the community recreation center is a resource for the residents of the City of Ewa Beach or exclusively for the Ocean Pointe Community. clarification of this matter should be specified in the report (see enhancement 05- 02).

3. Pages 4- 7 through 4- 15 address surface and inland waters of the drainage way and use storm model data for 1996 to account for higher than normal rainfall (pp. 4-9-11 & 4- 13). This model conflicts with the water quality test data presented for site Ka (Appendix A pg. 4). The water quality testing at site Ka was performed in March, 2004 at low tide without the occurrence of a rainfall event during or prior to the survey (see attached tide information from the NOAA website). Although this data is indeed a necessary and valid component of the study it should not be used as the sole criterion for assessment of the potential for an adverse environmental condition introduced by the proposed site (see enhancement 05- 03). A reasonable determination on positive or negative impact to the environment can not be based on the result of a single test performed when non- point discharge from Pearl Harbor and other inland drainage sites is not included. Overlooking the combined effect of the all inland drainage to the ocean does not account for the existing condition created by non- point sources other than the proposed drainage.

   Secondly, the test was run at low tide when near shore concentrations may have been lowered since contaminants, sediments, etc. are pulled by tidal flow off shore. The ebb flow conditions can be considered a contributing factor to improved coastal water quality leading to a conclusion as stated in the report that there is no negative impact imposed by the proposed project. This is a significant assumption since the testing performed in the study does not account for daily tidal flows. Further investigation is warranted in future studies to confirm the finding that the project will not have a negative impact on coastal water quality.

4. Page 4- 26 states that "the focus is therefore on using Best Management Practices throughout the water shed to minimize the volume of runoff and total suspended solids and other chemicals that overflow into the proposed drainage." However, the study provides no record of testing for the other chemicals that could cause serious harm to the near shore environment (see enhancement 05- 04). Given the lack of baseline data there is insufficient information to support the conclusion made in the aforementioned assumption of study. The water quality study does not include assessment of concentrations of heavy metals and organic constituents and the accumulation of bacterium that could jeopardize human health or result in harm to near shore flora and fauna.

5. Section 4.13 Marine Biology does not provide an adequate assessment of the present condition of the near shore environment. A comprehensive study has been conducted for protected specie (turtles) found in the area. However, the study does not investigate near shore habitat for limu, coral and marine fauna. The study does provide a conclusion that "the proposed project does not have the potential to significantly affect this resource" (page 4- 42-4) but supporting evidence was found to be lacking in the report. The study should be refined to establish baseline data of limu found in the near shore environment by specie and density along with near- shore vertebrates and invertebrates (see enhancement 05-05).

6. In a previous response to the preliminary EIS two concerns raised remain outstanding, ground water use for the golf course and kupuna interviews.

   a. The response to the ground water concern did not clearly address the request to prohibit use of ground water for irrigation of the golf course and dust control during construction as indicated in the proposal. To minimize environmental impact to specie(s) of limu dependent upon ground water seepage through limestone along the shore line it is strongly recommended that use of ground water be prohibited for any use.

   b. It has been suggested that kupuna interviews be handled through a high school project. Although the experience could enhance the educational experience of a few students, proper protocol should be followed. Kupuna are well respected elders of their community and regarded by many local people as a state treasure. The development of a historical video of the Ewa Ahupua`a should be done by individuals well versed in protocol, conducting interviews and video editing so that a quality production is submitted to the public library for review by the public.

I would like to acknowledge Haseko's expression of commitment to preservation of existing habitat and their planned effort to ensure no adverse effect.

In closing, I would like to add that I believe the proposed drainage modifications will be an improvement to the existing system since it was not designed to compensate for the degree of development undertaken by Haseko and local other developers. Additionally, I view Haseko as a responsible developer for this area. However, I strongly urge all parties concerned to encourage a much more comprehensive and scientific study on the potential environmental impact this project will have on near shore habitat. At the present time the present report is lacking sufficient detail to be deemed a valid study. The Ewa Beach shoreline including the area within the proposed project is indeed a vital habitat for many specie of marine fauna and flora and serves as a spawning ground for many of fish. Unfortunately, human impact is degrading the overall health of coastal habitat and careful consideration and planning should be given to any project that introduces potential hazard to near shore sea life.

I am not at all proposing stopping the project, my only interest is to protect and preserve the marine life. I am sincere in my request that all parties involved to give serious consideration to future health of the marine environment along this coast line and work co-operatively towards that goal.

Sincerely,

Henry Chang - Wo

cc:

Sharene Saito- Tam, Haseko Corporation
June Harrington- Lum, Environmental Planning Office
Genevieve Salmonson, Director, Office of Environmental Quality Control

Enhancements to the Draft Environmental Statement for Kaloi Gulch drainage Way

(05- 01) Ground Cover for the Drainage Way

At present consideration is being given to using sand as ground cover for the drainage way which may contribute to a lowered water quality index for near shore habitat. Unless, a detailed engineering study is performed by an approved authority stating otherwise it is suggested that grass or other suitable green ground cover be used.

(05- 02) Community Recreation Center

At the present time it is unclear if the proposed community recreation center will be available for use by residents of Ewa Beach or exclusively by the Ocean Point Community. It is suggested that the language within the report be clarified on this issue. Further, if the facility is to be used exclusively by the Ocean Point Community the proposal should be presented to residents of Ewa Beach their elected officials for approval.

(05- 03) Revision Water Quality Test Condition Criteria

The draft EIS statement uses data from one test conducted March, 2004 for test site Ka to support the conclusion the drainage way does not impact the environment. The test was conducted during a non- rain event at low tide. The conditions of the test are favorable for a false conclusion since non- point run off from other sources is not included. Additionally, a ebb tide (low tide) condition will pull contaminants from the shore line resulting in lowered concentrations for constituents tested and dilution of the same by deeper off shore waters. The study also concluded that the current rate is much faster off shore allowing further dilution of constituents tested.

Therefore, it is suggested that the water chemistry protocol be amended to match the conditions as closely as possible of the Numerical Modeling of Storm Drain Discharge Plume Transport or conditions likely to generate the designed flow rate of the proposed

drainage way used in the report. To accomplish this tests should be conducted prior to, during
and following heavy rain fall at all tide ranges and include the combined effect of all existing
drainage and future planned drainage. The project is planning additional drainage, Papipi Road,
which is within a few hundred yards of the proposed drainage fro Kaloi Gulch.

(05- 04) Revision of Water Quality Test Contaminants

The water quality study does not include assessment of concentrations of heavy metals and organic constituents presently in the water known to harm near shore flora and fauna. Heavy rain events introduces the potential for chemicals and derivatives found in pesticides, herbicides, fungicides to be washed into the drainage way. Additionally, there is potential for leaching of biocides from bottom paint of watercraft and other sources of point and non- point source pollution originating from the proposed marina.

The proposed remedy is to modify the existing water quality study for this proposal enhanced to include all potential heavy metals and chemicals from these sources.

(05- 05) Enhancement to Existing Marine Biology Study

Section 4.13 Marine Biology does not provide an adequate assessment of the present condition of the near shore environment. The study does provide a conclusion that "the proposed project does not have the potential to significantly affect this resource" (page 4- 42-4). The study should be refined to establish baseline data of limu found in the near shore environment by specie and density along with near- shore vertebrates and invertebrates.

420 Waiakamilo Road
Suite 411
Honolulu Hawaii 96817-4941
Telephone 808 842 1133
Fax 808 842 1937
eMail rmtowill@hawaii.rr.com

R. M. TOWILL CORPORATION
SINCE 1930

Planning
Engineering
Environmental Services
Photogrammetry
Surveying
Construction Management

December 2, 2005

Mr. Henry Chang Wo
91-1091 Hanaloa Street
Ewa Beach, Hawaii 96706

Dear Mr. Chang Wo:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Draft Environmental Impact Statement

On behalf of HASEKO (Ewa), Inc., thank you for your letter dated January 31, 2005, to the Department of Planning and Permitting, describing your concerns. We acknowledge your past assistance with helping us to develop a project that is environmentally sensitive and responsible. We have prepared the following in response to your comments (referenced in *italics*):

1. *It is noted on page 2-6 that the drainage channel may have little grass cover and "sand may be used as a supplement for ground cover". The concern for this remedy is that the sand may increase the turbidity of near shore waters (see enhancement 05- 01).*

Response: Thank you for bringing this item to our attention. We agree that if sand is used alone increased turbidity could result when there are stormwater discharges, however rare, through the channel and outlet. Based on your comment we have provided in the Final EIS, Section 2.2.4, Landscaping, that if sand is used that it will be clean sand to help establish ground cover (including grass). This will be an important element in reducing the release of turbidity generating particulates in stormwater runoff. The establishment of ground cover will be done immediately following completion of grading work.

2. *At the present time it is unclear if the community recreation center is a resource for the residents of the City of Ewa Beach or exclusively for the Ocean Pointe Community. Clarification of this matter should be specified in the report (see enhancement 05- 02).*

Response: The community recreation center identified in the Oneula Beach Park Master Plan will be a City facility for the use and benefit of the entire Ewa Beach community.

3. *Pages 4- 7 through 4- 15 address surface and inland waters of the drainage way and use storm model data for 1996 to account for higher than normal rainfall (pp. 4-9-11 & 4-13). This model conflicts with the water quality test data presented for site Ka (Appendix A pg. 4). The water quality testing at site Ka was performed in March, 2004 at low tide without the occurrence of a rainfall event during or prior to the survey (see attached tide information from the NOAA website). Although this data is indeed a necessary and valid*

component of the study it should not be used as the sole criterion for assessment of the potential for an adverse environmental condition introduced by the proposed site (see enhancement 05-03). A reasonable determination on positive or negative impact to the environment can not be based on the result of a single test performed when non- point discharge from Pearl Harbor and other inland drainage sites is not included. Overlooking the combined effect of the all inland drainage to the ocean does not account for the existing condition created by non- point sources other than the proposed drainage.

Secondly, the test was run at low tide when near shore concentrations may have been lowered since contaminants, sediments, etc. are pulled by tidal flow off shore. The ebb flow conditions can be considered a contributing factor to improved coastal water quality leading to a conclusion as stated in the report that there is no negative impact imposed by the proposed project. This is a significant assumption since the testing performed in the study does not account for daily tidal flows. Further investigation is warranted in future studies to confirm the finding that the project will not have a negative impact on coastal water quality.

Response: We note your concerns regarding water quality and your statement that further investigation is required. We can inform you that the State Department of Health (DOH) required the long-term monitoring of coastal waters when it approved the permit for the Ocean Pointe Marina. This means that future monitoring (including use of transect "KA") will continue and that the results of the data collected will continue to be reviewed and evaluated by DOH. HASEKO has been coordinating this ongoing effort with the DOH to complete and fulfill its regulatory requirements.

We also note you did not reference the Draft EIS, Appendix B-Numerical Modeling of Storm Drainage Discharge Plume Transport, August 2004, as another source of important information that does describe the behavior and quality of stormwater if it should discharge through the ocean outlet. The modeling undertaken for the report accounts for tidal as well as weather conditions, and does provide a detailed analysis of the behavior of the discharge.

We add that discharges through the outlet are expected to occur infrequently only once every ten years. This can be considered to be a relatively rare event which itself would help to minimize the potential for negative impacts, if any, due to stormwater runoff from the outlet.

4. *Page 4- 26 states that "the focus is therefore on using Best Management Practices throughout the water shed to minimize the volume of runoff and total suspended solids and other chemicals that overflow into the proposed drainage." However, the study provides no record of testing for the other chemicals that could cause serious harm to the near shore environment (see enhancement 05- 04). Given the lack of baseline data there is insufficient information to support the conclusion made in the aforementioned assumption of study. The water quality study does not include assessment of concentrations of heavy metals and organic constituents and the accumulation of bacterium that could jeopardize human health or result in harm to near shore flora and fauna.*

Response: The proposed project is not a causal factor in the potential for *"concentrations of heavy metals and organic constituents and ...accumulation of bacterium"* in coastal waters that you describe. Instead, the proposed project is designed to address municipal stormwater drainage requirements to meet public health and safety concerns associated with needed control of storm water runoff. This is in accordance with Federal EPA, State Department of Health, and City and County of Honolulu standards.

Factors that make further testing of toxic and hazardous constituents in coastal waters questionable include:

(1) The proposed project will handle storm water discharges that are generated primarily by uses from upland residential developments that have been required by the City to provide extensive stormwater retention and detention capacity. Wastewater treatment, the most likely potential source of accumulated bacterium, is managed and handled through the Honouliuli Wastewater Treatment Plant, which is regulated by the EPA and State DOH to ensure proper control of pathogens; and

(2) Coastal waters surrounding the subject site are recognized by the DOH as a water quality limited segment subject to provisions of the TMDL program. While there are no requirements for further testing of toxic and hazardous constituents, HASEKO intends to continue working with Mr. David Penn, DOH's designated coordinator for this program to ensure that the proposed project will not, itself, be the source of a potential negative adverse impact to the environment.

5. *Section 4.13 Marine Biology does not provide an adequate assessment of the present condition of the near shore environment. A comprehensive study has been conducted for protected specie (turtles) found in the area. However, the study does not investigate near shore habitat for limu, coral and marine fauna. The study does provide a conclusion that "the proposed project does not have the potential to significantly affect this resource" (page 4- 42-4) but supporting evidence was found to be lacking in the report. The study should be refined to establish baseline data of limu found in the near shore environment by specie and density along with near- shore vertebrates and invertebrates (see enhancement 05-05).*

Response: The basis for determining that the proposed project is not anticipated to negatively impact the nearshore marine biology is based on the characteristics and frequency of discharge through the ocean outlet. According to the Draft EIS, Appendix B, Numerical Modeling of Storm Drain Discharge Plume Transport: (1) the nearshore coastal waters are characterized by a relatively energetic wave regime. The modeling of this wave regime was analyzed according to the length of time a discharge plume would persist in the nearshore environment. A worst case scenario would result in the dissipation of the plume after approximately 12 hours. This plume is expected to be efficiently mixed by wave action with contact of the sea floor only in the immediate vicinity of the discharge site. The majority of the plume would be near the surface layer which would result in little to no impact on benthic biota; and (2) the chances for a major discharge would occur at a frequency of only once every ten years (1 in 10 years). Therefore, potential for negative impacts would be rare or minimal.

We further note that a storm of sufficient magnitude resulting in stormwater discharges through the Kaloi Drainageway ocean outlet would also release runoff from numerous other discharge points along the Ewa coastline.

Finally, we wish to add that one of the most important aspects of the proposed project is that it is an improvement over the prior use of the marina. Whereas the original design discharged all stormwater runoff from the entire Kaloi watershed into the marina, and into the ocean, the design that is now proposed reduces the potential for pollutants entering State waters. In the present design approximately 40 percent of the 1,100-acre Ocean Pointe property will drain into the marina, the remaining 60 percent, as well as stormwater runoff originating in the much larger portion of the Kaloi basin that lies mauka of the Ocean Pointe project, will be accommodated by the Kaloi channel.

6. *In a previous response to the preliminary EIS two concerns raised remain outstanding, ground water use for the golf course and kupuna interviews.*
a. The response to the ground water concern did not clearly address the request to prohibit use of ground water for irrigation of the golf course and dust control during construction as indicated in the proposal. To minimize environmental impact to specie(s) of limu dependent upon ground water seepage through limestone along the shore line it is strongly recommended that use of ground water be prohibited for any use.

Response: Because treated wastewater is currently unavailable, we cannot comply with your request right now. However, we do intend to use R-1 treated wastewater for golf course irrigation. Groundwater may be needed to supplement the R-1 irrigation for the golf course if there is an insufficient R-1 supply.

We agree that the use of retention and detention basins in the Ocean Pointe and other upland golf courses will facilitate the return infiltration of water into the ground.

b. It has been suggested that kupuna interviews be handled through a high school project Although the experience could enhance the educational experience of a few students, proper protocol should be followed. Kupuna are well respected elders of their community and regarded by many local people as a state treasure. The development of a historical video of the Ewa Ahupua'a should be done by individuals well versed in protocol, conducting interviews and video editing so that a quality production is submitted to the public library for review by the public.

Response: HASEKO has conducted extensive cultural studies and kupuna interviews about the area that has become Ocean Pointe, and continues to consult with kupuna, such as you, about the project. While we agree that the knowledge and perspective of kupuna are invaluable and worthy of preservation, your request for a video production falls outside of the scope of this EIS. May we suggest you contact the State Foundation for Culture & The Arts Biennium Grants Program at 586-0302. The Grants Program is intended to "help support projects designed to preserve and further culture, the arts, history, and/or the humanities beneficial to Hawaii."

We appreciate the time you have taken to provide constructive comments to the Draft EIS and for your past support. If you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Henry Eng, FAICP, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Morihara Lau & Fong LLP

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU
801 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96813 · AREA CODE (808) 529-3111
http://www.honolulupd.org
www.honolulu.gov

MUFI HANNEMANN
MAYOR

BOISSE P. CORREA
CHIEF

GLEN R. KAJIYAMA
PAUL D. PUTZULU
DEPUTY CHIEFS

OUR REFERENCE CS-KP

January 25, 2005

TO: HENRY ENG, FAICP, ACTING DIRECTOR
DEPARTMENT OF PLANNING AND PERMITTING

FROM: BOISSE P. CORREA, CHIEF OF POLICE
HONOLULU POLICE DEPARTMENT

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT, KALOI GULCH DRAINAGEWAY IMPROVEMENTS AT ONEULA BEACH PARK, TAX MAP KEYS: (1) 9-1-012: PORTION OF PARCEL 025

Thank you for the opportunity to review and comment on the subject project.

This project should have no significant impact on police facilities or services.

If there are any questions, please call Major Michael Tamashiro of District 8 at 692-4253 or Ms. Carol Sodetani of the Support Services Bureau at 529-3658.

BOISSE P. CORREA
Chief of Police

By
KARL GODSEY
Assistant Chief of Police
Support Services Bureau

Serving and Protecting with Aloha

420 Waiakamilo Road
Suite 411
Honolulu Hawaii 96817-4941
Telephone 808 842 1133
Fax 808 842 1937
eMail rmtowill@hawaii.rr.com

R. M. TOWILL CORPORATION
SINCE 1930

Planning
Engineering
Environmental Services
Photogrammetry
Surveying
Construction Management

December 2, 2005

Mr. Boisse P. Correa
Chief of Police
Honolulu Police Department
City and County of Honolulu
801 South Beretania Street
Honolulu, Hawaii 96813

Dear Mr. Correa:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Draft Environmental Impact Statement

On behalf of HASEKO (Ewa), Inc., thank you for your letter dated January 25, 2005, to the Department of Planning and Permitting, stating that the Honolulu Police Department does not anticipate any significant impact on police facilities or services as a result of the subject project.

We appreciate your comments. Should you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Henry Eng, FAICP, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Morihara Lau & Fong LLP

[redacted]
LINDA LINGLE
GOVERNOR

PATRICIA HAMAMOTO
SUPERINTENDENT

STATE OF HAWAI'I
DEPARTMENT OF EDUCATION
P.O. BOX 2360
HONOLULU, HAWAII 96804

OFFICE OF THE SUPERINTENDENT

January 20, 2005

Mr. Henry Eng, Acting Director
Department of Planning and Permitting
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, Hawaii 96813

Dear Mr. Eng:

SUBJECT: Draft Environmental Impact Statement
Kaloi Gulch Drainage Way Improvements to
Oneula Beach Park, Ewa, TMK: 9-1-12: por. 25

The Department of Education has no comment concerning the Draft Environmental Impact Statement for improvements to Oneula Beach Park in Ewa.

If you have any questions, please call Rae Loui, Assistant Superintendent of the Office of Business Services, at 586-3444 or Heidi Meeker of the Facilities and Support Services Branch at 733-4862.

Very truly yours,

Patricia Hamamoto
Superintendent

PH:jmb

c: Rae Loui, OBS

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

420 Waiakamilo Road
Suite 411
Honolulu Hawaii 96817-4941
Telephone 808 842 1133
Fax 808 842 1937
eMail rmtowill@hawaii.rr.com

R. M. TOWILL CORPORATION
SINCE 1930

Planning
Engineering
Environmental Services
Photogrammetry
Surveying
Construction Management

December 2, 2005

Ms. Patricia Hamamoto, Superintendent
State of Hawaii
Department of Education (DOE)
P.O. Box 2360
Honolulu, Hawaii 96804

Dear Ms. Hamamoto:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Draft Environmental Impact Statement

On behalf of HASEKO (Ewa), Inc., thank you for your letter dated January 20, 2005, to the Department of Planning and Permitting stating that the DOE has no comment concerning the proposed project.

We appreciate your comments. Should you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Henry Eng, FAICP, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Morihara Lau & Fong LLP

LINDA LINGLE
GOVERNOR

RUSS K. SAITO
COMPTROLLER

KATHERINE H. THOMASON
DEPUTY COMPTROLLER

(P)1018.5

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P.O. BOX 119, HONOLULU, HAWAII 96810

JAN 19 2005

Mr. Henry Eng, Acting Director
Department of Planning and Permitting
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, Hawaii 96813

Dear Mr. Eng:

Subject: Kaloi Gulch Drainway Improvements at Oneula Beach Park
Draft Environmental Impact Statement
Oneula Beach Park, Ewa, Oahu
TMK: 9-1-12: por. 2 and 2

Thank you for the opportunity to review the information regarding the subject project. This project does not impact any of the Department of Accounting and General Services' projects or existing facilities. Therefore, we have no comments to offer.

If there are any questions regarding the above, please have your staff call Mr. David DePonte of the Planning Branch at 586-0492.

Sincerely,

ERNEST Y. W. LAU
Public Works Administrator

DD:jp

420 Waiakamilo Road
Suite 411
Honolulu Hawaii 96817-4950
Telephone 808 842 1133
Fax 808 842 1937
eMail rmtowill@hawaii.rr.com

R. M. TOWILL CORPORATION
SINCE 1930

Planning
Engineering
Environmental Services
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Construction Management

December 2, 2005

Mr. Ernest Y.W. Lau
Public Works Administrator
Department of Accounting and General Services
P.O. Box 119
Honolulu, Hawaii 96810

Dear Mr. Lau:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Draft Environmental Impact Statement

On behalf of HASEKO (Ewa), Inc., thank you for your letter dated January 19, 2005, to the Department of Planning and Permitting, stating that the proposed project does not impact any of the DAGS projects or existing facilities.

We appreciate your comments. Should you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Henry Eng, FAICP, Department of Planning and Permitting
Haseko (Ewa), Inc.
Morihara Lau & Fong LLP

LINDA LINGLE
GOVERNOR OF HAWAII

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

YVONNE Y. IZU
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
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FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

2005 JAN 21 AM 10 52

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

January 18, 2005
2004 ED- 12HASEKO.RCM

LD-NAV

Honorable Eric G Crispin, AIA
Director of Planning and Permitting
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Crispin:

SUBJECT: Draft Environmental Impact Statement
File No.: 2004-ED-12(ask)
Proposed: Oneula Beach Park
Authority: C&CoH Department of Planning and Permitting
TMK: (1) 9-1-012 portion of 002 and 025

Thank you for the opportunity to review and comment on the subject matter

A copy of the document pertaining to the subject matter was transmitted or made available to the following Department of Land and Natural Resources' Divisions for their review and comment:

- Division of Aquatic Resources
- Division of Forestry and Wildlife
- Division of State Parks
- Engineering Division
- Commission on Water Resource Management
- Office of Conservation and Coastal Lands
- Land-Oahu District Land Office

Enclosed please find a copy of the Division of Aquatic Resources and Engineering Division comments.

Based on the attached responses, the Department of Land and Natural Resources has no other comment to offer on the subject matter.

If you have any questions, please contact Nicholas A. Vaccaro of the Land Division Support Services Branch at 587-0384.

Very truly yours,

DIERDRE S. MAMIYA
Administrator

C: ODLO

LINDA LINGLE
GOVERNOR OF HAWAII

2005 JAN 21 AM 10 52

RECEIVED
LAND DIVISION
2004 DEC 20 P 3:31

2005 JAN 10 P 3:5

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DAN DAVIDSON
DEPUTY DIRECTOR - LAND

YVONNE Y. IZU
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
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BUREAU OF CONVEYANCES
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KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

December 20,2004
KALOIGULCHC&CoHDEIS.CMT

LD/NAV
Suspense Date: 1/14/05

MEMORANDUM:

TO:
XXX Division of Aquatic Resources
*XXX Division of Forestry & Wildlife
*XXX Division of State Parks
XXX Engineering Division
*XXX Commission on Water Resource Management
XXX Office of Conservation and Coastal Lands
*XXX Oahu District Land Office

FROM: Dierdre S. Mamiya, Administrator
Land Division

RECEIVED
04 DEC 21 AM 10:42

SUBJECT: Draft Environmental Impact Statement (DEIS)
Kaloi Gulch Drainageway Improvements at Oneula Beach Park
District of Ewa, Oahu, Hawaii

Please review the DEIS pertaining to the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date.

***Note: One copy of the DEIS is available for your review in the Land Division Office, Room 220.**

Should you have any questions, please contact Nicholas A. Vaccaro at 587-0384.

If this office does not receive your comments by the suspense date, we will assume there are no comments.

(X) We have no comments. ( ) Comments attached.

Date: 1-6-05

Signed:

Name: LENORE Y. NAKAMA

LINDA LINGLE
GOVERNOR OF HAWAII

DIVISION OF AQUATIC RESOURCES
Suspense Date:
Draft Reply
Reply Direct
Comments
Information
Comm Ack & File
Signature
Recommend
Date
OHE-913

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

2005 JAN -5 A 10:12

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DAN DAVIDSON
DEPUTY DIRECTOR - LAND

YVONNE Y. IZU
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
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COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
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HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
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December 20,2004 LD/NAV
KALOIGULCHC&CoHDEIS.CMT Suspense Date: 1/14/05

MEMORANDUM:

RECEIVED
DEC 21 2004
AQUATIC RESOURCES

TO: XXX Division of Aquatic Resources
*XXX Division of Forestry & Wildlife
*XXX Division of State Parks
XXX Engineering Division
*XXX Commission on Water Resource Management
XXX Office of Conservation and Coastal Lands
*XXX Oahu District Land Office

FROM: Dierdre S. Mamiya, Administrator
Land Division

SUBJECT: Draft Environmental Impact Statement (DEIS)
Kaloi Gulch Drainageway Improvements at Oneula Beach Park
District of Ewa, Oahu, Hawaii

Please review the DEIS pertaining to the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date.

***Note: One copy of the DEIS is available for your review in the Land Division Office, Room 220.**

Should you have any questions, please contact Nicholas A. Vaccaro at 587-0384.

If this office does not receive your comments by the suspense date, we will assume there are no comments.

( ) We have no comments.

(X) Comments attached.

Signed: Richard Oishi

Name: Francis Oishi

Date: 1/5/2005

SUSPENSE DATE: Friday January 14, 2005

STATE OF HAWAII
Department of Land and Natural Resources
Division of Aquatic Resources

MEMORANDUM

To: Francis Oishi, Acting Administrator
From: Richard Sixberry, Aquatic Biologist RS
Subject: Comments on Draft Environmental Impact Statement

Comments Requested By: Dierdre Mamiya - Land Division

Date of Request: 12/20/04 Date Received: 12/21/04

Summary of Project

Title: Kaloi Gulch Drainageway Improvements

Proj. By: Haseko, Inc.

Location: Oneula Beach Park, Ewa Beach, Oahu

Brief Description:

The applicant proposes to improve the existing Kaloi Gulch drainageway through the Oneula Beach Park in Ewa Beach Oahu.

The improvements will consist of smoothening out a portion of the park to accommodate runoff overflow from the watershed. The improved drainageway will have gently sloping banks on each side. A ford will be used along the park access road to cross the drainageway. Following construction, the drainage channel will be returned to a normal condition and grassed.

Comments:

The project site is situated in an area of Ewa Beach which has previously been graded and disturbed. Therefore, significant impacts adverse to aquatic resource values are not expected from the activities proposed.

However, we suggest that construction activities be restricted to periods of minimal rainfall and areas denuded of vegetation which could be susceptible to erosion are appropriately stabilized. Further, precautionary measures should include preventing construction materials, petroleum products, debris and eroded soil from entering coastal waters. We note that the applicant plans to excavate and remove about 20,000 cubic yards of soil and sandy material. The disposition of these spoils has not been described in the DEIS.

Richard Sixberry
Aquatic Biologist

LINDA LINGLE
GOVERNOR OF HAWAII

RECEIVED
LAND DIVISION
2005 JAN -3 P 3:59

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DAN DAVIDSON
DEPUTY DIRECTOR - LAND

YVONNE Y. IZU
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
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COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
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KAHOOLAWE ISLAND RESERVE COMMISSION
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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

December 20,2004 LD/NAV
KALOIGULCHC&CoHDEIS.CMT Suspense Date: 1/14/05

MEMORANDUM:

TO: XXX Division of Aquatic Resources
*XXX Division of Forestry & Wildlife
*XXX Division of State Parks
XXX Engineering Division
*XXX Commission on Water Resource Management
XXX Office of Conservation and Coastal Lands
*XXX Oahu District Land Office

'04 DEC 21 A10:01 ENGINEERING

FROM: Dierdre S. Mamiya, Administrator
Land Division

SUBJECT: Draft Environmental Impact Statement (DEIS)
Kaloi Gulch Drainageway Improvements at Oneula Beach Park
District of Ewa, Oahu, Hawaii

Please review the DEIS pertaining to the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date.

***Note: One copy of the DEIS is available for your review in the Land Division Office, Room 220.**

Should you have any questions, please contact Nicholas A. Vaccaro at 587-0384.

If this office does not receive your comments by the suspense date, we will assume there are no comments.

( ) We have no comments.

(X) Comments attached.

Signed: Andrew M. Monden

Name: Andrew M. Monden

Date: 12/30/04

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LA/NAV

Ref.: KALOIGULCHC&CODEIS.CMT

COMMENTS

0 **We confirm that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Flood Zones A and AE.**

( ) Please take note that according to the Flood Insurance Rate Map (FIRM), the project site is located in Zone ___.

( ) Please note that the correct Flood Zone Designation for the project site according to the Flood Insurance Rate Map (FIRM) is ___.

(X) **Please note that the project must comply with the rules and regulations of the National Flood Insurance Program (NFIP) presented in Title 44 of the Code of Federal Regulations (44CFR), whenever development within a Special Flood Hazard Area is undertaken. If there are any questions, please contact the State NFIP Coordinator, Ms. Carol Tyau-Beam, of the Department of Land and Natural Resources, Engineering Division at (808) 587-0267.**

Please be advised that 44CFR indicates the minimum standards set forth by the NFIP. Your Community's local flood ordinance may prove to be more restrictive and thus take precedence over the minimum NFIP standards. If there are questions regarding the local flood ordinances, please contact the applicable County NFIP Coordinators below:

(X) Mr. Robert Sumimoto at (808) 523-4254 or Mr. Mario Siu Li at (808) 523-4247 of the City and County of Honolulu, Department of Planning and Permitting.

( ) Mr. Kelly Gomes at (808) 961-8327 (Hilo) or Mr. Kiran Emler at (808) 327-3530 (Kona) of the County of Hawaii, Department of Public Works.

( ) Mr. Francis Cerizo at (808) 270-7771 of the County of Maui, Department of Planning.

( ) Mr. Mario Antonio at (808) 241-6620 of the County of Kauai, Department of Public Works.

( ) The applicant should include project water demands and infrastructure required to meet water demands. Please note that the implementation of any State-sponsored projects requiring water service from the Honolulu Board of Water Supply system must first obtain water allocation credits from the Engineering Division before it can receive a building permit and/or water meter.

( ) The applicant should provide the water demands and calculations to the Engineering Division so it can be included in the State Water Projects Plan Update.

(X) **Additional Comments: Please correct information on page 4-27 Item 4.7.1 Flood Zones of the Draft Environmental Impact Statement (DEIS). The correct Panel Number is 15003C0320F (Map Revised September 30, 2004). Also, please update FIRM Map on page 4-28 of the DEIS.**

( ) Other: _____

Should you have any questions, please call Mr. Andrew Monden of the Planning Branch at 587-0229.

Signed: Andrew M. Monden
for ERIC T. HIRANO, CHIEF ENGINEER

Date: 12/30/04

LINDA LINGLE
GOVERNOR OF HAWAII

RECEIVED
LAND DIVISION
2004 DEC 23 A 10:38

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DAN DAVIDSON
DEPUTY DIRECTOR - LAND

YVONNE Y. IZU
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

December 20,2004
KALOIGULCHC&CoHDEIS.CMT

LD/NAV
Suspense Date: 1/14/05

MEMORANDUM:

TO: XXX Division of Aquatic Resources
*XXX Division of Forestry & Wildlife
*XXX Division of State Parks
XXX Engineering Division
*XXX Commission on Water Resource Management
XXX Office of Conservation and Coastal Lands
*XXX Oahu District Land Office

FROM: Dierdre S. Mamiya, Administrator
Land Division

SUBJECT: Draft Environmental Impact Statement (DEIS)
Kaloi Gulch Drainageway Improvements at Oneula Beach Park
District of Ewa, Oahu, Hawaii

Please review the DEIS pertaining to the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date.

***Note: One copy of the DEIS is available for your review in the Land Division Office, Room 220.**

Should you have any questions, please contact Nicholas A. Vaccaro at 587-0384.

If this office does not receive your comments by the suspense date, we will assume there are no comments.

(X) We have no comments.

Date: 12/22/04

( ) Comments attached.

Signed: Cecil Santos

Name: CECIL SANTOS
LH

#1.14/7.

LINDA LINGLE
GOVERNOR OF HAWAII

RECEIVED
LAND DIVISION
2004 DEC 29 P 3:27

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DAN DAVIDSON
DEPUTY DIRECTOR - LAND

YVONNE Y. IZU
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

December 20,2004
KALOIGULCHC&CoHDEIS.CMT

LD/NAV
Suspense Date: 1/14/05

MEMORANDUM:

TO: XXX Division of Aquatic Resources
*XXX Division of Forestry & Wildlife
*XXX Division of State Parks
XXX Engineering Division
*XXX Commission on Water Resource Management
XXX Office of Conservation and Coastal Lands
*XXX Oahu District Land Office

FROM: Dierdre S. Mamiya, Administrator
Land Division

SUBJECT: Draft Environmental Impact Statement (DEIS)
Kaloi Gulch Drainageway Improvements at Oneula Beach Park
District of Ewa, Oahu, Hawaii

Please review the DEIS pertaining to the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date.

***Note: One copy of the DEIS is available for your review in the Land Division Office, Room 220.**

Should you have any questions, please contact Nicholas A. Vaccaro at 587-0384.

If this office does not receive your comments by the suspense date, we will assume there are no comments.

(X) We have no comments.

Date: DEC 21 2004

( ) Comments attached.

Signed: Nicholas Vaccaro

Name: for ~~PAUL J. CONRY, ADMINISTRATOR~~
DIVISION OF FORESTRY AND WILDLIFE

420 Waiakamilo Road
Suite 411
Honolulu Hawaii 96817-4950
Telephone 808 842 1133
Fax 808 842 1937
eMail rmtowill@hawaii.rr.com

R. M. TOWILL CORPORATION
SINCE 1930

Planning
Engineering
Environmental Services
Photogrammetry
Surveying
Construction Management

December 2, 2005

Mr. Peter Young, Chairperson
State Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Young:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Draft Environmental Impact Statement

On behalf of HASEKO (Ewa), Inc., thank you for your letter dated January 18, 2005, to the Department of Planning and Permitting, providing comments from your Division of Aquatic Resources and Engineering Division. We have prepared the following in response to your comments (referenced in *italics*):

> *Division of Aquatic Resources*
> *The project site is situated in an area of Ewa Beach which has previously been graded and disturbed. Therefore, significant impacts adverse to aquatic resource values are not expected from the activities proposed.*

Response: We concur with the Division of Aquatic Resources assessment of the proposed project. The studies completed for the Draft EIS demonstrate that significant adverse impacts to aquatic resources as a result of the proposed project are not anticipated.

> *However, we suggest that construction activities be restricted to periods of minimal rainfall and areas denuded of vegetation which could be susceptible to erosion are appropriately stabilized. Further, precautionary measures should include preventing construction materials, petroleum products, debris and eroded soil from entering coastal waters. We note that the applicant plans to excavate and remove about 20,000 cubic yards of soil and sandy material. The disposition of these spoils has not been described in the DEIS.*

Response: We share your concerns and note the following:

- Whenever possible construction will be limited to periods of minimal rainfall since operation of machinery during heavy rainfall conditions is generally not practicable.
- Areas of removed vegetation shall be property stabilized to reduce or eliminate the possibility of erosion.

- A National Pollutant Discharge Elimination System, Construction Stormwater Permit Application is required by the State Department of Health. The permit application will include a Best Management Practices (BMPs) Plan to address the potential for contamination of coastal waters from on-site stormwater contact with construction materials, petroleum products, debris, and eroded soil associated with the project. HASEKO or its designated contractor will implement the approved BMPs Plan to ensure against uncontrolled stormwater discharges from the project site.
- Section 2.2.1 of the FEIS has clarified that the amount of soil and sandy material that will be excavated is approximately 7,110 cubic yards. All will be used to meet fill requirements to construct the embankments of the channel. The storage and reuse of this material will be in accordance with regulations to ensure protection of coastal water quality. Materials that cannot be reused will be properly disposed of at a City and County of Honolulu facility that accepts construction and demolition debris waste.

> *Engineering Division*
> *We confirm that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Flood Zones A and AE.*
>
> *Please note that the project must comply with the rules and regulations of the National Flood Insurance Program (NFIP) presented in Title 44 of the Code of Federal Regulations (44CFR), whenever development within a Special Flood Hazard Area is undertaken.*
>
> *Please be advised that 44CFR indicates the minimum standards set forth by the NFIP. Your Community's local flood ordinance may prove to be more restrictive and thus take precedence over the minimum NFIP standards.*
>
> *Additional Comments: Please correct information on page 4-27 Item 4.7.1 Flood Zones of the Draft Environmental Impact Statement (DEIS). The correct Panel Number is 15003C0320F (Map Revised September 30,2004). Also, please update FIRM Map on page 4-28 of the DEIS.*

Response: We acknowledge that the proposed project will comply with the requirements of Title 44 of the Code of Federal Regulations, National Flood Insurance Program. The proposed project will also comply with the local flood ordinances of the City and County of Honolulu through a review of the project by the Department of Planning and Permitting which has approved the Ocean Pointe Drainage Master Plan.

We also acknowledge the Federal Emergency Management Agency has updated the FIRM map you reference and offer the following based on our contact with FEMA on March 25, 2005: (1) FIRM Map Panel Number 15003C0320F is not yet available from FEMA for download; and, (2) Flood elevations in the area of the project site have not changed from the prior FIRM. No new flood studies have been undertaken for the area and the only change to the FEMA FIRM involved a revision to the base graphic layer which does not materially alter the information that is provided in the Draft EIS. Because of this FIRM Map Panel Number 15003C0320 E, dated November 20, 2000 will be used for the Final EIS with the notation that this map has been revised to FIRM Map Panel Number 15003C0320 F.

We appreciate this opportunity to respond to your comments. Should you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Henry Eng, FAICP, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Morihara Lau & Fong LLP

BOARD OF WATER SUPPLY

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

MUFI HANNEMANN, Mayor

EDDIE FLORES, JR., Chairman
CHARLES A. STED, Vice-Chairman
HERBERT S. K. KAOPUA, SR.
DAROLYN H. LENDIO

RODNEY K. HARAGA, Ex-Officio
LARRY J. LEOPARDI, Ex-Officio

CLIFFORD S. JAMILE
Manager and Chief Engineer

DONNA FAY K. KIYOSAKI
Deputy Manager and Chief Engineer

January 13, 2005

TO: HENRY ENG, FAICP, ACTING DIRECTOR
DEPARTMENT OF PLANNING AND PERMITTING

FROM: CLIFFORD S. JAMILE, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

ATTENTION: ARDIS SHAW-KIM

SUBJECT: Your Letter on the Draft Environmental Impact Statement for Kaloi Gulch Drainageway Improvements, 2004/ED-12(ASK)

Our comments of July 2, 2004, which are included in the Draft Environmental Assessment, are still applicable.

If you have any questions, please contact Joseph Kaakua at 748-5442.

Water for Life . . . Ka Wai Ola

420 Waiakamilo Road
Suite 411
Honolulu Hawaii 96817-4941
Telephone 808 842 1133
Fax 808 842 1937
eMail rmtowill@hawaii.rr.com

R. M. TOWILL CORPORATION
SINCE 1930

Planning
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Environmental Services
Photogrammetry
Surveying
Construction Management

December 2, 2005

Ms. Donna Kiyosaki
Deputy Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843

Dear Ms. Kiyosaki:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Draft Environmental Impact Statement

On behalf of HASEKO (Ewa), Inc., thank you for your letter dated January 13, 2005, to the Department of Planning and Permitting stating that your prior comments remain applicable to the subject project.

We acknowledge that we intend to comply with the requirements of the Board of Water Supply and will submit a set of the construction drawings for review.

Should you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Henry Eng, FAICP, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Morihara Lau & Fong LLP

FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU
3375 Koapaka Street, Suite H-425
Honolulu, Hawaii 96819-1869
Phone: (808) 831-7761 Fax: (808) 831-7750 Internet: www.honolulufire.org

MUFI HANNEMANN
MAYOR

ATTILIO K. LEONARDI
FIRE CHIEF

JOHN CLARK
DEPUTY FIRE CHIEF

January 12, 2005

TO: HENRY ENG, FAICP, ACTING DIRECTOR
DEPARTMENT OF PLANNING AND PERMITTING

FROM: JOHN CLARK, ACTING FIRE CHIEF

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT
CHAPTER 343, HAWAII REVISED STATUTES
PROJECT NAME: KALOI GULCH DRAINAGEWAY IMPROVEMENTS AT ONEULA BEACH PARK
APPLICANT: HASEKO (EWA), INC.
AGENT: R.M. TOWILL CORPORATION
LANDOWNER: CITY AND COUNTY OF HONOLULU
LOCATION: ONEULA BEACH PARK
EWA, OAHU, HAWAII
TAX MAP KEY: 9-1-012: PORTIONS OF 002 AND 025

We received a memorandum from Eric G. Crispin, former Director of the Department of Planning and Permitting, requesting our review and comments on the above-mentioned project.

The Honolulu Fire Department requires that the following be complied with for the duration of the project:

1. Maintain fire apparatus access throughout the construction site.
2. Notify the Fire Communication Center at 523-4411 regarding any interruption of the existing fire hydrant system.

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

JOHN CLARK
Acting Fire Chief

JC/SK:bh

420 Waiakamilo Road
Suite 411
Honolulu Hawaii 96817-4941
Telephone 808 842 1133
Fax 808 842 1937
eMail rmtowill@hawaii.rr.com

R. M. TOWILL CORPORATION
SINCE 1930

Planning
Engineering
Environmental Services
Photogrammetry
Surveying
Construction Management

December 2, 2005

Mr. Ken Silva
Fire Chief
Honolulu Fire Department
City and County of Honolulu
3375 Kopaka Street, Suite H425
Honolulu, Hawaii 96819-1869

Dear Mr. Silva:

Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Draft Environmental Impact Statement

On behalf of HASEKO (Ewa), Inc., thank you for your letter dated January 12, 2005, to the Department of Planning and Permitting, stating that the Honolulu Fire Department requests compliance with the following for the duration of the project:

(1) Maintain fire apparatus access throughout the construction site; and

(2) Notify the Fire Communications Center at 523-4411 regarding any interruption of the existing fire hydrant system.

We acknowledge the importance of complying with requirements for fire safety and have included these items in the Final EIS, Section 5.6, Police and Fire Protection.

Should you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Henry Eng, FAICP, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Morihara Lau & Fong LLP

DEPARTMENT OF ENVIRONMENTAL SERVICES
CITY AND COUNTY OF HONOLULU
1000 ULUOHIA STREET, SUITE 308, KAPOLEI, HI 96707
TELEPHONE: (808) 692-5156 FAX: (808) 692-5159 WEBSITE: http://www.co.honolulu.hi.gov

MUFI HANNEMANN
Mayor

ERIC S. TAKAMURA, Ph.D., P.E.
Director

KENNETH A. SHIMIZU
Deputy Director

PRO 05-050

November 30, 2005

VIA FAX: 527-6743
MEMORANDUM

TO: HENRY ENG, FAICP, DIRECTOR
DEPARTMENT OF PLANNING AND PERMITTING

FROM: Dr. ERIC S. TAKAMURA, P.E., DIRECTOR
DEPARTMENT OF ENVIRONMENTAL SERVICES

SUBJ: KALOI GULCH DRAINAGEWAY IMPROVEMENTS AT ONUELA BEACH PARK, DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)

This memo is to confirm our previous memos on the subject drainageway, dated July 6, 2000, and February 7, 2005. Copies of these memos are attached for your reference. To clarify our February 7, 2005, comments, we do object to the alternative proposed in the draft EIS. The issues raised in our comments on this alternative need to be resolved.

From our July 6, 2000 memo, please note that we do not object to the concept of directing the drainage flow over our existing outfall and into the marina, whether this requires the outfall to be lowered or not. Our approval of this alternative would be contingent on satisfactory answers to our concerns during the preliminary engineering and engineering design phases.

Should you have any questions, please call me at 692-5159.

attachments

420 Waiakamilo Road
Suite 411
Honolulu Hawaii 96817-4950
Telephone 808 842 1133
Fax 808 842 1937
eMail rmtowill@hawaii.rr.com

R. M. TOWILL CORPORATION
SINCE 1930

Planning
Engineering
Environmental Services
Photogrammetry
Surveying
Construction Management

December 15, 2005

Dr. Eric S. Takamura, P.E., Director
Department of Environmental Services
City and County of Honolulu
1000 Uluohia Street, Suite 308
Kapolei, Hawaii 96707

Dear Dr. Takamura:

Memorandum of November 30, 2005
Kaloi Gulch Drainageway Improvements at Oneula Beach Park
Draft Environmental Impact Statement

On behalf of HASEKO (Ewa), Inc., we acknowledge your memorandum to the Department of Planning and Permitting, stating your objection to the proposed alternative and your comment that the issues raised by your Department must be resolved. Please note that we have responded to the February 7, 2005 letter concerning the Draft Environmental Impact Statement (EIS) in a separate letter that is included in the Final EIS.

As noted in Chapter 3 of the Final EIS, directing regional drainage into the marina by lowering the sewer outfall pipe is an alternative to the proposal of discharging storm waters through an ocean outlet located within One`ula Beach Park. We are cognizant that there are issues involved with either alternative, as well as with other alternatives identified in the FEIS. Given the assessment of a number of different factors, not the least of which is the time it would take to permit and construct any of the alternative outlets and the impact on the stakeholders in the region, the applicant is at this time pursuing the alternative of discharging storm water through the beach park. Should the issues associated with this alternative become insurmountable, or should this alternative otherwise appear impractical, other alternatives will be pursued, including lowering the outfall.

Thank you for this opportunity to respond. Should you have any further comments please do not hesitate to contact us at 842-1133.

Sincerely,

Brian Takeda

Brian Takeda
Planning Project Coordinator

cc: Mr. Henry Eng, FAICP, Department of Planning and Permitting
HASEKO (Ewa), Inc.
Morihara Lau & Fong LLP

CHAPTER 14
LIST OF PREPARERS

APPLICANT

HASEKO (Ewa), Inc.	Nelson W.G. Lee, Executive Vice-President

EIS CONSULTANTS

R.M. Towill Corporation	Brian Takeda, Project Coordinator
	Greg Hiyakumoto, Sr. Project Manager
	Chester Koga, Project Manager
	James Niermann, Planner
	Kevin Polloi, Planner
Morihara Lau & Fong LLP	Yvonne Izu, Esq.
	Linnell Nishioka, Esq.

TECHNICAL STUDIES

Char & Associates

Marine Research Consultants

Paul H. Rosendahl, Ph.D., Inc.

Planning Solutions, Inc.

Rana Productions Ltd.

Sea Engineering, Inc.

CHAPTER 15

REFERENCES

Bruner, Phillip. 1990. Survey of the Avifauna and Feral Animals, in Final Environmental Impact Statement, 'Ewa Marina, Phase II.

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APPENDIX A

Ocean Pointe Marine Environmental

Monitoring Program Water Chemistry

OCEAN POINTE

MARINE ENVIRONMENTAL MONITORING PROGRAM

WATER CHEMISTRY

March 2004

Prepared for

HASEKO (Ewa), Inc.
91-1001 Kaimalie St., Suite 205
Ewa Beach HI 96706-5005

by

Marine Research Consultants
1039 Waakaua Pl.
Honolulu, HI 96822

July 5, 2004

I. INTRODUCTION AND PURPOSE

Phase I of the proposed Ocean Pointe Project is located on 1,100 acres of land along the south shore of Oahu between Ewa Beach and Barbers Point Naval Air Station. The proposed project presently includes residential and commercial development, and approximately 120 acres of waterway providing slips for an estimated 1,400 boats. The planned marina will be excavated from dry lands behind the shoreline, and will be connected to the open ocean by an entrance channel that will bisect a broad offshore limestone platform that is the seaward extension of the Ewa Plain.

Construction of the proposed project will result in alteration of the physical, chemical and biological properties of the nearshore ocean waters in the vicinity of the Marina channel. In addition, development on land, including construction of the residential project has the potential to alter the offshore marine environment through runoff or wind-delivered dust. In order to establish the extent of such potential environmental alterations, one requirement of the Section 401 Water Quality Certification (WQC) issued by the State of Hawaii Department of Health on July 24, 1992 is the establishment of a monitoring program. The express purpose of the program is to evaluate the effects on water chemistry resulting from construction and operation of the Ocean Pointe project, including the residential and commercial development, as well as the marina itself. The monitoring program is a continuation of a baseline study, which described the existing character of the marine environment, including aspects of temporal (seasonal) and spatial variability (Marine Research Consultants, September 1990). The following report presents the data from the fortieth increment of the water chemistry monitoring program, which was conducted in March 2004. The results presented are from the twenty-sixth survey conducted during the construction phase of the Ocean Pointe development.

II. METHODS

This study was carried out in accordance with the methodology approved by the State of Hawaii Department of Health pursuant to the WQC issued for the Ewa Marina project. Three sites in the vicinity of the proposed Ocean Pointe channel alignment were previously selected as water chemistry sampling stations (see

Figure 1). Two of the sites (O-W and O-E) were located to the west and east, respectively, of the site of the proposed entrance channel; the third site (Control) was located near the western end of the property, adjacent to the Barbers Point Recreational Facility. At the request of the State of Hawaii Department of Health, an additional site was added to the sampling scheme in August 1992. The additional sampling transect site, located in the center of the proposed entrance channel was designated "O-C."

During the original planning of the Marina, one of the functions of the excavated basin was to serve as a retention basin for surface water drainage. Subsequently, however, it was determined that such drainage retention cannot take place owing to the location of the discharge pipe for the Honouliuli Sewage Treatment Plant adjacent to the eastern border of the Marina Basin. As an alternative, planning is now underway to route surface drainage from inland areas through Kolo'i Gulch followed by retention behind a beach berm directly to the east of the Marina. To aid in the evaluation of the effects of the new drainage scheme, a fifth ocean water monitoring transect was added in December 2003. The transect (designated KA) originates directly offshore of the of the Kaloi Gulch retention basin at the eastern boundary of Oneula Beach Park. The transect extends seaward for 500 m and parallels the other four transects. Sampling on the Kaloi Gulch transect (KA) will be a permanent component of the monitoring program.

Water quality was evaluated at each site on transects that were oriented perpendicular to the shoreline and depth contours. Water samples were collected at seven stations on each transect from the shoreline to approximately 500 m offshore. Such a sampling scheme was designed to span the greatest range of salinity with respect to potential input of materials from the shoreline. Sampling was more concentrated in the nearshore zone because this area is most likely to show the effects of shoreline modification. With the exception of the shoreline stations, samples were collected at two depths; a surface sample was collected within approximately 10 centimeters (cm) of the sea surface, and a bottom sample was collected within one m of the sea floor.

Water quality parameters evaluated included all of the specific criteria designated for open coastal waters in Chapter 11-54, Section 06 (Open Coastal waters) of the State of Hawaii Department of Health (DOH) Water Quality Standards. These criteria include: total nitrogen (TN), nitrate + nitrite nitrogen (NO_3^- + NO_2-,

hereafter referred to as NO_3^-), ammonium nitrogen (NH_4^+), total phosphorus (TP), chlorophyll a (Chl *a*), turbidity, pH, salinity and temperature. In addition, orthophosphate phosphorus (PO_4^{3-}) and silica (Si) were also reported because these parameters are sensitive indicators of biological activity and the degree of groundwater mixing. Total suspended solids (TSS) was also measured as a means of determining the degree of dust from land that is entering the marine environment.

Field collection of water samples was conducted on March 16, 2004 between the hours of 0700 and 0900 using two methods. Samples within 50 m of the shoreline were collected by divers swimming from shore. Water samples from distances of 100 and 500 m from shore were collected from a small boat using a Niskin-type oceanographic sampling bottle. The bottle is lowered to the desired sampling depth with spring-loaded endcaps held open so water can pass freely through the bottle. At the desired sampling depth, a weighted messenger released from the surface triggers closure of the endcaps, isolating a volume of water.

Following collection, subsamples for nutrient analyses were immediately placed in 125-milliliter (ml) acid washed, triple rinsed, polyethylene bottles and stored on ice. Analyses for NH_4^+, PO_4^{3-}, and NO_3^- were performed with a Technicon autoanalyzer using standard methods for seawater analysis (Strickland and Parsons 1968, Grasshoff 1983). TN and TP were analyzed in a similar fashion following oxidative digestion. Total organic nitrogen (TON) and total organic phosphorus (TOP) were calculated as the difference between TN and dissolved inorganic N, and TP and dissolved inorganic P, respectively.

Water for other analyses was subsampled from 1-liter polyethylene bottles and kept chilled until analysis. Chl *a* was measured by filtering 300 ml of water through glass fiber filters; pigments on filters were extracted in 90% acetone in the dark at 20° C for 12-24 hours. Fluorescence before and after acidification of the extract was measured with a Turner Designs fluorometer. Salinity was determined using an AGE Model 2100 laboratory salinometer with a readability of 0.0001‰ (ppt). TSS was measured gravimetrically on dried filtrate using a Cahn electrobalance.

Turbidity was determined on 60 ml subsamples using a Monitek Model 21 nephelometer, and reported in nephelometric turbidity units (NTU).

In situ field measurements included water temperature using a hand-held mercury thermometer with a readability of 0.01°C and pH using a portable meter with a readability of 0.01 pH units.

All laboratory analyses were conducted by Marine Analytical Specialists (Lab #HI00009), which possess the appropriate acceptability ratings from the Department of Health.

III. RESULTS OF WATER CHEMISTRY ANALYSES

A. Horizontal and Vertical Stratification

Prevailing weather conditions during the March 2004 survey consisted of clear skies, calm winds, and surf of 2-4 feet. Sampling commenced at 0700 during a falling tide with an average tidal height of +0.40 ft above lower mean water. No rainfall occurred during the sampling or during the 48-hr period preceding sampling.

Tables 1 and 2 show results of all water chemistry analyses for samples collected off the Ocean Pointe site on March 16, 2004. Table 1 shows results with concentrations of dissolved nutrients in micromolar units (μM), while Table 2 shows the same results in units of micrograms per liter (μg/L). Concentrations of eight dissolved nutrient constituents are plotted as functions of distance from the shoreline in Figure 2, while plots of salinity, turbidity, total suspended solids, NO_3^- and temperature versus distance from shore are shown in Figure 3.

Surface concentration of Si, NO_3^-, and TN were highest in the samples collected at the shoreline and decreased with increasing distance offshore at all five sites (Figure 1 and Tables 1 and 2). By far the most prominent gradients were evident at the OW site, where the concentration of NO_3^- decreased by three orders of magnitude between the shoreline and 500 m from the shoreline (40.4 – 0.06 μM). It is noted that the single measurement of NO_3^- at the shoreline of site OW of 40.4 μM is the highest value measured during the entire course of the monitoring program is likely a result of some form of sample contamination. At the two other transects off of the Marina (O-C and O-E) and at the Control site gradients were evident, with concentrations of NO_3^- decreasing by two orders of magnitude between the shoreline and 500 m from the shoreline. Surface concentrations of

NO_3^-, Si and TN along the newly sampled Kolo'i Gulch (KA) transect showed only a very slight indication of a decreasing gradient across the sampling regime (Figure 1 and Tables 1 and 2).

During the March 2004 survey values of salinity ranged from 32.6‰ at the shoreline to approximately 34.7‰ at the stations located 500 m offshore. The greatest change in salinity was at the O-W site, where a difference of 1.98 ‰ was measured between the shoreline and offshore terminus of the transect (Figure 3, Tables 1 and 2). Beyond 5 m from the shoreline, surface salinity showed very little variation along the other transects.

Decreasing concentrations of inorganic nutrients and increasing salinity with increasing distance offshore have been evident in most past surveys in varying degrees of intensity. These consistent gradients are the result of mixing of low salinity groundwater that discharges at the shoreline with oceanic water.

Concentrations of PO_4^{3-} and TP were relatively constant along the length of each transect with the single exception of a higher value for PO_4^{3-} near the shoreline at the O-C site (Figure 1 and Tables 1 and 2). Among the five sampling sites, PO_4^{3-} concentrations were of the same magnitude while TP was slightly higher along the R-C transect compared to the other four transects (Figure 2 and Table 1).

Patterns in dissolved nutrients that are not associated with groundwater input (NH_4^+, TOP, TON) were varied (Figure 2). Surface NH_4^+ ranged from undetectable to 0.77 μM and showed highest concentrations near the shoreline at all the sites except the Control (Figure 2). TOP and TON were higher at the shoreline at all five sites. Among the five sites, the concentrations of NH_4^+, TOP and TON were of the same magnitude during March 2004 (Tables 1 and 2).

Surface concentrations of Chl *a* ranged between 0.21 - 2.25 μg/L during the March 2004 survey with the lowest concentrations at the sampling sites 10 m and 50 m from the shoreline (Figure 3, Tables 1 and 2). Surface turbidity and total suspended solids (TSS) were highest in the shoreline sample and decreased with increasing distance offshore (Figure 3, Tables 1 and 2).

Surface temperature during the March 2004 survey was lowest at the shoreline and ranged between 22.5°C and 24.5°C for all samples collected (Figure 3, Tables 1 and 2). The greatest variation within any one transect was 1.7°C.

Tables 1 and 2 and Figures 2 and 3 also show concentrations of water chemistry constituents with respect to depth in the water column. Groundwater efflux in the nearshore zone often results in a surface lens with lower salinity and higher nutrient content relative to subsurface water. At many of the sampling sites on all transects, salinity was slightly lower in the surface water compared to deep water. Correspondingly, concentrations of Si, NO_3^- and TN were slightly higher in the surface waters. Such stratification indicates that during the sampling in March 2004 mixing from waves and wind was not sufficient to completely eliminate the signal of groundwater in the nearshore area off the Ocean Pointe Marina site.

With the exception of the KA transect, samples collected beyond 50 m of the shoreline showed lower NO_3^- measurements in the deep water (Figure 3). While differences existed between individual surface and deep samples, no distinct pattern emerged for the other constituents measured.

B. Temporal Comparison of Monitoring Results

Figures 4-11 show histograms of the means and standard errors of water chemistry constituents at the Control, O-W, O-C and O-W sites during the pre-construction field sampling, and during the construction phase of the Ocean Pointe residential project. For comparison, Figures 4-11 also show the data from the most recent survey in March 2004. Table 3 shows the P values for single factor analysis of variance for the preconstruction and during construction values of six water chemistry constituents at each of four distances from shore (0.1, 1, 5, 10 m) at each of these four transects. Nine surveys conducted between August 1992 and October 1997 constitutes the pre-construction phase of the project. Twenty-six surveys from December 1997 to March 2004 comprise the during-construction data set.

Considering Si, NO_3^- and turbidity, there is a general decrease in mean values with increasing distance offshore at all four sites during both phases of the project (Figures 4-11). Salinity displays the opposite trend with mean values lower within 10 m of the shoreline compared to the zone 50 - 500 m from the shoreline. Mean temperature at all the sites remained essentially constant from the shoreline to 500 m from the shoreline (Figures 5, 7, 9 and 11). While a few cases of Si and turbidity show higher mean concentrations in the during construction phase

compared to the pre-construction phase, none of these differences were significant (Table 3).

Horizontal gradients in the mean concentrations of PO_4^{3-} did not exhibit the same pattern as NO_3^- and Si (i.e., highest values close to the shoreline). Rather, the highest values of PO_4^{3-} were generally at the stations farthest from shore (Figures 6, 8 and 10). This trend was evident during both phases of construction. With the exception of the stations located 0.1 and 1 m from the shoreline at the O-W site, mean concentrations of PO_4^{3-} were higher during the construction phase. However, the elevated concentrations of PO_4^{3-} during the construction were significant only at stations 10 m from the shore at the O-W and O-C sites, and at stations 0.1 and 5 m from shore at the O-E transect (Table 3).

The mean concentrations of NH_4^+ were relatively constant at all stations during both survey phases with one exception. Concentrations of NH_4^+ at the station 5 m from shore at the Control site during the construction phase were unusually high. Comparing concentrations of NH_4^+ before construction and during construction, there were no significant differences at any of the survey sites (Table 3). During the most recent survey, all of the stations except the Control had distinctly higher Si and NO_3^- values compared to the mean values during either construction phases (Figures 6, 8 and 10). These elevated values of Si and NO_3^- , along with corresponding decreases in salinity reflect increased input of groundwater at the shoreline. Elevated concentrations of NH_4^+ relative to the means were also noted at the O-E and O-W sites during the most recent survey (Figures 6 and 10).

For the nutrients found in high concentrations in groundwater (NO_3^-, PO_4^{3-} and Si), as well as salinity, turbidity and NO_3^-, the standard error was very small for samples collected beyond 50 m of the shoreline at all four sites during both phases of construction (Figures 4-11). These results suggest that there is little variation in these constituents over time in the offshore waters. In contrast to offshore stations, nearshore stations show greater variability around the mean. The larger range in values reflects the variability of mixing of groundwater and ocean water throughout the period of monitoring, largely as a function of tidal phase and sea state during the time of sample collection.

The observation that concentrations of many constituents were higher during construction relative to pre-construction at the Control site, indicates that the

changes in mean concentrations may be a result of natural factors and are not necessarily a result of construction activities.

C. Effects of Construction Generated Dust

A concern regarding construction of the residential components of Ocean Pointe is the effect to the ocean of dust generated by excavation. To assess this effect, analysis of total suspended solids (TSS) in water samples collected on the ocean transects was initiated in March 1998 at the outset of construction. TSS is a measurement of all particulate material within a water sample; hence TSS would be expected to increase if delivery of dust to the ocean surface resulted from construction activities. Because TSS is not a component of the DOH water quality standards, this constituent was not measured as part of the standard suite of components during the pre-construction phase of monitoring. As a result, it is not possible to compare pre- and during construction values of TSS.

Table 4 show geometric means of TSS from the twenty-four surveys conducted since the initiation of residential construction at each distance from shore where samples are collected. As TSS is a function of resuspension of naturally occurring sediment, it would be expected that there would be gradients of decreasing values with increasing distance from shore (i.e., decreasing wave energy with increasing distance from shore). Inspection of Table 4 indicates that indeed there is a decreasing trend in geometric mean values of TSS with increasing distance from shore. As a result, all calculations are performed to compare values at sampling stations that are the same distance from shore.

If airborne dust was adding to the suspended particle load of the water column, it would also be expected that there would be a gradient with increasing values in the downwind direction (i.e., increasing values to the west). Inspection of Table 4 indicates that at some of the sampling stations, particularly those closest to shore (1S, 2S), there are slight gradients in the east-west direction. However, 2-Way Analysis of Variance (ANOVA) indicates that there are only three distances from shore (0.1-m, 100-m surface, and 500-m deep) with a significant difference ($p<0.05$) between stations (see STATION in Table 4). If airborne dust generated from construction activities was increasing the sediment load of the water column, it would be expected that there would be consistent significant differences between

stations, as it is unlikely that dust would be carried upwind of the construction area.

On the other hand, ANOVA statistics indicate that there are significant differences ($p<0.05$) in TSS at all twelve sampling areas when compared by sampling increment date (DATE in Table 4). This result indicates that at each individual sampling location (with respect to distance from shore and water depth), values of TSS were significantly different over the twenty-four sampling events. Inspection of the data, however, does not reveal an increasing trend at each station over time. Rather, the high variability is likely a result of sea conditions on the date of sampling (e.g., wave action) which resuspends sediment. These results showing no effect to TSS have been consistent throughout the entire monitoring program indicating that at no time has there been an increase in airborne dust to the ocean.

D. Conservative Mixing Analyses

A useful treatment of water chemistry data for interpreting the extent of material inputs from land is application of a hydrographic mixing model. In the simplest form, such a model consists of plotting the concentration of a dissolved chemical species as a function of salinity. It is possible to evaluate the extent of nutrient input from sources other than groundwater efflux by plotting the concentration of the dissolved material as a function of salinity (Officer 1979, Smith and Atkinson 1992, Dollar and Atkinson 1992).

Comparison of the curves produced by such plots with conservative mixing lines provides an indication of the origin and fate of the material in question. Figure 12 shows the concentrations of four dissolved nutrient constituents (Si, NO_3^-, NH_4^+, PO_4^{3-}) at the five sampling transect sites plotted as functions of salinity for March 2004. Similar plots showing results from the past seven years of monitoring surveys, grouped by year, are shown in Figure 13 (data from the new KA site is not included in the data set). Each plot also shows two conservative mixing lines that were constructed by connecting the endpoint concentrations of open ocean water and groundwater from two different regions. The dashed mixing lines show nutrient concentrations from a potable well drilled through the basaltic region of the Koolau mountains (Kunia II), while the solid mixing lines show nutrient concentrations from the irrigation well in the limestone aquifer of the Ewa plain

directly mauka of the proposed Ocean Pointe Marina site. A primary difference between the two mixing lines is that the water in the irrigation well is likely to have received input from leached fertilizers used on sugarcane, while the well water from the basaltic aquifer should not be contaminated from any anthropogenic sources.

If the parameter in question displays purely conservative behavior (no input or removal from any process other than physical mixing), data points should fall on, or near, the conservative mixing line. If, however, external material is added to the system, data points will fall above the mixing line. If material is being removed from the system by processes such as biological uptake, data points will fall below the mixing line.

Dissolved Si represents a check on assumptions of the method, as this material is present in high concentration in groundwater, but is not a major component of fertilizer, and is not generally utilized rapidly within the nearshore environment by biological processes. For the March 2004 sampling, nearly all of the data points for Si lie above the basalt mixing line (Figure 12).

Considering the entire data set (Figure 13), most of the Si data points fall near or below the limestone aquifer mixing line. Data points for 1997 generally fall below data points from the other years. It can also be seen that the data sets from each year show a progressively steeper distribution (e.g. higher values at the same salinity). Such an increase suggests that there is a progressively increasing contribution of basalt aquifer groundwater to the ocean over time. This trend is evident in the most recent survey where it can be seen that samples collected in 2004 lie generally above all other sample years (Figure 13).

The surveys conducted in June and December 2003 (but not in October 2003 or March 2004) displayed distinct upward concave curvature of the Si values as functions of salinity, particularly in the data points with salinities above 34‰. Such a pattern suggests that there was either detectable uptake of Si in the coastal ocean beyond the nearshore zone, or that there is another source of water in the sampling regime. As surface water draining into Pearl Harbor is likely to have substantially lower concentrations of Si than groundwater as a result of not having passed through the basalt aquifer, the lower nutrient concentrations in the offshore samples at the Ocean Pointe site suggests mixing of two water sources. It is

possible that there was discharge of surface runoff from Pearl Harbor that could have affected the Ewa region. The variability between the patterns of data points comprising the mixing lines suggests that composition of groundwater input to the nearshore zone changes on a short time scale, possibly as a result of weather conditions (primarily rainfall) that affects the composition and volume of water draining from Pearl Harbor. Subsequent to flowing out of Pearl Harbor, the plume moves westward with the predominant current flow and influences water chemistry in the region fronting the proposed Ocean Pointe Marina.

NO_3^- is the form of nitrogen most common in agricultural fertilizer mixes, and is the most mobile form of nitrogen within soils and groundwater. With the exception of the shoreline samples at the O-W and O-E sites, nearly all of the data points from the March 2004 sampling fall below both mixing lines. Data points do not prescribe distinctly linear arrays from any of the sampling sites (Figure 12). Rather, there is a distinct upward concave curvature. The shape of the curve prescribed by the NO_3^- data points indicates either substantial uptake of NO_3^- in the offshore zone, or mixing of a third water mass.

The plots of NO_3^- versus salinity for the past seven years (Figure 13) also reveals that most of the data points fall below both mixing lines, indicating a deficit of NO_3^- relative to the concentrations that should be present owing solely to mixing of groundwater and ocean water. This deficit may be a result of biotic uptake, or a result of mixing of water sources from Pearl Harbor that could contain substantially lower NO_3^- than groundwater or ocean water. Regardless of which processes are occurring off the Ewa coastline, it is apparent that there are no subsidies of NO_3^- to the coastal ocean from land that remain in the water column. Unlike Si, which displayed a clear progression of increasing concentrations at similar salinities over time, there is no such temporal pattern evident in the plot of NO_3^- versus salinity.

The other form of dissolved inorganic nitrogen, NH_4^+, shows a relationship with salinity that is distinctly different from that of Si and NO_3^-. There is very little difference in the concentrations of NH_4^+ between open ocean water and groundwater from either basaltic or limestone aquifers, resulting in "flat" conservative mixing lines (Figures 12 and 13). The plots of data points reveal that there is no indication of increased concentrations with decreased salinity. In March 2004, concentrations of NH_4^+ in the nearshore ocean samples occurred in a

randomly scattered pattern with little inverse relationship between salinity and concentration, and with no indication of upward concavity (Figure 12). For the entire data set, the highest concentrations of NH_4^+ occurred at some of the highest salinities (Figure 13). Such a relationship suggests that the source of most NH_4^+ in the nearshore ocean is not from the land, but rather from biological processes occurring in the ocean, or possibly from water flowing from Pearl Harbor.

PO_4^{3-} is also a component of fertilizer, but because a high absorptive affinity in soils is usually not found to leach to groundwater to the extent of NO_3^-. The substantial difference between the two conservative mixing lines for PO_4^{3-} is likely a result of more adsorption of PO_4^{3-} in the limestone aquifer relative to the basalt aquifer. For both the March 2004 data (Figure 12), and the entire data set (Figure 13) there is little indication that concentrations of PO_4^{3-} are a function of input of groundwater based on the lack linearity of the data points. Rather, it appears that the concentrations of PO_4^{3-} are a result of mixing of either water masses of the same salinity, or from biological activity in the water.

E. Compliance with DOH Standards

DOH Water Quality Standards include specific criteria for three situations; criteria that are not to be exceeded during either 10% or 2% of the time, and criteria that are not to be exceeded by the geometric mean of samples. Comparing sample concentrations to these criteria provide an indication of whether water quality is near the stated specific criteria.

Noted in Tables 1 and 2 are samples that exceed DOH 10% water quality standards for open coastal waters under "wet" conditions. The criteria for wet conditions are applied to the Ewa site assuming that this area receives at least 3 million gallons of groundwater input per mile per day. A comparison of water chemistry results with DOH criteria reveals that during the March 2004 sampling, eleven measurements of NO_3^-, three measurements of NH_4^+, ten measurements of TN, seven measurements of turbidity and twenty measurements of Chl a exceeded the 10% standards. No measurements of TP exceeded DOH water quality standards during this survey.

As discussed above, NO_3^- is a normal constituent of groundwater, and is also the primary constituent of fertilizer nitrogen that is added to groundwater through

leaching of agricultural chemicals. Assuming the concentration of NO_3^- in the basalt aquifer represents typical groundwater concentrations, it is apparent from the conservative mixing lines in Figure 12 that all nearshore samples will exceed DOH criteria at salinities less than approximately 34.6‰ with no further nutrient subsidy from land. The samples collected in March 2004 that exceeded the DOH criteria for NO_3^- were mostly at the shoreline and had salinities less than 34.5‰ (Tables 1 and 2).

Tables 5 (μM) and 6 (μg/L) show geometric mean data from samples collected at the same locations over the entire course of the monitoring program (forty survey dates over fourteen years from the O-W, O-E, and Control sites and thirty-five surveys over twelve years from the O-C site). Also shown in these tables are the samples that exceed the DOH geometric mean limits. DOH geometric mean specific criteria were exceed in fourteen cases for NO_3^-, twice for NH_4^+, nine cases for TN, twenty-eight cases for turbidity, and all but six cases of Chl *a*. No measurements of TP exceeded the geometric mean limits set by the DOH. All of the measurements of NO_3^- and TN that exceeded the DOH geometric mean limits were from samples collected within 5 m of the shoreline. It is important to note that the constituents and number of samples that exceeded DOH geometric mean limits at the control site was similar to the other three sample sites. This result indicates DOH limits can be exceeded under natural conditions of the nearshore ocean.

SUMMARY

- The 40th phase of the Ocean Pointe water chemistry monitoring program was carried out in March 2004. Sixty water samples were collected from three survey sites located off the project, as well as off a control site west of the project site. Commencing with the December 2003 survey, a fifth site was added off the eastern end of Oneula Beach Park at the point where drainage from Kolo'i Gulch would enter the ocean during heavy rains. Water samples were collected on transects perpendicular to shore extending from shoreline to a distance of approximately 500 m offshore. Analysis of fourteen water chemistry constituents included parameters specified in DOH water quality standards.

- Distinct horizontal gradients were evident for Si, NO_3-, and TN, which showed a two to three order of magnitude difference between the shoreline and offshore samples. Salinity showed the opposite trend of increasing values with increasing distance offshore. Vertical stratification between surface and bottom samples was also evident. The new site off of Kolo'i Gulch (KA) showed only small horizontal gradients in any water chemistry constituent.

- Other water chemistry constituents that are not related to groundwater efflux (NH_4^+, TON and TOP) showed little trends except for slightly higher concentrations of TON and TOP at the shoreline of all five sites. NO_3-measurements were lower in a zone 10 - 50 m from the shoreline while turbidity and TSS showed a pattern of decreasing values with distance from shore at all of the sites.

- Comparative results of pre-construction and during-construction monitoring phases indicate few statistically significant increases in water chemistry constituents during construction. The variability in the input and mixing characteristics of groundwater efflux at the shoreline off the Ocean Pointe site appears to affect water chemistry to a greater extent than does construction activity. Increases in mean values of water chemistry constituents at the control site (located at the Western end of the property) during the construction phase indicate that construction activities are not responsible for changes in water quality.

- The potential effects of dust generated by construction activities were evaluated by measurements of total suspended solids (TSS). The lack of consistent significant differences between TSS at each distance from shore along the east-west gradient of sampling stations indicates little effect from land. Values of TSS varied significantly by sampling date at each distance from shore, indicating that resuspension of sediment by wave energy is the most important factor in influencing values of TSS. Over the entire period when construction activities have occurred at Ocean Pointe, there has been no indication of increasing dust reaching the ocean.

- Scaling concentrations of dissolved Si and NO_3- to salinity indicates that groundwater entering the ocean at the survey sites varies in composition from site to site, and survey to survey. During the most recent survey, plots of the

concentrations of Si as functions of salinity reveal mixing of groundwater and ocean water in the nearshore zone. Plots of NO_3- vs. salinity prescribed data curves that indicate either biotic uptake of nutrients and/or mixing of a third water mass. If a third water mass is present in the offshore area, it is possible that it originates as water flowing out of Pearl Harbor and continuing in a westerly direction along the coastline. Scaling of NO_3- to salinity revealed a external subsidy of NO_3^- at one sampling point on the OW transect. The rest of the sample set revealed no subsidy to the nearshore ocean at the time of sampling. Contrary to Si, there is no pattern of temporally increasing NO_3^- concentrations with respect to salinity over the course of the monitoring program. Dissolved NH_4^+ in the ocean did not exhibit linear relationships with respect to salinity, indicating that concentrations of these constituents in the nearshore zone are not primarily a result of input from groundwater. Concentrations of phosphorus measured in the ocean samples are uniformly low, indicating little input to the ocean from land.

- No water samples exceeded the specific 10% or 2% State DOH water quality standards for TP during March 2004. State DOH standards for NO_3^- were exceeded only in samples collected near the shoreline. The 10% NO_3^- standards were exceeded at the Control, O-W, O-C and O-E sites but not at the R-C site. Several samples beyond the shoreline exceeded the DOH water quality standards for NH_4^+, TN, turbidity and Chl a. Geometric means of NO_3^-, NH_4^+, TN, turbidity and Chl a collected over the past years also exceeded the State DOH geometric mean criteria at all sites including the Control site. No instances of TP, however, have exceeded the State DOH geometric mean criteria. The similarity in the number of samples that exceeded DOH geometric mean standards at the Control site and the other three sites off the Ocean Pointe property indicate that natural factors influence water quality in the Ewa region, and are not a result of construction activities.

- Results of the Ocean Pointe monitoring program continue to indicate that there is no discernible effect to the nearshore ocean from the ongoing construction activity associated with the project.

- The next phase of monitoring will be conducted in the second quarter of 2004.

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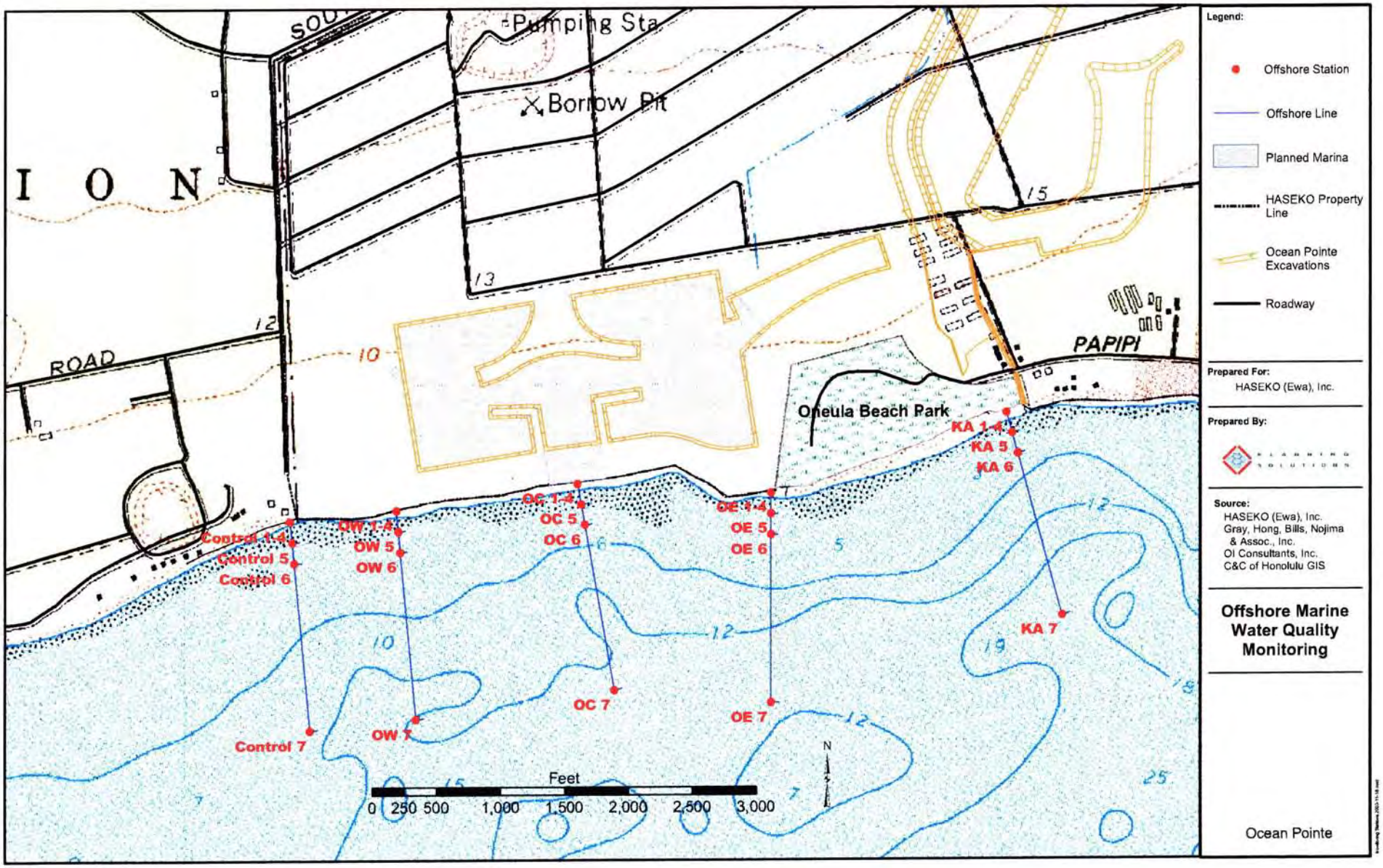
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Ocean Pointe Excavations
Roadway
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HASEKO (Ewa), Inc.
Prepared By:
Source:
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C&C of Honolulu GIS
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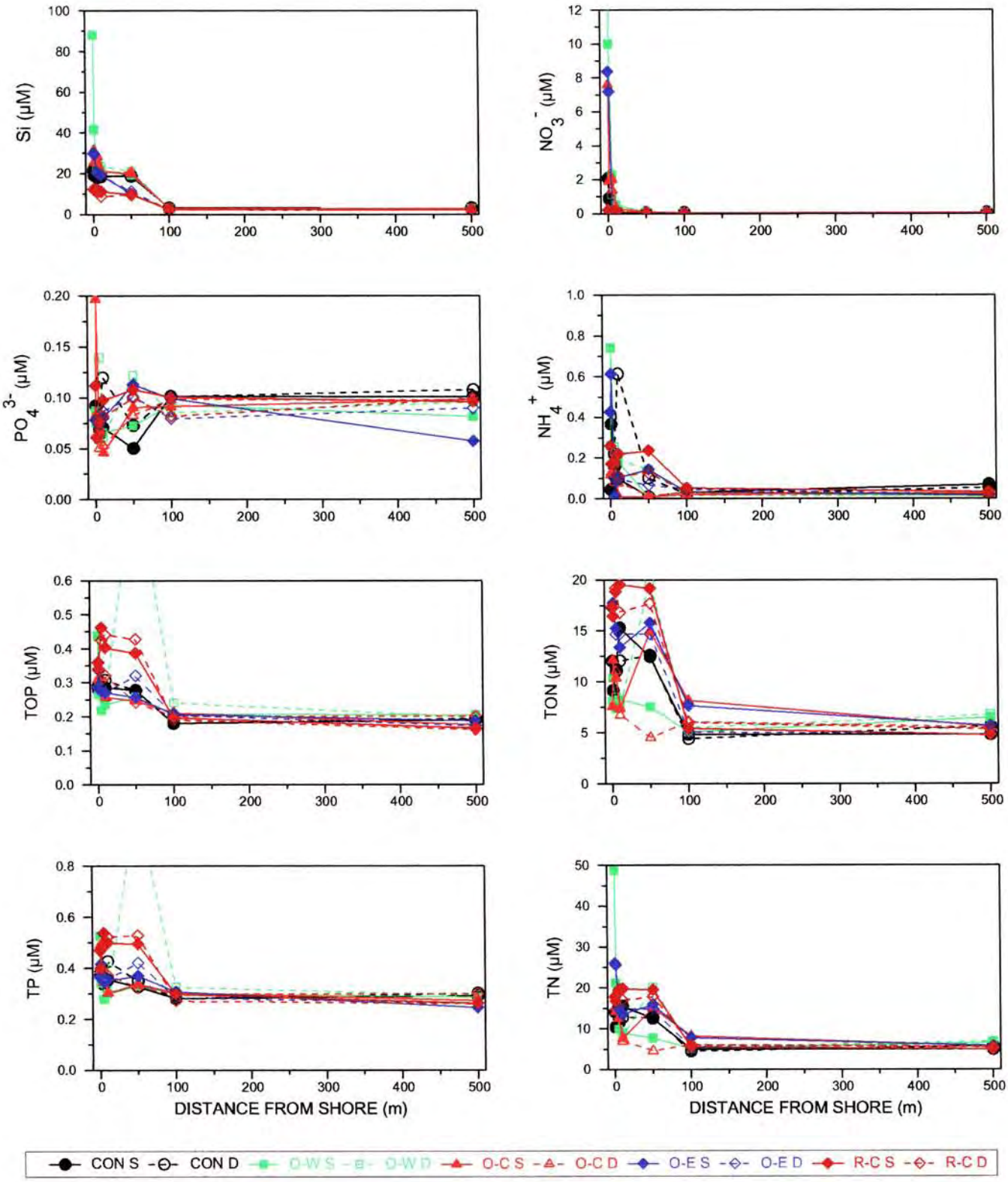


FIGURE 2. Plots of dissolved nutrients in surface (S) and deep (D) samples collected on March 16, 2004 as a function of distance from the shoreline in the vicinity of Ocean Pointe. Site abbreviations as follows: CON (ocean control); O-W (ocean west); O-C (ocean central); O-E (ocean east), R-C (runoff channel). For site locations, see Figure 1.

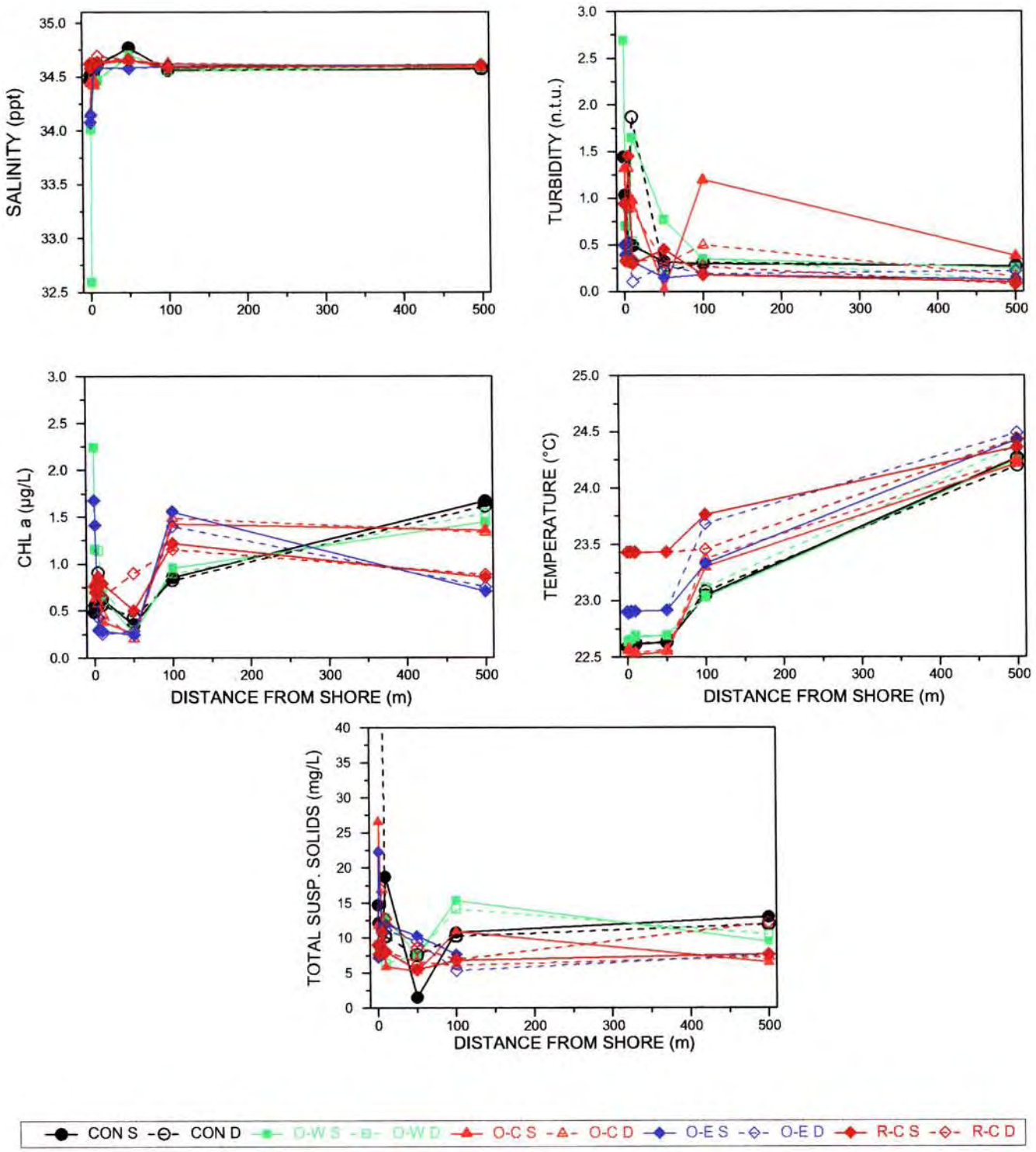


FIGURE 3. Plots of water chemistry constituents in surface (S) and deep (D) samples collected on March 16, 2004 as a function of distance from the shoreline in the vicinity of Ocean Pointe. Site abbreviations as follows: CON (ocean control); O-W (ocean west); O-C (ocean central); O-E (ocean east), R-C (runoff channel). For site locations, see Figure 1.

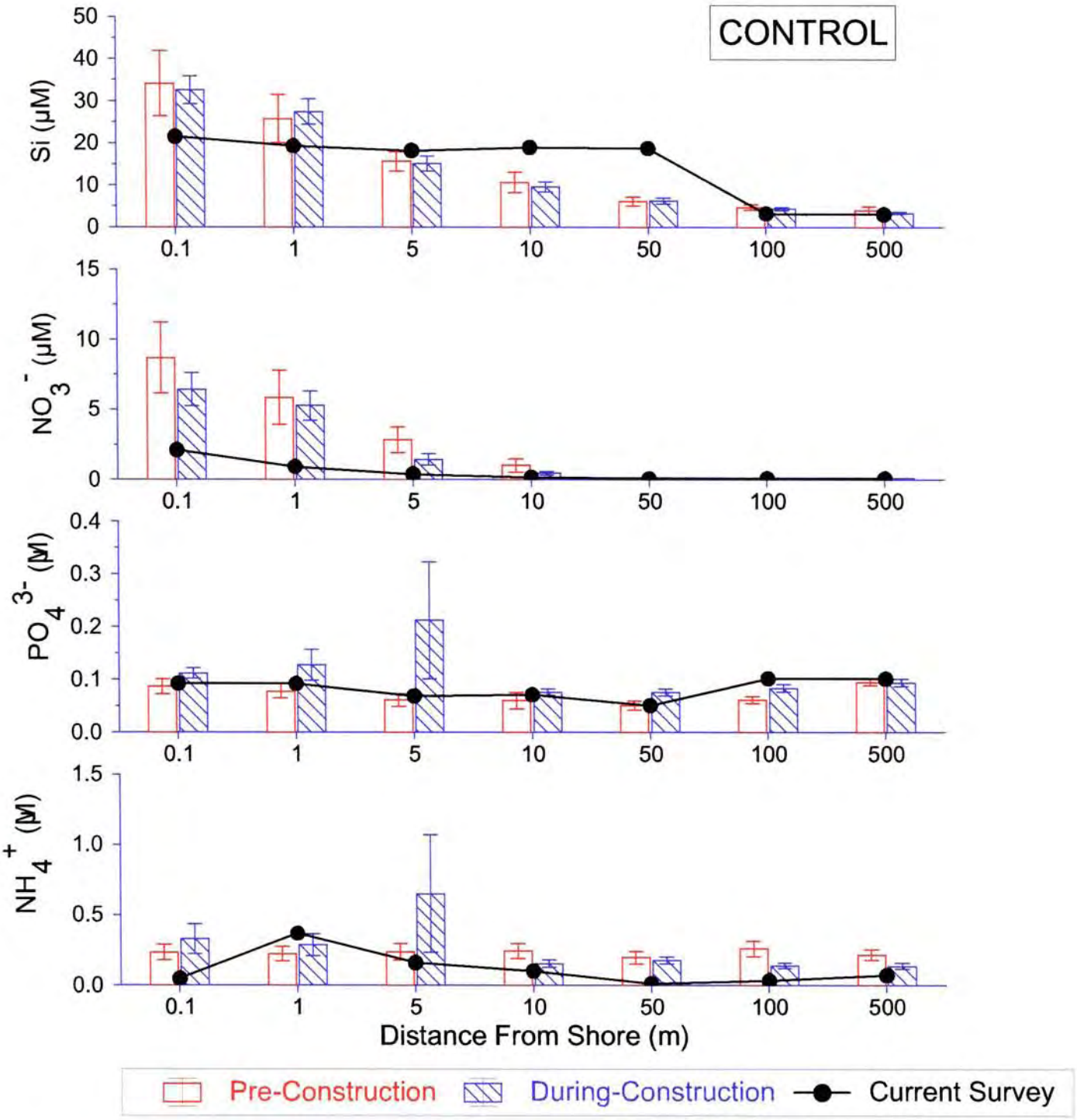


FIGURE 4. Bar and line plots comparing dissolved nutrient constituents measured in surface water samples collected at the Control site offshore of Ocean Pointe during different phases of construction and during the most recent survey in December 2003. Pre-construction data are means from surveys conducted between August 1992 and October 1997 (N=9). During- construction data are means from surveys conducted since December 1997 (N=26). Error bars represent standard error of the mean. For site location, see Figure 1.

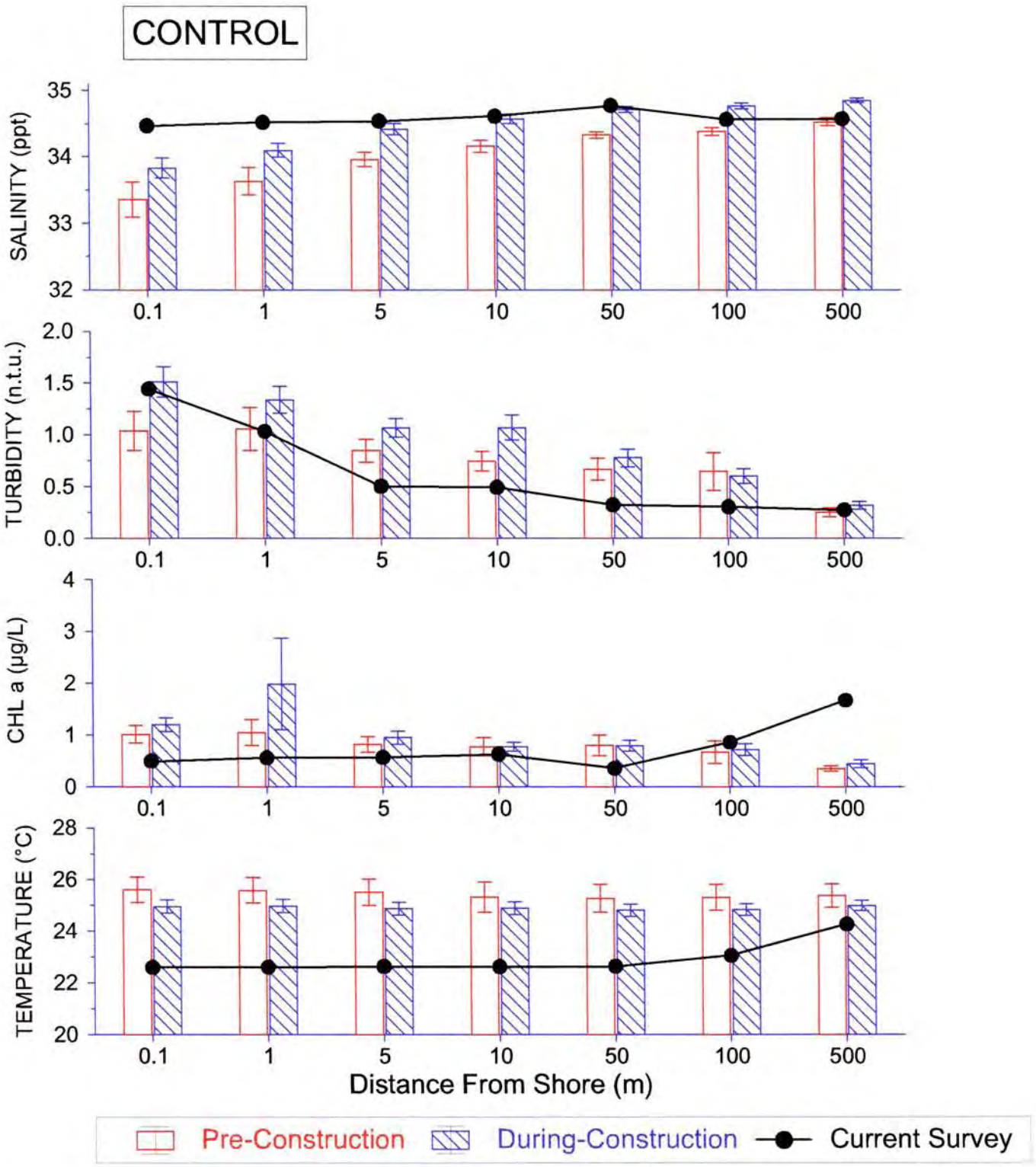


FIGURE 5. Bar and line plots comparing water chemistry constituents measured in surface water samples collected at the Control site offshore of Ocean Pointe during different phases of construction and during the most recent survey in December 2003. Pre-construction data are means from surveys conducted between August 12 and October 19 (N=8). During- construction data are means from surveys conducted since December 19 (N=26). Error bars represent standard error of the mean. For site location, see Figure 1.

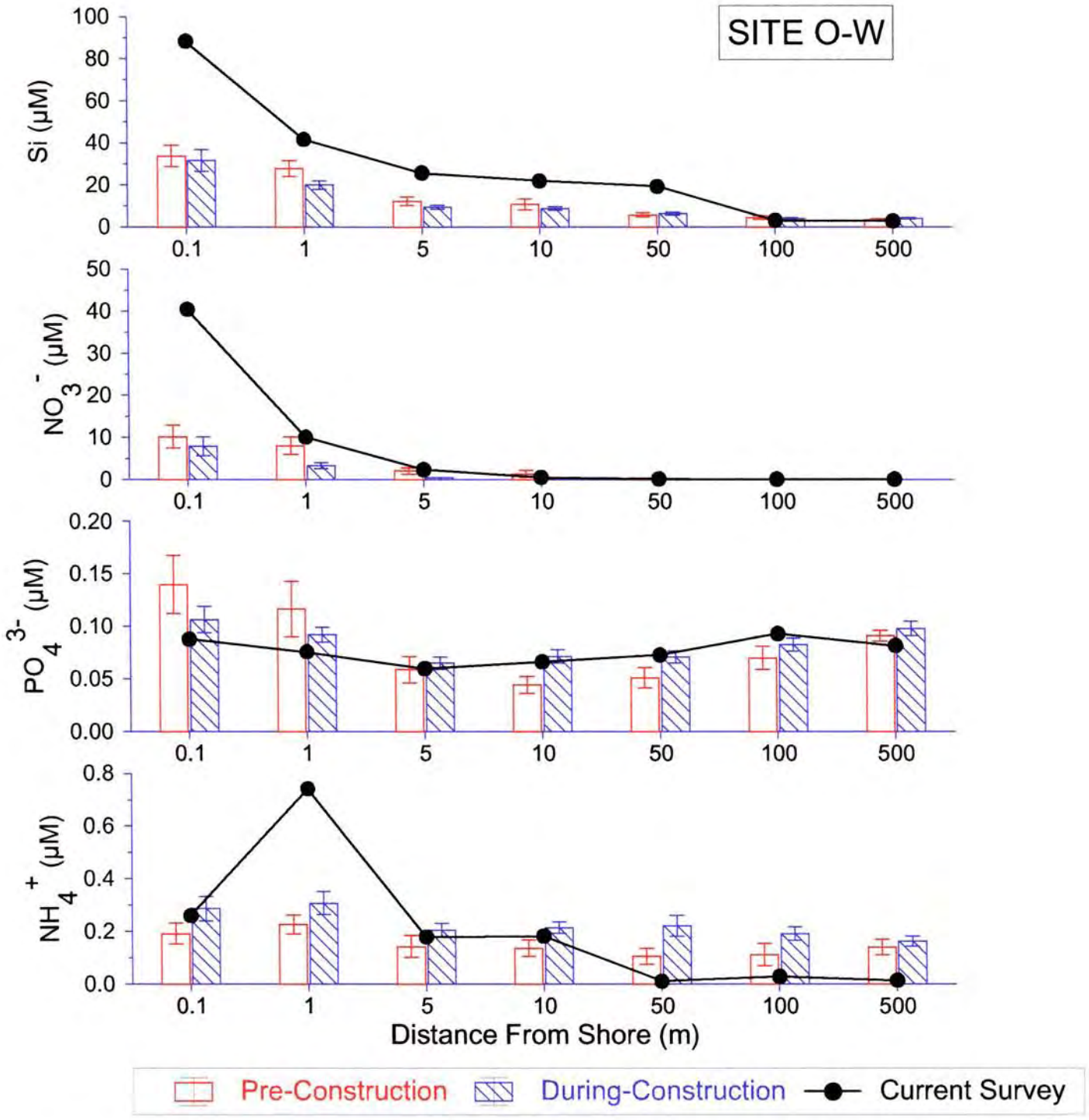


FIGURE 6. Bar and line plots comparing dissolved nutrient constituents measured in surface water samples collected at the Ocean West (O-W) site offshore of Ocean Pointe during different phases of construction and during the most recent survey in December 2003. Pre-construction data are means from surveys conducted between August 1992 and October 1997 (N=9). During-construction data are means from surveys conducted since December 1997 (N=26). Error bars represent standard error of the mean. For site location, see Figure 1.

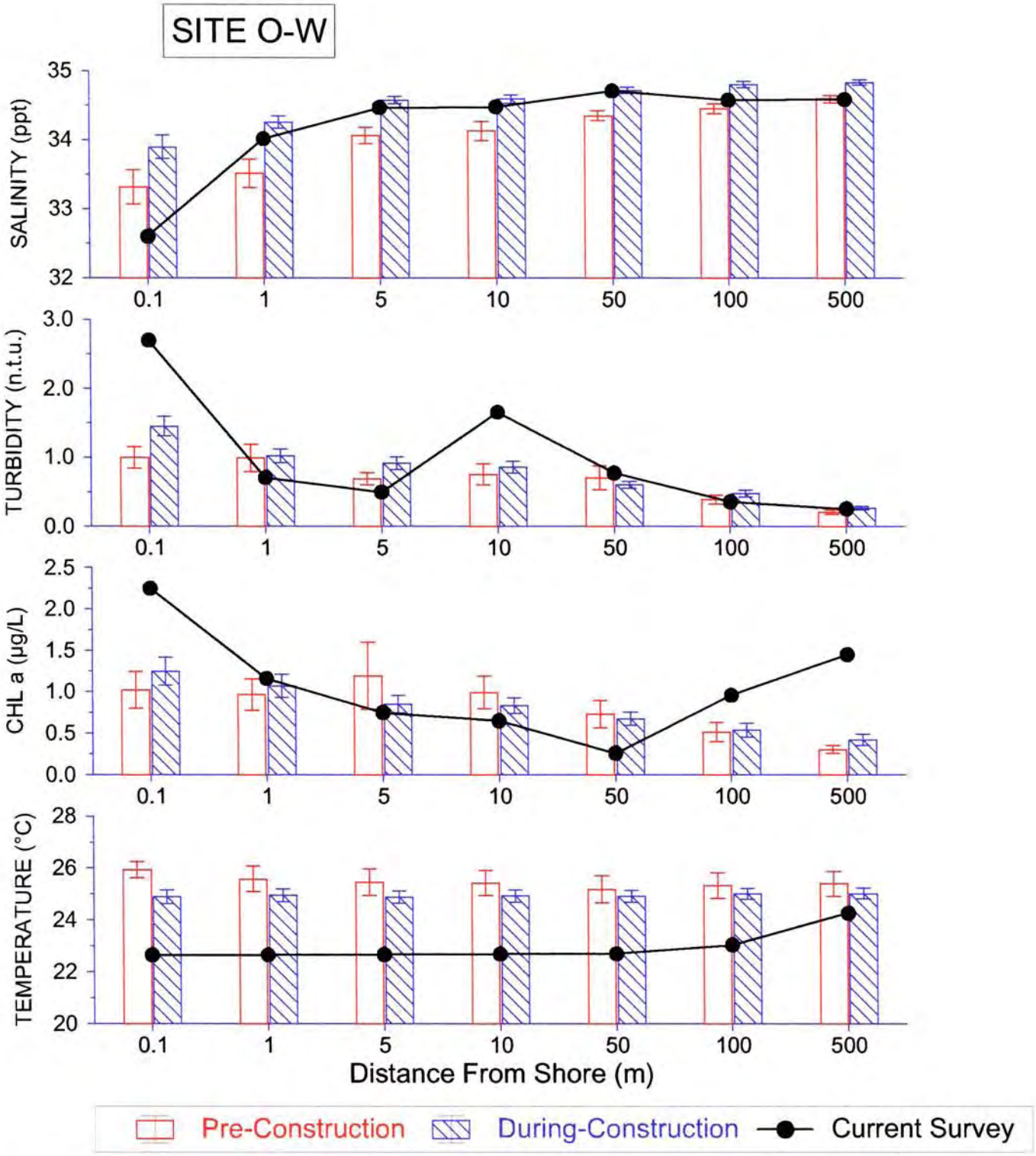


FIGURE 7. Bar and line plots comparing water chemistry constituents measured in surface water samples collected at the Ocean West (O-W) site offshore of Ocean Pointe during different phases of construction and during the most recent survey in December 2003. Pre-construction data are means from surveys conducted between August 1992 and October 1997 (N=9). During-construction data are means from surveys conducted since December 1997 (N=26). Error bars represent standard error of the mean. For site location, see Figure 1.

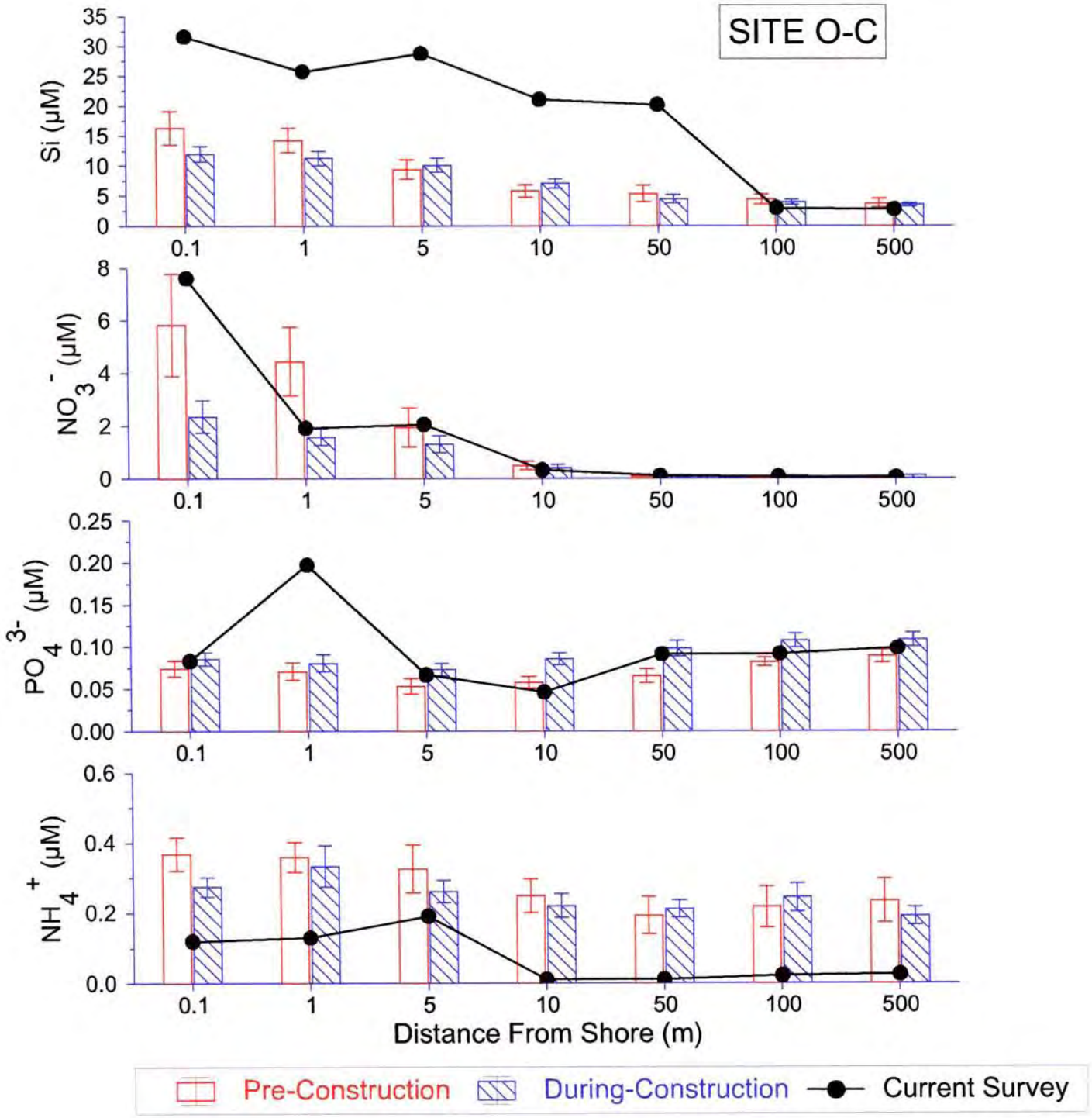


FIGURE 8. Bar and line plots comparing dissolved nutrient constituents measured in surface water samples collected at the Ocean Central (O-C) site offshore of Ocean Pointe during different phases of construction and during the most recent survey in December 2003. Pre-construction data are means from surveys conducted between August 1992 and October 1997 (N=9). During-construction data are means from surveys conducted since December 1997 (N=26).Error bars represent standard error of the mean. For site location, see Figure 1.

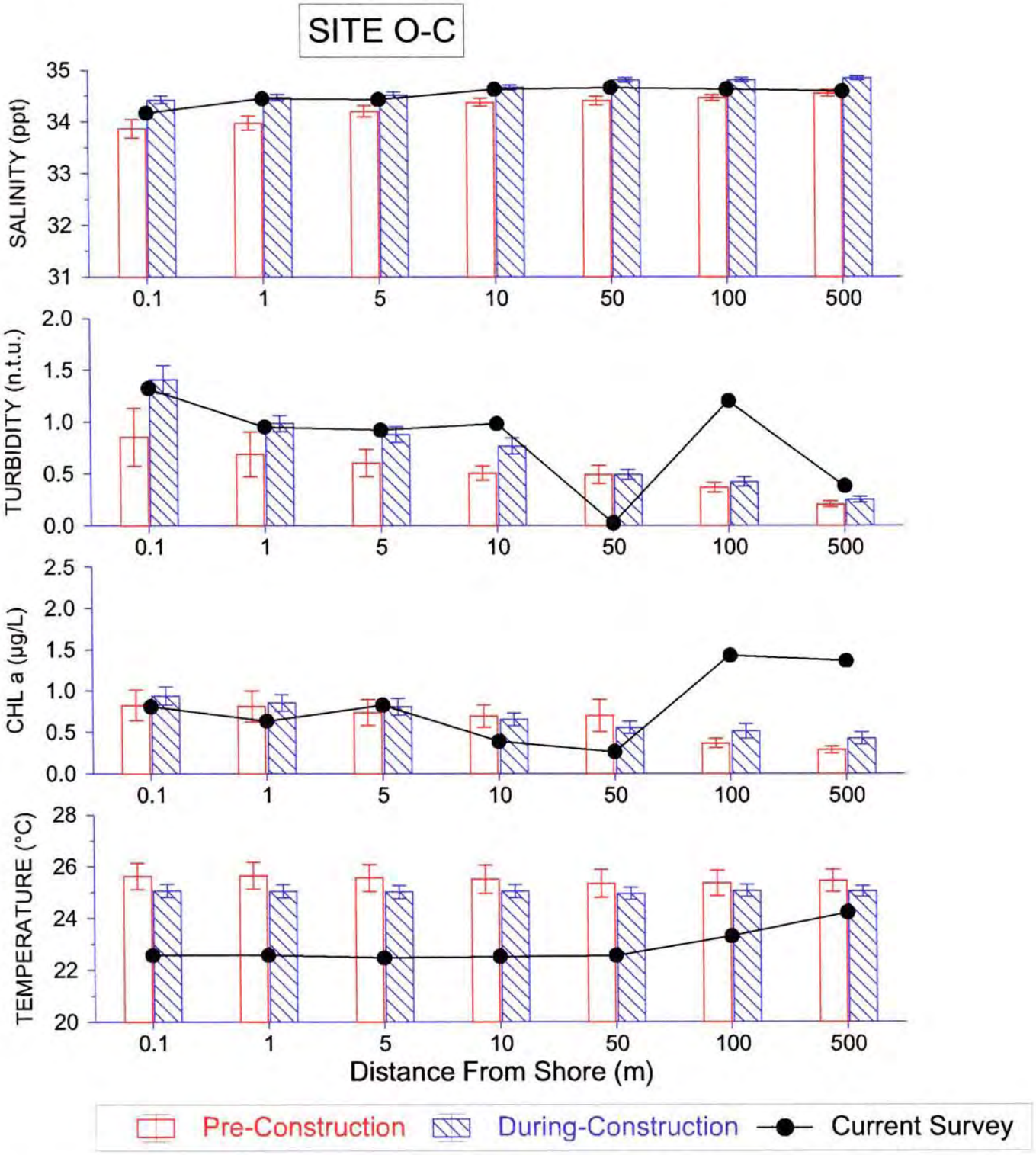


FIGURE 9. Bar and line plots comparing water chemistry constituents measured in surface water samples collected at the Ocean Central (O-C) site offshore of Ocean Pointe during different phases of construction and during the most recent survey in December 2003. Pre-construction data are means from surveys conducted between August 1992 and October 1997 (N=9). During-construction data are means from surveys conducted since December 1997 (N=26). Error bars represent standard error of the mean. For site location, see Figure 1.

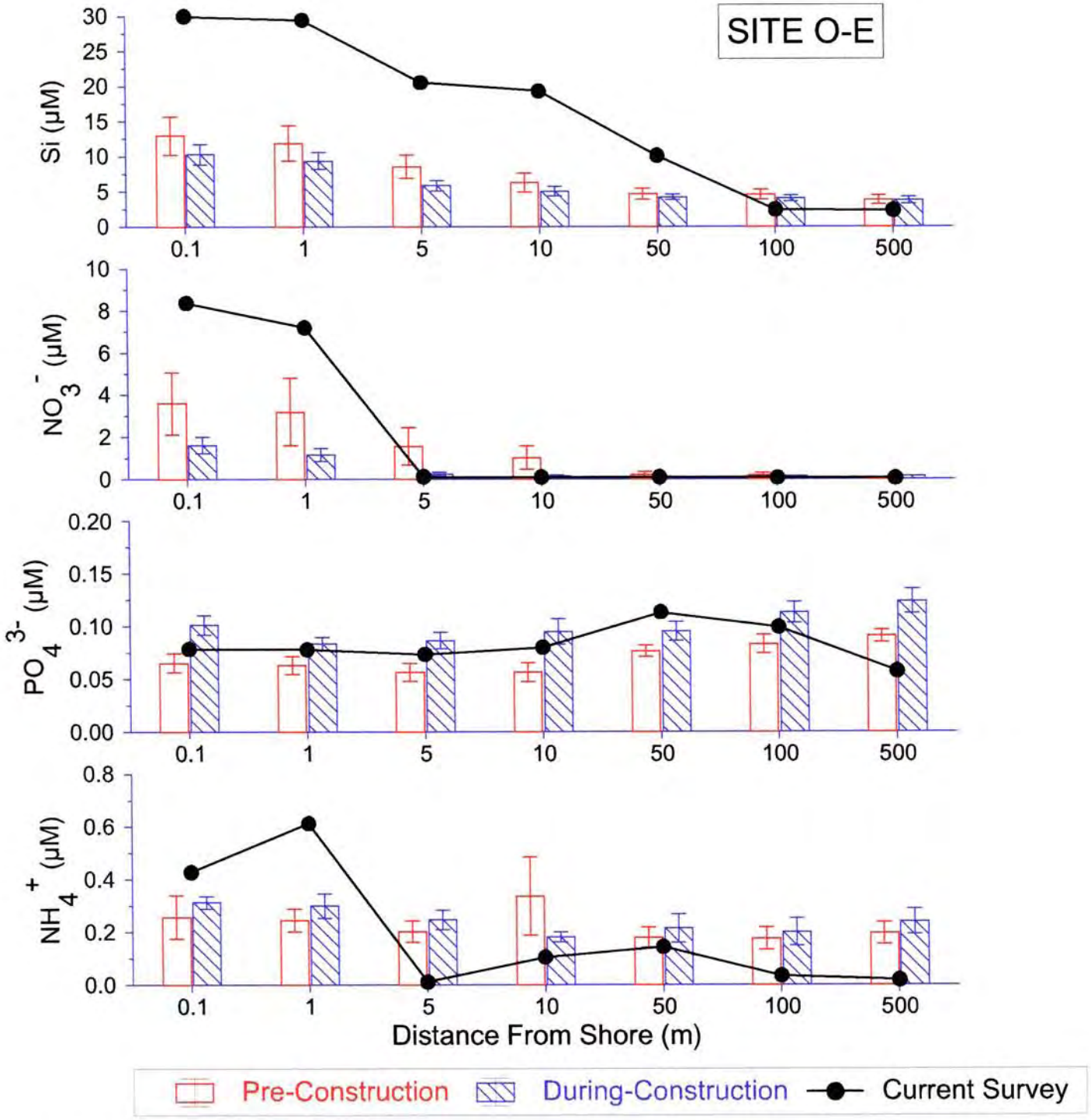


FIGURE 10. Bar and line plots comparing dissolved nutrient constituents measured in surface water samples collected at the Ocean East (O-E) site offshore of Ocean Pointe during different phases of construction and during the most recent survey in December 2003. Pre-construction data are means from surveys conducted between August 1992 and October 1997 (N=9). During-construction data are means from surveys conducted since December 1997 (N=26).Error bars represent standard error of the mean. For site location, see Figure 1.

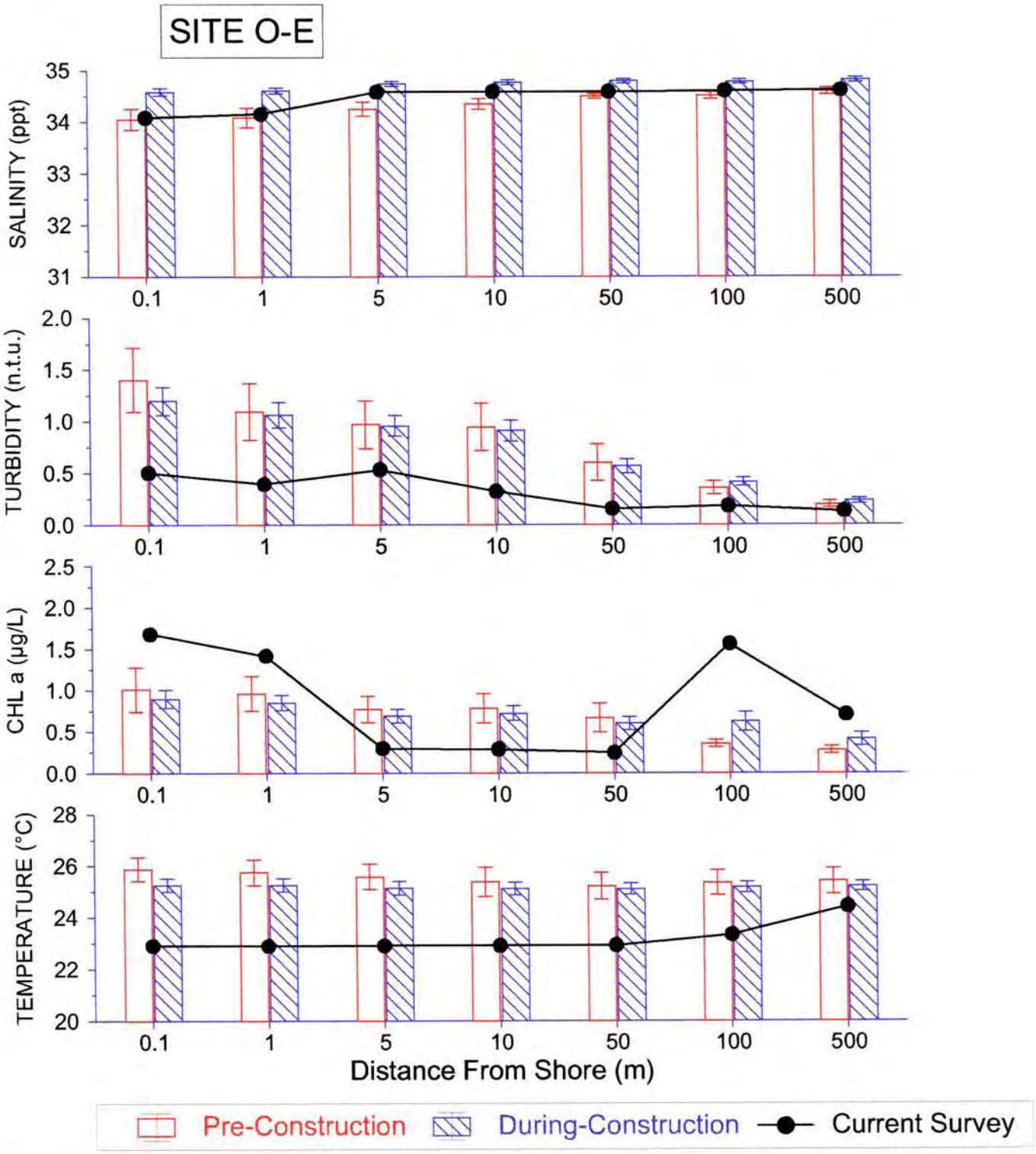


FIGURE 11. Bar and line plots comparing water chemistry constituents measured in surface water samples collected at the Ocean East (O-E) site offshore of Ocean Pointe during different phases of construction and during the most recent survey in December 2003. Pre-construction data are means from surveys conducted between August 1992 and October 1997 (N=9). During-construction data are means from surveys conducted since December 1997 (N=26). Error bars represent standard error of the mean. For site location, see Figure 1.

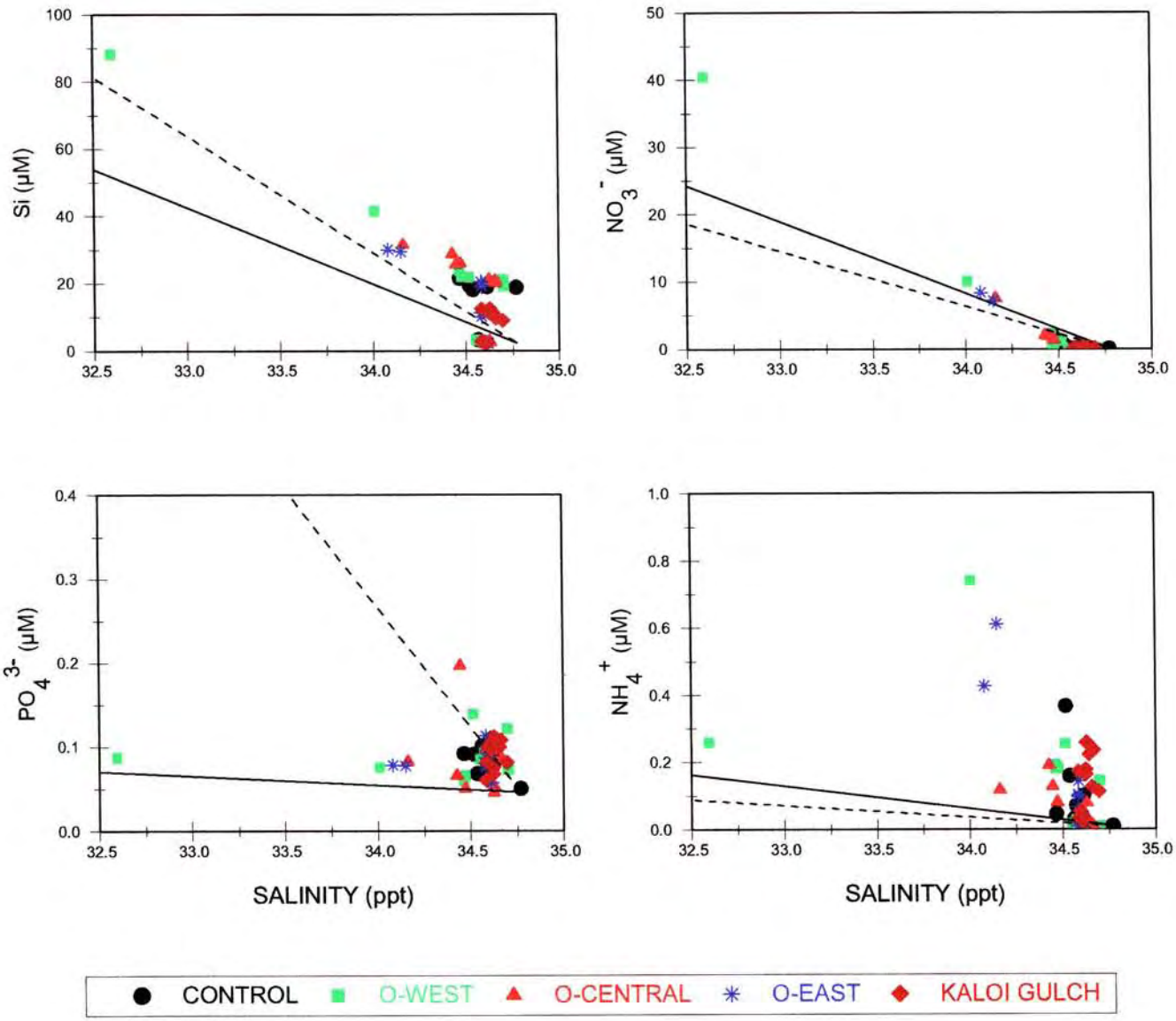


FIGURE 12. Mixing diagram showing concentration of dissolved nutrients from samples collected off Ocean Pointe in March 2004 as functions of salinity. Straight lines in each plot are conservative mixing lines constructed by connecting the concentrations in open ocean water with well water from a limestone aquifer (solid line) or with an upland basalt aquifer (dotted line). Well water was sampled December 29, 2000. For sampling site locations, see Figure 1.

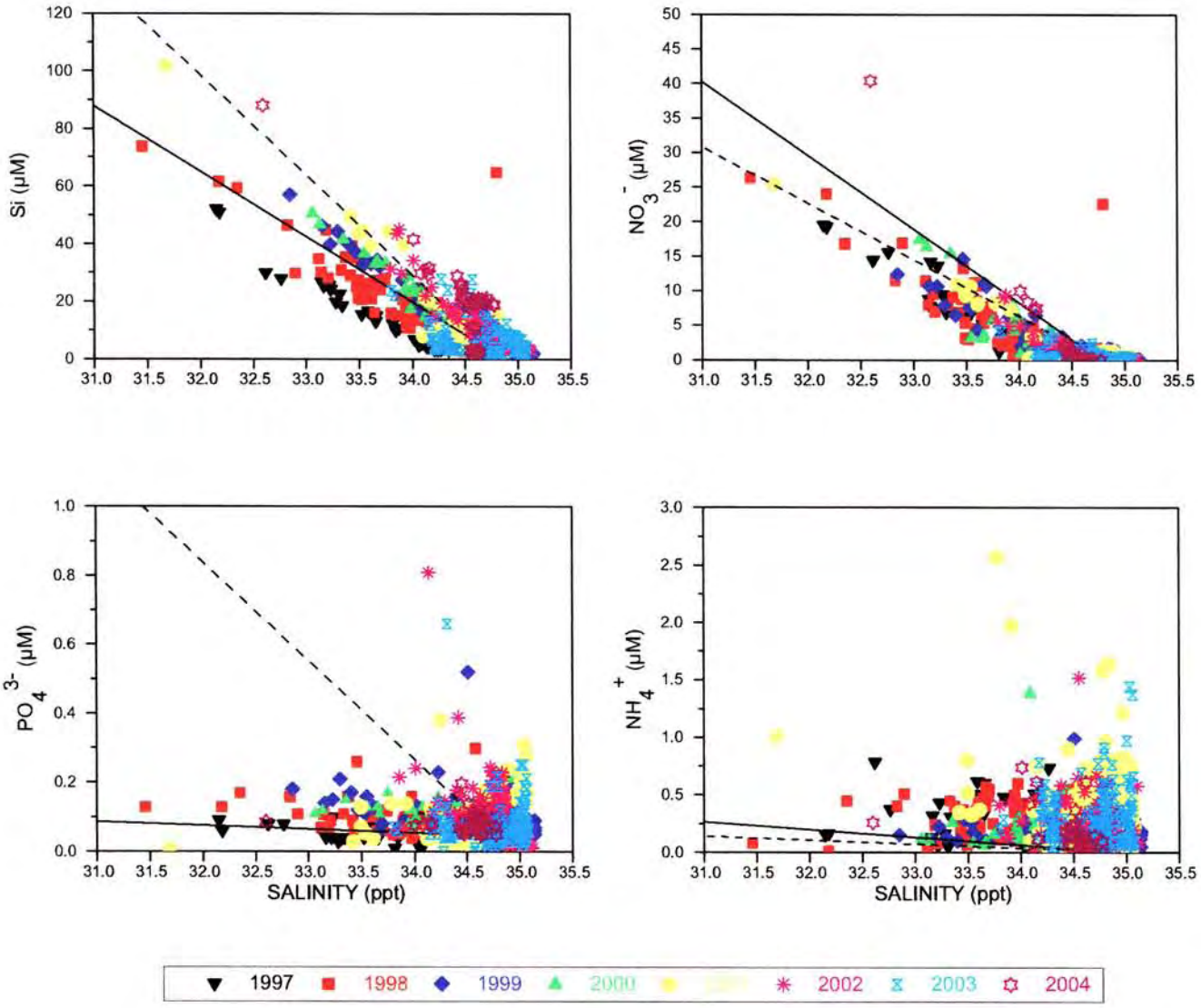


FIGURE 13. Mixing diagram showing concentration of dissolved nutrients from all samples collected along four Ocean Pointe transects (Control, O-W, O-C, and O-E) since April 1997 as functions of salinity. Straight lines in each plot are conservative mixing lines constructed by connecting the concentrations in open ocean water with well water from a limestone aquifer (solid line) or with an upland basalt aquifer (dotted line). Surveys were conducted four times per year (once in 2004).

TABLE 1. Water chemistry measurements off Ocean Pointe collected on March 16, 2004. Concentrations of nutrients are shown in micromolar units (µM). Abbreviations as follows: S=surface; D=deep; DFS=distance from shore; BDL=below detection limit. Also shown are the State of Hawaii, Department of Health (DOH) "not to exceed more than 10% of the time" and "not to exceed more than 2% of the time" water quality standards for open coastal water under "wet" conditions. Shaded and boxed values exceed DOH 10% standards. For site locations, see Figure 1.

SITE	NO.	DFS (m)	PO4 (µM)	NO3 (µM)	NH4 (µM)	Si (µM)	TOP (µM)	TON (µM)	TP (µM)	TN (µM)	TURB (ntu)	TSS (mg/L)	SAL (ppt)	CHL a (µg/L)	TEMP (deg C)	pH	O2 (%sat)
DOH	**10% std**			**1.00**	**0.61**				**1.29**	**17.85**	**1.25**			**0.90**	*	**	
	2% std			**1.78**	**1.07**				**1.93**	**25.00**	**2.00**			**1.75**			
CONTROL	1S	0.1	0.09	2.07	0.05	21.42	0.29	12.03	0.38	14.14	1.44	14.69	34.464	0.49	22.6	7.82	103.6
	2S	1	0.09	0.89	0.37	19.19	0.28	9.13	0.37	10.39	1.03	12.14	34.516	0.55	22.6	8.21	99.3
	3S	5	0.07	0.36	0.16	18.10	0.27	11.04	0.34	11.56	0.50	7.93	34.536	0.56	22.6	8.22	93.9
	3D	5	0.06	0.36	0.22	20.66	0.30	11.22	0.36	11.60	0.98	73.33	34.496	0.90	22.6	8.22	91.2
	4S	10	0.07	0.14	0.10	18.90	0.28	15.29	0.35	15.53	0.49	18.71	34.610	0.63	22.6	8.22	90.5
	4D	10	0.12	0.11	0.61	18.50	0.31	12.05	0.43	12.77	1.87	10.21	34.618	0.56	22.6	8.22	90.8
	5S	50	0.05	0.04	BDL	18.67	0.28	12.45	0.33	12.49	0.32	1.52	34.769	0.35	22.6	8.22	90.3
	5D	50	0.07	0.05	0.10	19.07	0.28	12.59	0.35	12.74	0.21	7.56	34.768	0.43	22.6	8.22	91.1
	6S	100	0.10	0.05	0.03	3.18	0.18	4.82	0.28	4.90	0.30	10.79	34.562	0.85	23.0	8.15	100.4
	6D	100	0.10	0.05	0.02	3.08	0.18	4.41	0.28	4.49	0.31	10.23	34.563	0.82	23.1	8.15	100.2
	7S	500	0.10	0.05	0.07	2.99	0.19	4.81	0.29	4.93	0.27	12.98	34.571	1.67	24.3	8.16	99.6
	7D	500	0.11	0.05	0.06	2.71	0.19	5.65	0.30	5.76	0.27	11.97	34.575	1.62	24.2	8.15	100.0
O-W	1S	0.1	0.09	40.40	0.26	88.15	0.44	8.08	0.53	48.73	2.69	9.07	32.596	2.25	22.6	8.10	105.5
	2S	1	0.08	10.00	0.74	41.47	0.27	10.37	0.34	21.12	0.70	8.07	34.010	1.16	22.6	8.10	107.1
	3S	5	0.06	2.29	0.16	25.53	0.22	7.38	0.28	9.84	0.49	10.25	34.461	0.75	22.7	8.11	101.6
	3D	5	0.14	1.11	0.25	21.76	0.26	8.48	0.40	9.84	0.89	11.12	34.515	1.14	22.7	8.10	99.3
	4S	10	0.07	0.49	0.18	21.80	0.24	8.25	0.30	8.91	1.65	12.95	34.473	0.65	22.7	8.10	99.3
	4D	10	0.06	0.52	0.19	23.75	0.25	7.44	0.31	8.16	0.54	6.36	34.464	0.75	22.7	8.11	99.4
	5S	50	0.07	0.10	BDL	19.23	0.26	7.54	0.33	7.64	0.77	7.57	34.703	0.25	22.7	8.11	98.8
	5D	50	0.12	0.07	0.14	21.06	0.93	19.87	1.05	20.09	0.25	7.62	34.699	0.30	22.7	8.11	99.0
	6S	100	0.09	0.06	0.03	3.00	0.21	5.09	0.30	5.17	0.35	15.32	34.573	0.96	23.0	8.14	101.4
	6D	100	0.09	0.06	0.02	3.10	0.24	5.48	0.33	5.55	0.35	14.16	34.551	0.89	23.1	8.14	99.4
	7S	500	0.08	0.06	0.01	2.82	0.20	6.48	0.29	6.55	0.26	9.51	34.582	1.45	24.3	8.15	100.8
	7D	500	0.10	0.06	0.01	2.44	0.20	6.75	0.29	6.83	0.11	10.49	34.588	1.54	24.4	8.16	100.7
O-C	1S	0.1	0.08	7.59	0.12	31.55	0.31	7.58	0.39	15.30	1.32	11.82	34.162	0.81	22.6	8.10	99.3
	2S	1	0.20	1.91	0.13	25.71	0.30	12.12	0.49	14.16	0.95	26.63	34.446	0.63	22.6	8.10	101.6
	3S	5	0.07	2.04	0.19	28.74	0.28	10.38	0.35	12.61	0.92	9.56	34.426	0.83	22.5	8.12	107.9
	3D	5	0.05	1.39	0.08	25.90	0.31	11.04	0.36	12.51	1.32	17.02	34.470	0.58	22.5	8.12	104.4
	4S	10	0.05	0.31	BDL	21.09	0.26	7.44	0.30	7.75	0.98	5.92	34.625	0.39	22.5	8.11	102.5
	4D	10	0.05	0.15	0.08	20.36	0.32	6.76	0.37	6.99	0.89	8.08	34.627	0.46	22.5	8.11	101.8
	5S	50	0.09	0.09	BDL	20.19	0.25	14.97	0.34	15.06	0.02	5.32	34.656	0.26	22.6	8.11	100.3
	5D	50	0.08	0.06	0.01	20.90	0.24	4.54	0.32	4.61	0.29	6.62	34.656	0.21	22.6	8.11	100.8
	6S	100	0.09	0.06	0.02	2.92	0.21	8.19	0.30	8.27	1.20	10.97	34.623	1.43	23.3	8.15	102.3
	6D	100	0.10	0.03	0.03	2.54	0.20	6.10	0.30	6.17	0.50	6.12	34.630	1.49	23.4	8.16	101.8
	7S	500	0.10	0.04	0.03	2.74	0.18	5.59	0.27	5.65	0.38	6.53	34.588	1.36	24.2	8.15	100.0
	7D	500	0.10	0.04	0.02	2.36	0.20	5.52	0.30	5.58	0.16	7.30	34.587	1.34	24.3	8.15	99.8
O-E	1S	0.1	0.08	8.36	0.43	29.92	0.29	17.74	0.36	26.03	0.50	7.23	34.080	1.68	22.9	8.18	104.4
	2S	1	0.08	7.19	0.61	29.41	0.34	17.74	0.42	25.54	0.39	22.29	34.149	1.41	22.9	8.17	104.6
	3S	5	0.07	0.10	BDL	20.50	0.28	15.24	0.35	15.34	0.53	7.66	34.579	0.30	22.9	8.17	104.7
	3D	5	0.08	0.10	0.10	20.33	0.29	14.65	0.36	14.86	0.34	11.20	34.581	0.43	22.9	8.17	104.6
	4S	10	0.08	0.07	0.10	19.29	0.27	13.37	0.35	13.55	0.32	11.97	34.584	0.28	22.9	8.17	104.7
	4D	10	0.09	0.08	0.10	18.91	0.27	14.72	0.36	14.89	0.11	11.11	34.583	0.25	22.9	8.17	104.8
	5S	50	0.11	0.08	0.14	10.09	0.26	15.77	0.37	16.00	0.15	10.28	34.580	0.24	22.9	8.17	105.5
	5D	50	0.10	0.08	0.07	11.24	0.32	14.71	0.42	14.86	0.28	9.52	34.577	0.28	22.9	8.17	105.6
	6S	100	0.10	0.06	0.03	2.39	0.21	7.69	0.31	7.78	0.18	7.67	34.601	1.56	23.3	8.15	102.3
	6D	100	0.09	0.04	0.05	2.46	0.20	5.08	0.28	5.17	0.19	5.34	34.600	1.40	23.7	8.16	101.8
	7S	500	0.06	0.04	0.02	2.27	0.19	5.66	0.24	5.72	0.13	no data	34.613	0.71	24.4	8.14	103.1
	7D	500	0.09	0.04	0.02	2.18	0.17	4.83	0.26	4.89	0.22	7.62	34.616	0.76	24.5	8.16	99.2
KA	1S	0.1	0.11	0.22	0.26	12.38	0.36	17.32	0.47	17.79	0.94	9.06	34.626	0.76	23.4	8.23	105.2
	2S	1	0.06	0.16	0.17	12.40	0.34	16.43	0.40	16.76	0.33	7.68	34.581	0.70	23.4	8.23	105.3
	3S	5	0.08	0.09	0.18	12.24	0.46	18.86	0.54	19.14	1.45	10.92	34.624	0.87	23.4	8.23	104.6
	3D	5	0.07	0.10	0.16	11.13	0.43	19.19	0.49	19.45	0.32	7.94	34.623	0.70	23.4	8.23	105.3
	4S	10	0.10	0.10	0.22	11.20	0.40	19.54	0.50	19.86	0.30	8.03	34.641	0.80	23.4	8.23	105.6
	4D	10	0.08	0.10	0.11	8.92	0.44	16.82	0.52	17.03	0.34	12.73	34.695	0.65	23.4	8.23	105.1
	5S	50	0.11	0.07	0.24	9.03	0.39	19.17	0.50	19.48	0.45	5.48	34.664	0.50	23.4	8.23	105.2
	5D	50	0.10	0.08	0.13	9.69	0.43	17.70	0.53	17.90	0.33	8.61	34.657	0.90	23.4	8.23	105.0
	6S	100	0.10	0.04	0.05	2.47	0.20	5.41	0.30	5.51	0.18	6.82	34.593	1.22	23.8	8.15	102.5
	6D	100	0.08	0.05	0.03	2.85	0.19	6.01	0.27	6.10	0.27	6.97	34.585	1.16	23.5	8.16	101.8
	7S	500	0.10	0.05	0.03	2.28	0.17	4.80	0.26	4.89	0.10	7.68	34.610	0.85	24.4	8.15	102.2
	7D	500	0.10	0.05	0.02	2.19	0.16	5.33	0.26	5.40	0.08	12.21	34.605	0.88	24.4	8.15	100.8
KALOI GULCH			0.11	0.11	0.63	1.21	0.30	6.32	0.41	7.06	0.07	2.08	35.003	0.11	25.7	8.22	93.0

* Shall vary no more that 1 °C from "ambient conditions"

** Shall not deviate more than 0.5 units from a value of 8.

TABLE 2. Water chemistry measurements off Ocean Pointe collected on March 16, 2004. Concentrations of nutrients are shown as micrograms per liter (µg/L). Abbreviations as follows: S=surface, D=deep, DFS=distance from shore; BDL=below detection limit. Also shown are the State of Hawaii, Department of Health (DOH) "not to exceed more than 10% of the time" and "not to exceed more than 2% of the time" water quality standards for open coastal waters under "wet" conditions. Shaded and boxed values exceed DOH 10% standards. For site locations, see Figure 1

SITE	NO	DFS (m)	PO4 (µg/L)	NO3 (µg/L)	NH4 (µg/L)	Si (µg/L)	TOP (µg/L)	TON (µg/L)	TP (µg/L)	TN (µg/L)	TURB (ntu)	TSS (mg/L)	SAL (ppt)	CHL a (µg/L)	TEMP (deg C)	pH	O2 (%sat)
DOH	10% std			14.00	8.50				40.00	250	1.25			0.90	*	**	
	2% std			26.00	15.00				60.00	350	2.00			1.75			
CONTROL	1S	0.1	2.85	29.02	0.64	601.86	8.92	12.03	11.77	198.02	1.44	14.69	34.464	0.49	22.6	7.82	103.5
	2S	1	2.83	12.42	5.13	539.13	8.63	127.87	11.46	145.42	1.03	12.14	34.516	0.55	22.6	8.21	99.3
	3S	5	2.10	5.06	2.22	508.67	8.28	12.03	10.39	161.84	0.50	7.93	34.536	0.56	22.6	8.22	98.9
	3D	5	1.97	5.10	3.08	580.69	0.33	157.05	11.30	165.24	0.98	73.33	34.496	0.90	22.6	8.22	91.2
	4S	10	2.19	1.91	1.36	531.10	8.81	214.08	10.99	217.36	0.49	18.71	34.610	0.63	22.6	8.22	90.5
	4D	10	3.71	1.49	8.59	519.94	9.51	158.69	13.23	179.78	1.87	10.21	34.618	0.56	22.6	8.22	90.8
	5S	50	1.56	0.61	BDL	524.72	8.61	174.36	10.16	174.93	0.32	1.52	34.769	0.35	22.6	8.22	90.3
	5D	50	2.25	0.68	1.48	535.83	8.60	176.23	10.85	178.32	0.21	7.66	34.768	0.40	22.6	8.22	91.1
	6S	100	3.14	0.69	0.45	89.24	5.57	67.47	8.71	68.61	0.30	10.79	34.562	0.85	23.0	8.15	100.4
	6D	100	3.13	0.71	0.29	86.67	5.57	61.81	8.71	62.81	0.31	10.23	34.563	0.82	23.1	8.15	100.2
	7S	500	3.12	0.73	0.96	84.10	5.90	67.36	9.03	69.07	0.27	12.98	34.571	1.67	24.3	8.16	99.6
	7D	500	3.34	0.76	0.77	76.17	6.01	79.12	9.35	80.65	0.27	11.97	34.575	1.62	24.2	8.15	100.0
D-W	1S	0.1	2.71	565.57	3.62	2476.91	13.58	113.10	16.29	682.29	2.69	9.07	32.590	2.25	22.6	8.10	105.5
	2S	1	2.34	140.03	10.36	1165.26	8.24	145.26	10.58	295.64	0.70	8.07	34.010	1.16	22.6	8.10	107.1
	3S	5	1.84	32.02	2.49	717.28	6.77	103.29	8.62	137.80	0.49	10.25	34.461	0.75	22.7	8.11	101.6
	3D	5	4.32	15.61	3.56	611.33	8.19	118.74	12.51	137.81	0.89	11.12	34.515	1.14	22.7	8.10	99.3
	4S	10	2.04	6.82	2.54	612.72	7.09	115.44	9.33	124.79	1.65	12.95	34.473	0.68	22.7	8.10	99.3
	4D	10	1.91	7.82	2.68	567.47	7.78	104.18	9.69	114.18	0.54	6.36	34.464	0.75	22.7	8.11	99.4
	5S	50	2.25	1.40	BDL	540.26	8.02	105.56	10.27	106.96	0.77	7.57	34.703	0.75	22.7	8.11	98.8
	5D	50	3.77	0.98	2.01	591.81	28.82	278.24	32.59	281.23	0.25	7.62	34.699	0.30	22.7	8.11	99.0
	6S	100	2.88	0.78	0.40	84.31	6.46	71.25	9.34	72.43	0.35	15.32	34.573	0.96	23.0	8.14	101.4
	6D	100	2.64	0.80	0.24	87.10	7.46	76.69	10.10	77.73	0.35	14.19	34.551	0.89	23.1	8.14	99.4
	7S	500	2.52	0.82	0.19	79.16	6.35	90.71	8.88	91.72	0.25	9.51	34.582	1.45	24.3	8.15	100.6
	7D	500	2.96	0.84	0.19	68.54	6.12	94.53	9.09	95.57	0.11	10.49	34.588	1.54	24.4	8.16	100.7
O-C	1S	0.1	2.57	106.32	1.65	886.66	9.63	106.17	12.20	214.14	1.32	11.82	34.162	0.81	22.6	8.10	99.3
	2S	1	6.11	26.68	1.80	722.35	9.20	169.74	15.32	198.23	0.05	26.63	34.446	0.63	22.6	8.10	101.6
	3S	5	2.06	28.54	2.67	807.46	8.76	145.31	10.82	178.51	0.92	9.56	34.426	0.83	22.5	8.12	107.9
	3D	5	1.56	19.42	1.13	727.72	9.50	154.53	11.07	175.08	1.32	17.02	34.470	0.58	22.5	8.12	104.4
	4S	10	1.43	4.38	BDL	592.51	8.01	104.10	9.44	108.47	0.98	5.92	34.625	0.39	22.5	8.11	102.5
	4D	10	1.65	2.13	1.12	572.22	8.81	94.61	11.56	97.87	0.89	8.08	34.627	0.46	22.5	8.11	101.6
	5S	50	2.82	1.26	BDL	567.44	7.67	209.58	10.48	210.83	0.02	5.32	34.656	0.26	22.6	8.11	100.3
	5D	50	2.56	0.84	0.19	587.32	7.51	63.54	10.07	64.58	0.29	6.62	34.656	0.21	22.6	8.11	100.0
	6S	100	2.64	0.87	0.30	82.00	6.57	114.67	9.41	115.83	1.20	10.97	34.623	1.43	23.3	8.15	102.3
	6D	100	3.06	0.49	0.46	71.42	0.23	85.43	9.29	86.38	0.50	6.12	34.630	1.49	23.4	8.16	101.0
	7S	500	3.05	0.51	0.35	76.89	5.46	78.26	8.51	79.12	0.38	6.53	34.588	1.36	24.2	8.15	100.0
	7D	500	3.04	0.53	0.30	66.25	6.23	77.31	9.27	78.15	0.16	7.30	34.587	1.34	24.3	8.15	99.8
O-E	1S	0.1	2.43	117.07	0.98	840.79	8.88	241.32	11.31	364.36	0.50	7.23	34.080	1.68	22.9	8.18	104.4
	2S	1	2.41	100.65	8.57	826.31	10.47	248.40	12.88	357.62	0.39	22.29	34.149	1.41	22.9	8.17	104.5
	3S	5	2.27	1.42	BDL	576.03	8.54	213.32	10.81	214.74	0.53	7.66	34.579	0.30	22.9	8.17	104.7
	3D	5	2.37	1.46	1.40	571.27	8.91	205.13	11.28	208.00	0.34	11.20	34.581	0.43	22.9	8.17	104.6
	4S	10	2.47	1.04	1.45	542.13	8.39	187.17	10.87	189.67	0.32	11.97	34.584	0.28	22.9	8.17	104.7
	4D	10	2.60	1.08	1.35	531.34	8.42	206.07	11.11	208.50	0.11	11.11	34.583	0.25	22.9	8.17	104.8
	5S	50	3.51	1.12	2.01	283.55	7.97	220.83	11.47	223.95	0.15	10.28	34.583	0.24	22.9	8.17	105.5
	5D	50	3.13	1.16	0.93	315.77	9.91	205.95	13.04	208.04	0.28	9.62	34.577	0.28	22.9	8.17	105.6
	6S	100	3.08	0.80	0.47	67.04	6.45	107.68	9.52	108.96	0.18	7.67	34.601	1.56	23.3	8.15	102.3
	6D	100	2.47	0.55	0.68	69.04	6.35	71.11	8.82	72.34	0.19	5.84	34.600	1.40	23.7	8.16	101.8
	7S	500	1.78	0.50	0.25	63.76	5.81	79.23	7.59	80.06	0.13	no data	34.613	0.71	24.4	8.14	103.1
	7D	500	2.79	0.60	0.25	61.17	5.35	67.61	8.14	68.46	0.22	7.62	34.616	0.76	24.5	8.16	99.2
KA	1S	0.1	3.47	3.02	3.63	347.87	11.14	242.43	14.62	249.09	0.94	9.06	34.626	0.76	23.4	8.23	105.2
	2S	1	1.89	2.19	2.40	348.36	10.54	230.03	12.44	234.62	0.33	7.68	34.581	0.70	23.4	8.23	105.3
	3S	5	2.35	1.32	2.50	344.08	11.33	264.08	16.68	267.90	1.45	10.92	34.624	0.87	23.4	8.23	104.6
	3D	5	2.09	1.36	2.29	312.79	13.18	266.60	15.28	272.26	0.32	7.94	34.623	0.70	23.4	8.23	105.3
	4S	10	3.03	1.40	3.10	314.59	12.50	273.55	15.52	278.06	0.30	8.03	34.641	0.80	23.4	8.23	105.6
	4D	10	2.53	1.44	1.57	250.56	13.68	235.48	16.21	238.49	0.34	12.73	34.695	0.65	23.4	8.23	105.1
	5S	50	3.30	1.03	3.30	270.36	12.01	268.44	15.36	272.77	0.45	5.48	34.664	0.50	23.4	8.23	105.2
	5D	50	3.09	1.07	1.76	272.25	13.29	247.74	16.38	250.58	0.33	8.61	34.657	0.90	23.4	8.23	105.0
	6S	100	3.11	0.62	0.73	69.34	6.12	75.78	9.23	77.14	0.18	6.82	34.593	1.22	23.6	8.15	102.5
	6D	100	2.54	0.74	0.47	80.20	5.91	84.12	8.45	85.33	0.27	6.97	34.585	1.16	23.5	8.16	101.8
	7S	500	2.98	0.74	0.47	64.15	5.12	67.22	8.11	68.43	0.10	7.68	34.610	0.86	24.4	8.15	102.2
	7D	500	3.06	0.69	0.31	61.56	5.01	74.66	8.10	75.66	0.08	12.21	34.605	0.88	24.4	8.15	100.8
KALOI GULCH			3.41	1.54	8.82	34.00	9.30	88.48	12.71	98.84	0.07	2.08	35.003	0.11	25.7	8.22	99.9

* Shall vary no more that 1 °C from "ambient conditions"

** Shall not deviate more than 0.5 units from a value of 8.1

TABLE 3. P-values for single factor analysis of variance (ANOVA) for pre-construction (n=9) and during construction (n=26) surface water chemistry data within 10 m of the shoreline at the four sampling transects off the Ocean Pointe Project. Shaded boxes indicate instances where means were higher during construction compared to preconstruction (see Figures 4-11). Shaded and circled values indicate significant (P≤0.05) increases during construction. For transect location, see Figure 1.

TRANSECT	CONSTITUENT	DISTANCE FROM SHORE (m)			
		0.1	1	5	10
CONTROL	SILICA	0.82	0.99	0.86	0.67
	NITRATE	0.37	0.99	0.12	0.11
	PHOSPHATE	0.54	0.33	0.43	0.25
	AMMONIUM	0.62	0.64	0.57	0.10
	TURBIDITY	0.09	0.28	0.20	0.14
	CHLa	0.46	0.54	0.59	0.9
OCEAN WEST	SILICA	0.56	0.07	0.16	0.34
	NITRATE	0.29	0.01	0.00	0.06
	PHOSPHATE	0.20	0.21	0.62	(0.03)
	AMMONIUM	0.29	0.31	0.25	0.07
	TURBIDITY	0.11	0.89	0.19	0.56
	CHLa	0.62	0.07	0.25	0.42
OCEAN CENTRAL	SILICA	0.13	0.20	0.06	0.35
	NITRATE	0.03	0.00	0.36	0.68
	PHOSPHATE	0.44	0.60	0.16	(0.04)
	AMMONIUM	0.09	0.80	0.34	0.65
	TURBIDITY	0.05	0.11	0.07	0.06
	CHLa	0.61	0.84	0.73	0.85
OCEAN EAST	SILICA	0.17	0.11	0.01	0.06
	NITRATE	0.03	0.03	0.02	0.01
	PHOSPHATE	(0.03)	0.08	(0.04)	0.08
	AMMONIUM	0.43	0.59	0.33	0.13
	TURBIDITY	0.53	0.08	0.9	0.92
	CHLa	0.55	0.50	0.74	0.84

TABLE 4. Geometric means of total suspended solids (TSS) at each sampling distance from shore during the construction period of the Ocean Pointe Project (March 1998 to March 2004, n=24). Also shown are results of 2-way analysis of variance where station is the sampling location at each distance from shore at each of the four transects.

SITE	SAMPLE NO.	DFS (m)	GEOMETRIC MEAN (n=24)	2-WAY ANOVA			
				STATION	df=3	DATE	df=23
				F	signif.	F	signif.
CONTROL	1S	0.1	13.26	2.94	0.04	4.58	0.00
O-W	1S	0.1	10.46				
O-C	1S	0.1	9.76				
O-E	1S	0.1	9.96				
CONTROL	2S	1	12.01	1.53	0.21	4.01	0.00
O-W	2S	1	9.08				
O-C	2S	1	9.48				
O-E	2S	1	9.97				
CONTROL	3S	5	10.05	2.53	0.06	4.60	0.00
O-W	3S	5	8.40				
O-C	3S	5	8.80				
O-E	3S	5	10.21				
CONTROL	3D	5	11.34	3.62	0.17	2.60	0.00
O-W	3D	5	8.18				
O-C	3D	5	8.41				
O-E	3D	5	10.66				
CONTROL	4S	10	10.27	2.59	0.06	5.12	0.00
O-W	4S	10	8.53				
O-C	4S	10	7.48				
O-E	4S	10	9.59				
CONTROL	4D	10	9.63	1.69	0.18	5.01	0.00
O-W	4D	10	8.84				
O-C	4D	10	8.12				
O-E	4D	10	9.89				
CONTROL	5S	50	8.02	1.30	0.28	6.60	0.00
O-W	5S	50	7.26				
O-C	5S	50	6.36				
O-E	5S	50	7.67				
CONTROL	5D	50	8.75	2.15	0.10	7.74	0.00
O-W	5D	50	7.58				
O-C	5D	50	6.00				
O-E	5D	50	8.10				
CONTROL	6S	100	7.37	3.85	0.01	5.19	0.00
O-W	6S	100	6.44				
O-C	6S	100	5.05				
O-E	6S	100	6.01				
CONTROL	6D	100	8.11	1.98	0.12	2.20	0.01
O-W	6D	100	6.07				
O-C	6D	100	5.60				
O-E	6D	100	5.32				
CONTROL	7S	500	4.06	0.59	0.62	4.87	0.00
O-W	7S	500	4.12				
O-C	7S	500	4.34				
O-E	7S	500	3.50				
CONTROL	7D	500	4.85	5.57	0.00	5.78	0.00
O-W	7D	500	3.96				
O-C	7D	500	3.65				
O-E	7D	500	3.09				

TABLE 5. Geometric means of water chemistry measurements collected from four sites off Ocean Pointe during surveys conducted between June 1990 and March 2004 (N=40 surveys for the West, East and Control sites; N=35 for the Central site). Concentrations of nutrients are shown in micromolar units (µM). For calculation of geometric means, detection limits were used for sample data below the detectable limit. Abbreviations as follows: S=surface; D=deep; DFS=distance from shore. Also shown are State of Hawaii, Department of Health (DOH) geometric mean water quality standards for open coastal waters under "wet" conditions. Shaded and boxed values exceed DOH geometric mean standards. For sampling site locations, see Figure 1.

SITE	NO	DFS (m)	PO4 (µM)	NO3 (µM)	NH4 (µM)	Si (µM)	TOP (µM)	TON (µM)	TP (µM)	TN (µM)	TURB (ntu)	SAL (ppt)	CHL a (µg/L)	TEMP (deg C)	pH
DOH GM STD				0.36	0.25				0.64	10.71	0.50		0.30	*	**
CONTROL	1S	0.1	0.11	4.29	0.16	28.17	0.30	8.93	0.44	15.99	1.12	33.590	0.90	25.2	8.07
	2S	1	0.08	2.83	0.17	22.24	0.27	8.07	0.38	12.73	1.01	33.910	0.86	25.2	8.10
	3S	5	0.08	0.90	0.17	13.41	0.27	8.83	0.39	10.88	0.85	34.230	0.64	25.1	8.12
	3D	5	0.07	0.68	0.18	12.13	0.27	8.77	0.36	10.27	0.91	34.280	0.90	25.0	8.11
	4S	10	0.06	0.31	0.13	8.53	0.27	8.30	0.34	9.08	0.78	34.400	0.58	25.0	8.12
	4D	10	0.06	0.24	0.15	8.29	0.28	8.29	0.35	9.00	0.78	34.420	0.68	25.0	8.12
	5S	50	0.06	0.06	0.13	5.60	0.27	8.09	0.34	8.38	0.61	34.570	0.56	24.9	8.11
	5D	50	0.05	0.06	0.11	5.39	0.29	8.25	0.36	8.54	0.65	34.570	0.62	24.9	8.11
	6S	100	0.07	0.05	0.12	4.16	0.26	7.40	0.34	7.67	0.47	34.630	0.46	25.0	8.11
	6D	100	0.07	0.06	0.12	4.02	0.26	7.52	0.35	7.79	0.43	34.640	0.59	25.0	8.11
	7S	500	0.08	0.06	0.11	3.10	0.24	6.91	0.34	7.14	0.24	34.740	0.30	25.1	8.15
	7D	500	0.09	0.06	0.10	3.10	0.25	7.06	0.35	7.30	0.23	34.750	0.30	25.1	8.15
O-W	1S	0.1	0.09	3.18	0.18	24.66	0.29	8.10	0.40	14.47	1.14	33.740	0.93	25.1	8.09
	2S	1	0.08	2.48	0.24	19.19	0.26	8.86	0.36	13.67	0.81	34.000	0.76	25.2	8.12
	3S	5	0.05	0.52	0.14	9.82	0.26	8.34	0.33	10.13	0.69	34.340	0.67	25.1	8.12
	3D	5	0.06	0.42	0.15	9.56	0.27	8.59	0.34	10.31	0.67	34.340	0.78	25.1	8.13
	4S	10	0.05	0.25	0.15	7.91	0.26	8.38	0.33	9.37	0.67	34.420	0.67	25.1	8.12
	4D	10	0.06	0.27	0.15	7.82	0.27	8.47	0.35	9.38	0.66	34.430	0.71	25.0	8.12
	5S	50	0.06	0.12	0.12	5.30	0.26	7.96	0.33	8.40	0.52	34.580	0.51	25.0	8.11
	5D	50	0.06	0.10	0.14	4.96	0.28	8.13	0.36	8.54	0.50	34.590	0.56	25.0	8.11
	6S	100	0.07	0.06	0.12	3.81	0.25	7.20	0.34	7.46	0.36	34.670	0.37	25.1	8.13
	6D	100	0.08	0.06	0.12	3.61	0.26	7.35	0.35	7.61	0.33	34.690	0.46	25.1	8.13
	7S	500	0.09	0.05	0.12	3.43	0.23	6.97	0.34	7.19	0.21	34.730	0.29	25.1	8.15
	7D	500	0.09	0.06	0.11	3.24	0.24	6.90	0.35	7.14	0.21	34.760	0.28	25.1	8.15
O-C	1S	0.1	0.07	1.58	0.26	11.37	0.29	8.45	0.37	11.33	1.04	34.260	0.76	25.1	8.17
	2S	1	0.06	1.25	0.28	10.63	0.28	8.49	0.36	10.82	0.78	34.320	0.69	25.1	8.17
	3S	5	0.05	0.74	0.22	8.67	0.27	8.23	0.34	9.65	0.70	34.410	0.65	25.1	8.17
	3D	5	0.06	0.72	0.22	8.63	0.29	8.45	0.37	9.89	0.68	34.410	0.71	25.1	8.17
	4S	10	0.07	0.23	0.16	5.91	0.28	8.57	0.36	9.20	0.60	34.570	0.55	25.1	8.16
	4D	10	0.06	0.19	0.18	5.52	0.30	8.44	0.38	8.99	0.60	34.590	0.60	25.1	8.15
	5S	50	0.08	0.07	0.15	4.06	0.26	8.23	0.38	8.53	0.40	34.690	0.45	25.0	8.13
	5D	50	0.08	0.06	0.13	3.78	0.29	7.94	0.39	8.21	0.44	34.690	0.50	25.0	8.13
	6S	100	0.09	0.06	0.16	3.62	0.26	7.77	0.36	8.07	0.35	34.700	0.37	25.1	8.14
	6D	100	0.09	0.06	0.15	3.51	0.26	7.75	0.37	8.04	0.35	34.700	0.43	25.1	8.15
	7S	500	0.09	0.07	0.14	3.24	0.25	7.28	0.36	7.57	0.20	34.750	0.31	25.1	8.15
	7D	500	0.09	0.06	0.14	2.83	0.25	7.16	0.37	7.46	0.18	34.800	0.33	25.1	8.16
O-E	1S	0.1	0.07	1.41	0.25	10.71	0.29	8.40	0.38	12.21	0.99	34.180	0.71	25.4	8.20
	2S	1	0.06	1.06	0.21	9.78	0.29	8.29	0.36	11.53	0.84	34.260	0.65	25.4	8.20
	3S	5	0.06	0.26	0.17	6.58	0.28	8.18	0.36	9.93	0.78	34.440	0.58	25.3	8.19
	3D	5	0.07	0.22	0.17	6.48	0.28	8.64	0.36	10.14	0.76	34.470	0.65	25.3	8.19
	4S	10	0.07	0.14	0.17	4.86	0.27	8.41	0.37	9.11	0.71	34.590	0.55	25.2	8.17
	4D	10	0.07	0.14	0.16	4.92	0.29	8.49	0.38	9.13	0.68	34.590	0.55	25.2	8.17
	5S	50	0.08	0.08	0.13	4.13	0.28	8.27	0.38	8.68	0.45	34.660	0.45	25.1	8.15
	5D	50	0.08	0.09	0.10	4.36	0.29	8.46	0.40	8.91	0.49	34.630	0.53	25.2	8.15
	6S	100	0.09	0.08	0.13	3.77	0.26	7.61	0.36	7.92	0.33	34.680	0.37	25.2	8.14
	6D	100	0.10	0.08	0.11	3.53	0.25	7.75	0.37	8.06	0.31	34.690	0.40	25.2	8.15
	7S	500	0.10	0.07	0.13	3.27	0.25	7.08	0.37	7.41	0.18	34.730	0.27	25.2	8.15
	7D	500	0.10	0.06	0.10	3.00	0.25	6.92	0.36	7.16	0.17	34.780	0.28	25.3	8.16

* Shall vary no more that 1 °C from "ambient conditions"

** Shall not deviate more than 0.5 units from a value of 8.1

TABLE 6. Geometric means of water chemistry measurements collected from four sites off Ocean Pointe during surveys conducted between June 1990 and March 2004 (N=40 surveys for the West, East and Control sites; N=35 for the Central site). Concentrations of nutrients are shown as micrograms per liter (µg/L). For calculation of geometric means, detection limits were used for sample data below the detectable limit. Abbreviations as follows: S=surface; D=deep; DFS=distance from shore. Also shown are State of Hawaii, Department of Health (DOH) geometric mean water quality standards for open coastal waters under "wet" conditions. Shaded and boxed values exceed DOH geometric mean standards. For sampling site locations, see Figure 1.

SITE	NO.	DFS (m)	PO4 (µg/L)	NO3 (µg/L)	NH4 (µg/L)	Si (µg/L)	TOP (µg/L)	TON (µg/L)	TP (µg/L)	TN (µg/L)	TURB (ntu)	SAL (ppt)	CHL a (µg/L)	TEMP (deg C)	pH
DOH GM STD				**5.00**	**3.50**				**20.00**	**150.0**	**0.50**		**0.30**	*	**
CONTROL	1S	0.1	3.41	60.06	2.24	794.4	9.30	125.0	13.64	223.86	1.12	33.590	0.90	25.2	8.07
	2S	1	2.48	39.62	2.38	627.2	8.37	113.0	11.78	178.22	1.01	33.910	0.86	25.2	8.10
	3S	5	2.48	12.60	2.38	378.2	8.37	123.6	12.09	152.32	0.85	34.230	0.64	25.1	8.12
	3D	5	2.17	9.52	2.52	342.1	8.37	122.8	11.16	143.78	0.91	34.280	0.90	25.0	8.11
	4S	10	1.86	4.34	1.82	240.5	8.37	116.2	10.54	127.12	0.78	34.400	0.58	25.0	8.12
	4D	10	1.86	3.36	2.10	233.8	8.68	116.1	10.85	126.00	0.78	34.420	0.68	25.0	8.12
	5S	50	1.86	0.84	1.82	157.9	8.37	113.3	10.54	117.32	0.61	34.570	0.56	24.9	8.11
	5D	50	1.55	0.84	1.54	152.0	8.99	115.5	11.16	119.56	0.65	34.570	0.62	24.9	8.11
	6S	100	2.17	0.70	1.68	117.3	8.06	103.6	10.54	107.38	0.47	34.630	0.46	25.0	8.11
	6D	100	2.17	0.84	1.68	113.4	8.06	105.3	10.85	109.06	0.43	34.640	0.59	25.0	8.11
	7S	500	2.48	0.84	1.54	87.4	7.44	96.7	10.54	99.96	0.24	34.740	0.30	25.1	8.15
	7D	500	2.79	0.84	1.40	87.4	7.75	98.8	10.85	102.20	0.23	34.750	0.30	25.1	8.15
O-W	1S	0.1	2.79	44.52	2.52	695.4	8.99	113.4	12.40	202.58	1.14	33.740	0.93	25.1	8.09
	2S	1	2.48	34.72	3.36	541.2	8.06	124.0	11.16	191.38	0.81	34.000	0.76	25.2	8.12
	3S	5	1.55	7.28	1.96	276.9	8.06	116.8	10.23	141.82	0.69	34.340	0.67	25.1	8.12
	3D	5	1.86	5.88	2.10	269.6	8.37	120.3	10.54	144.34	0.67	34.340	0.78	25.1	8.13
	4S	10	1.55	3.50	2.10	223.1	8.06	117.3	10.23	131.18	0.67	34.420	0.67	25.1	8.12
	4D	10	1.86	3.78	2.10	220.5	8.37	118.6	10.85	131.32	0.66	34.430	0.71	25.0	8.12
	5S	50	1.86	1.68	1.68	149.5	8.06	111.4	10.23	117.60	0.52	34.580	0.51	25.0	8.11
	5D	50	1.86	1.40	1.96	139.9	8.68	113.8	11.16	119.56	0.50	34.590	0.56	25.0	8.11
	6S	100	2.17	0.84	1.68	107.4	7.75	100.8	10.54	104.44	0.36	34.670	0.37	25.1	8.13
	6D	100	2.48	0.84	1.68	101.8	8.06	102.9	10.85	106.54	0.33	34.690	0.46	25.1	8.13
	7S	500	2.79	0.70	1.68	96.7	7.13	97.6	10.54	100.66	0.21	34.730	0.29	25.1	8.15
	7D	500	2.79	0.84	1.54	91.4	7.44	96.6	10.85	99.96	0.21	34.760	0.28	25.1	8.15
O-C	1S	0.1	2.17	22.12	3.64	320.6	8.99	118.3	11.47	158.62	1.04	34.260	0.76	25.1	8.17
	2S	1	1.86	17.50	3.92	299.8	8.68	118.9	11.16	151.48	0.78	34.320	0.69	25.1	8.17
	3S	5	1.55	10.36	3.08	244.5	8.37	115.2	10.54	135.10	0.70	34.410	0.65	25.1	8.17
	3D	5	1.86	10.08	3.08	243.4	8.99	118.3	11.47	138.46	0.68	34.410	0.71	25.1	8.17
	4S	10	2.17	3.22	2.24	166.7	8.68	120.0	11.16	128.80	0.60	34.570	0.55	25.1	8.16
	4D	10	1.86	2.66	2.52	155.7	9.30	118.2	11.78	125.86	0.60	34.590	0.60	25.1	8.15
	5S	50	2.48	0.98	2.10	114.5	8.06	115.2	11.78	119.42	0.40	34.690	0.45	25.0	8.13
	5D	50	2.48	0.84	1.82	106.6	8.99	111.2	12.09	114.94	0.44	34.690	0.50	25.0	8.13
	6S	100	2.79	0.84	2.24	102.1	8.06	108.8	11.16	112.98	0.35	34.700	0.37	25.1	8.14
	6D	100	2.79	0.84	2.10	99.0	8.06	108.5	11.47	112.56	0.35	34.700	0.43	25.1	8.15
	7S	500	2.79	0.98	1.96	91.4	7.75	101.9	11.16	105.98	0.20	34.750	0.31	25.1	8.15
	7D	500	2.79	0.84	1.96	79.8	7.75	100.2	11.47	104.44	0.18	34.800	0.33	25.1	8.16
O-E	1S	0.1	2.17	19.74	3.50	302.0	8.99	117.6	11.78	170.94	0.99	34.180	0.71	25.4	8.20
	2S	1	1.86	14.84	2.94	275.8	8.99	116.1	11.16	161.42	0.84	34.260	0.65	25.4	8.20
	3S	5	1.86	3.64	2.38	185.6	8.68	114.5	11.16	139.02	0.78	34.440	0.58	25.3	8.19
	3D	5	2.17	3.08	2.38	182.7	8.68	121.0	11.16	141.96	0.76	34.470	0.65	25.3	8.19
	4S	10	2.17	1.96	2.38	137.1	8.37	117.7	11.47	127.54	0.71	34.590	0.55	25.2	8.17
	4D	10	2.17	1.96	2.24	138.7	8.99	118.9	11.78	127.82	0.68	34.590	0.55	25.2	8.17
	5S	50	2.48	1.12	1.82	116.5	8.68	115.8	11.78	121.52	0.45	34.660	0.45	25.1	8.15
	5D	50	2.48	1.26	1.40	123.0	8.99	118.4	12.40	124.74	0.49	34.630	0.53	25.2	8.15
	6S	100	2.79	1.12	1.82	106.3	8.06	106.5	11.16	110.88	0.33	34.680	0.37	25.2	8.14
	6D	100	3.10	1.12	1.54	99.5	7.75	108.5	11.47	112.84	0.31	34.690	0.40	25.2	8.15
	7S	500	3.10	0.98	1.82	92.2	7.75	99.1	11.47	103.74	0.18	34.730	0.27	25.2	8.15
	7D	500	3.10	0.84	1.40	84.6	7.75	96.9	11.16	100.24	0.17	34.780	0.28	25.3	8.16

* Shall vary no more that 1 °C from "ambient conditions"

** Shall not deviate more than 0.5 units from a value of 8.1

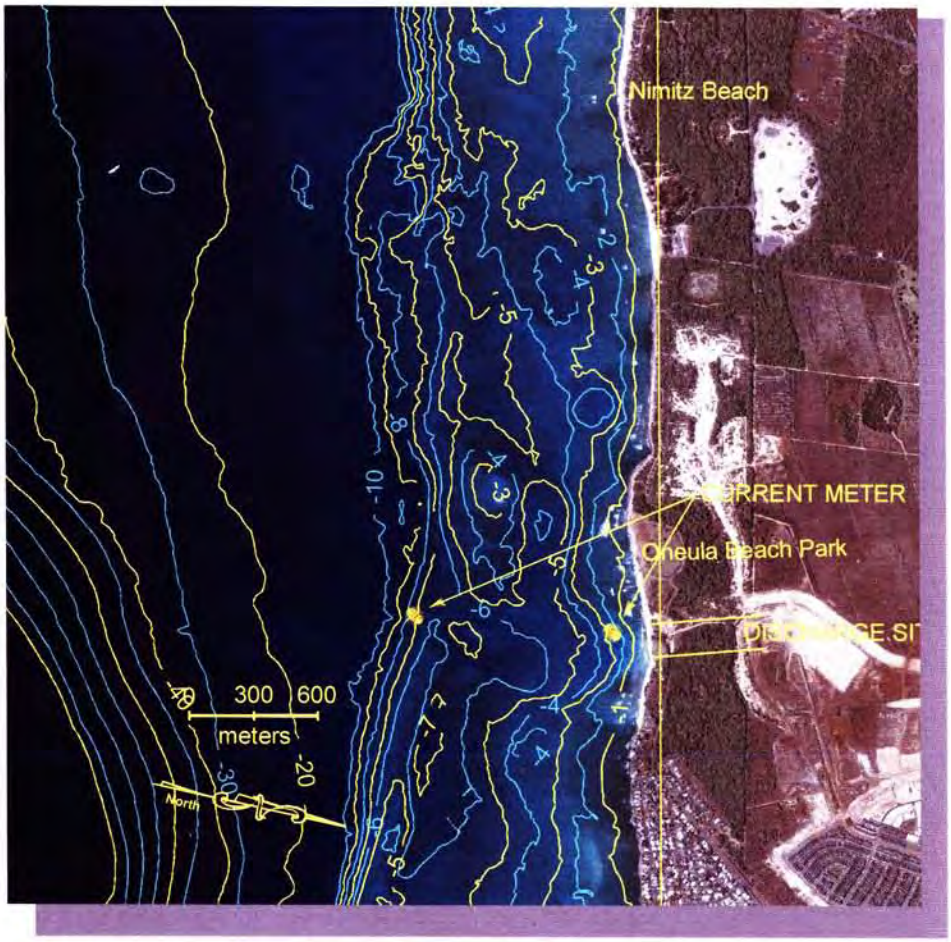
APPENDIX B-1

Numerical Modeling of Storm Drain Discharge

Plume Transport

NUMERICAL MODELING OF
STORM DRAIN DISCHARGE PLUME TRANSPORT
OCEAN POINTE MARINA, OAHU

August, 2004



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NUMERICAL MODELING OF STORM DRAIN DISCHARGE PLUME TRANSPORT OCEAN POINTE MARINA, OAHU

August 2004

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#3-41

NUMERICAL MODELING OF
STORM DRAIN DISCHARGE PLUME TRANSPORT
OCEAN POINTE MARINA, OAHU

EXECUTIVE SUMMARY

- This report describes the development, application and results of a state-of-the-art computerized numerical transport model of the discharge plume from a 150 meters wide drainage swale that is proposed along the shoreline immediately east of Oneula Beach Park in Ewa, Oahu.

- A wide surf zone typically exists on the reef flat on either side of the discharge site. Current meter data collected at the site show that flow is predominantly to the west through southwest, with tidal reversals. Average speeds are 8.0-10.0 cm/s. Close to shore, currents are driven by a combination of waves and winds, and average 2 to 3 cm/s. Field observations indicate that during large wave events, an offshore rip current forms at the discharge site.

- An EPA approved, state-of-the-art model, EFDC (Environmental Fluid Dynamics Code), was used for the three dimensional hydrodynamic modeling of the discharge plume transport. The wave model REF/DIF was used to calculate wave direction, breaker heights and wave energy dissipation, which were then input into EFDC. The model incorporates the effects of wind, tide and wave driven currents, and allows simulation of discharge plume transport under a variety of possible conditions.

- The model was used to predict conditions over a range of possible runoff events and ocean conditions. Inputs to the model included: storm discharge outflow and suspended sediment load from 20-year and 10-year rain events; strong, moderate and weak tides; no waves, Kona waves and south swell; calm winds and Kona winds. Model results are summarized in the attached figures and table.

- The modeling results show that the site is characterized by good transport and mixing. In general, the plume generated by storm runoff discharge at the discharge site hugs the shoreline, and is transported initially either to the east during ebb tide, or west during flood tide. The current meter data indicated that currents flowing to the west and southwest are stronger and last longer than the ebb flows to the east and northeast. Thus, the bulk of the discharge plume transport is to the west to southwest. However, episodes of predominant flow to the east infrequently occur, and could result in net plume transport to the east.

- The Ocean Pointe storm discharge system has an extremely large inland retention capacity. Thus, the 8-inch (10-year) rainfall event represents the threshold for discharge into the ocean; runoff from any lesser rainfall event will be retained inland and will not discharge into the ocean. Because of this large retention capacity, the runoff from the 10-year event lasts only 3 hours, and results in discharge of only small quantities of water and suspended sediment into the ocean. Calm seas ensuing from no waves or winds result in a poor (worst case) mixing environment for the plume. During these calm conditions and moderate tides, the plume from the 10-year discharge event will meet the State DOH salinity standard of 31.5 ppt

within 6 hours after the discharge ends (Figure 2 Executive Summary) and will extend a maximum 2,300 meters along the coast, and 500 meters offshore (Figure 1 Executive Summary).

- The suspended sediment concentration (TSS) in the discharge is relatively low. At the point of greatest deposition close to the outlet, the model calculates that the 10-year event results in deposition of only 0.12 mm (0.005 inches) of sediment. Deposition rapidly diminishes with distance from the discharge. Suspended solids concentrations in the water in the project area are calculated to approach ambient levels of about 10 mg/l approximately 1 day after the end of the storm discharge (Figure 3 Executive Summary).

- Perfectly calm conditions are rare at the project site. Incorporation of Kona winds and waves into the model results in a dramatic increase in mixing and a decrease in sediment deposition. Kona waves reduce the maximum plume dimensions to about 500 x 170 meters (Figure 1 Executive Summary). Water salinity falls below State water quality standards only for a brief time immediately offshore of the discharge site. Similarly, suspended sediment concentrations in the water return to ambient levels within 6 hours of the peak discharge. This is because the breaking waves efficiently mix and diffuse the plume throughout the water column.

- Worst-case conditions at the site are represented by the 20-year discharge event occurring when there are no waves or wind to promote mixing and dispersion. Model results are summarized in the attached table (Runs 1 to 4). They show that although the discharge plume from such an infrequent event is much larger, the time required for the plume affected waters to meet the State DOH salinity standard of 31.5 ppt is a maximum of 12 hours after the peak discharge outflow. The suspended sediment load in the discharge results in deposition of 1.9 mm of sediment (0.07 inches) at the point of greatest deposition immediately offshore of the discharge site. Deposition rapidly diminishes with distance from the discharge. Suspended solids concentrations in the water in the project area are calculated to approach ambient levels of about 10 mg/l approximately 1 day after the end of the storm discharge. Incorporation of waves into the model results in a dramatic increase in mixing and decrease in sediment deposition.

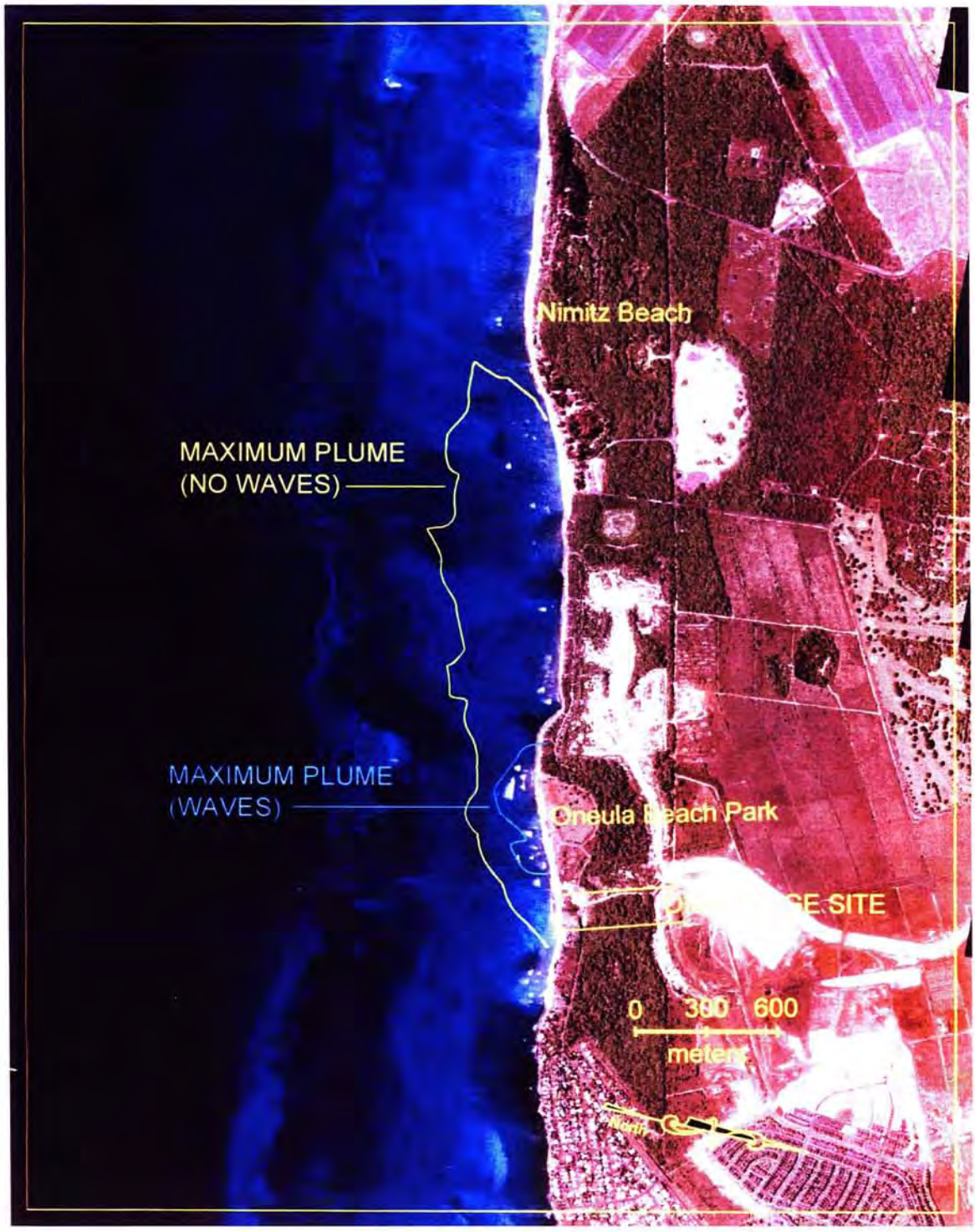

Figure 1 Executive Summary
Maximum plume size during a 10-year rain event, assuming no waves (yellow line) and waves (blue line), and moderate tides. The plume is defined by the 31.5 ppt salinity concentration (or 10% of initial discharge concentration).

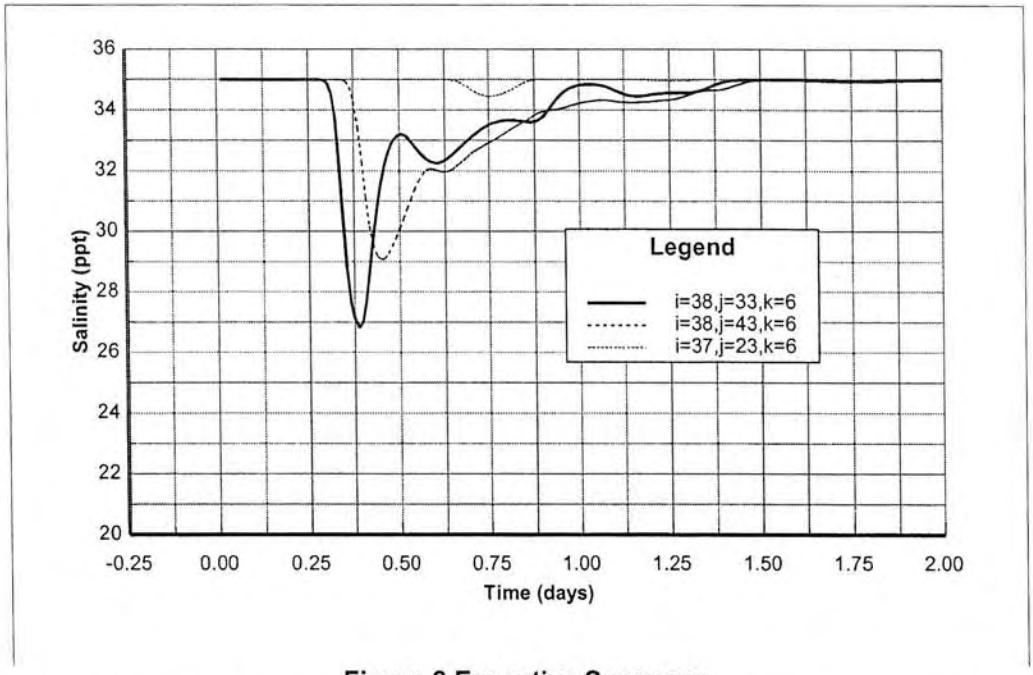

Figure 2 Executive Summary

Surface layer salinity time series during the 10-year rain event at locations 300 meters offshore of discharge site (i=38,j=33), 1000 meters west of discharge site (i=38,j=43) and 1000 meters east of discharge site (i=37,j=23)

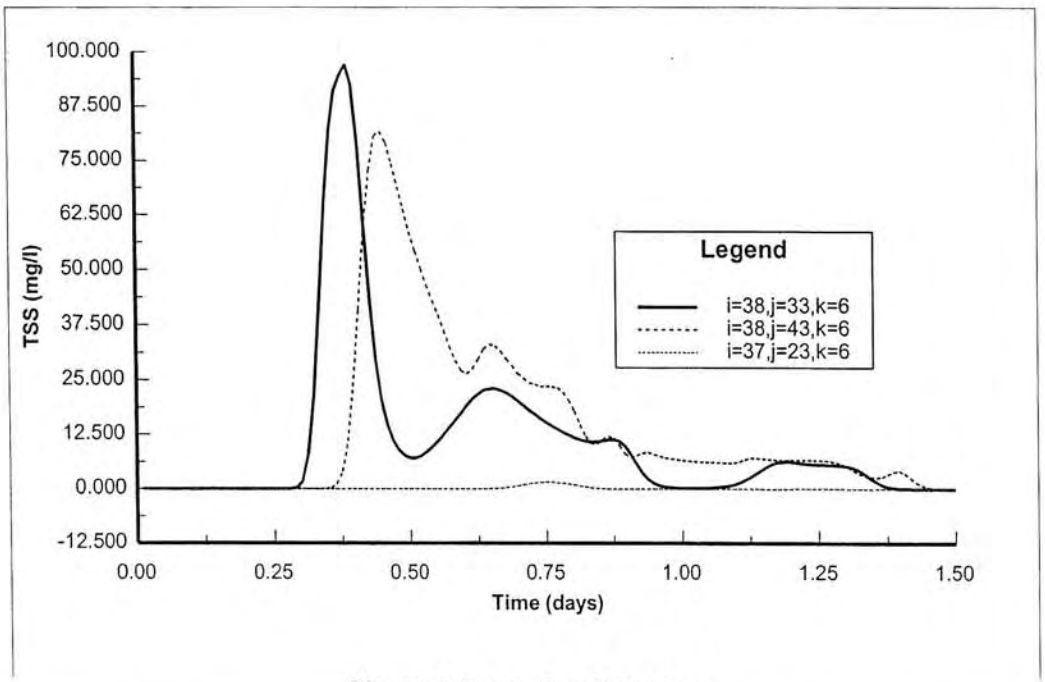

Figure 3 Executive Summary

Surface layer TSS time series during the 10-year rain event at locations 300 meters offshore of the discharge site (i=38,j=33), 1000 meters west of the discharge site (i=38,j=43) and 1000 meters east of discharge site (i=37,j=23).

Model Run Results

Run No.	Run Description	Maximum Plume Size (meters)	Time Required to Meet State DOH Salinity Standard of 31.5 ppt (hours)	Maximum Sediment Deposition (mm)	Time Required to Approach Ambient TSS Level (hours)
1	20-year discharge, moderate tide	1200 x 4500	12	1.9	24
2	20-year discharge, moderate ebb tide	1400 x 4200	12		
3	20-year discharge, strong tide	900 x 5500	8		
4	20-year discharge, weak tide	1500 x 3600	12		
5	20-year discharge, moderate tide, Kona wind and waves	800 x 3300	<3	0.75	12
6	20-year discharge, moderate tide, south swell	500 x 2400	<3		
7	10-year discharge, moderate tide	500 x 2300	6	0.125	24
8	10-year discharge, moderate tide, Kona wind and waves	170 x 500	<3	0.04	6

Note: Plume is defined as water with salinity below the State water quality standard of 31.5 ppt

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1. INTRODUCTION

The construction of a drainage swale, 150 meters wide, has been proposed along the shoreline immediately east of Oneula Beach Park in Ewa, Oahu, to discharge storm water from the upland developments. The construction of this storm drain outlet will result in infrequent storm discharge of a fresh water and suspended sediment plume into the ocean. Plume transport and mixing in coastal waters is a complex process that depends on the characteristics of the storm drain outlet, as well as those of the ambient receiving waters. The discharge plume will be transported and dispersed due to coastal waves and currents, and will also spread due to the buoyancy of the plume itself. To help evaluate these processes and possible impacts to the environment, Sea Engineering completed a measurement program of currents in the project site, and a numerical modeling analysis of plume transport and dispersion. The results of the current measurement program are presented in a previous report (Sea Engineering, 2004). This report presents the development, application and results of a state-of-the-art numerical transport model of the site. The model incorporates the effects of wind, tide and wave driven currents, and allows simulation of discharge plume transport under a variety of possible conditions.

2. PROJECT SITE

The proposed discharge location is known as Kaloi Gulch, and is located immediately east of Oneula Beach Park in Ewa, Oahu (Figure 2-1). The shoreline consists of a beach about 900 meters long, between low, rocky limestone bluffs. Figure 2-1 shows the bathymetry in the project area, derived from high-resolution lidar data. The figure shows that the bathymetry is characterized by a broad fringing reef with water depths less than 7 meters; offshore of the storm drainage outlet the reef is about 1,000 meters wide, to the east the reef broadens to about 2,000 meters wide. Immediately offshore of the drainage outlet (inshore of the -7 meter depth contour), a broad, shallow channel is present in the reef. A broad embayment is evident in the depth contours between the 40-meter and 100-meter water depths.

A wide surf zone typically exists on the reef flat on either side of the discharge site. Surfing is common in the area. In a companion project to this modeling effort, Sea Engineering deployed two current meters at the site during summer and winter conditions. One current meter was installed on the inner reef flat in 3 meters of water, approximately 150 meters offshore, and the other seaward of the reef flat in 7 meters of water, approximately 1,000 meters offshore (Figure 2-1). The current data at the offshore meter showed the upper layer flow (0 to 3-meter depth) is predominantly to the west to southwest, driven primarily by prevailing east to northeast tradewinds, while flow in the 1.5- to 4.5-meter depth is distinctly more tidal, showing clear current reversals with tides. Flood tidal currents flow to the west, while ebb tide flows to the east. Average current speeds were 8.0-10.0 cm/sec, and the maximum was 57 cm/s to the southwest. At the nearshore current meter location, currents were, on average, much weaker, driven by a combination of waves and winds. The average speed was 2 to 3 cm/s and the maximum speed was 41.6 cm/s (to the east-southeast). The maximum current speeds recorded by both the offshore and nearshore meters occurred during the strong Kona storm on February 27, 2004, which consisted of south to west winds of up to 30 knots, and large waves from the same direction. Field observations indicated that during large wave events, a rip current is driven offshore at the discharge site.

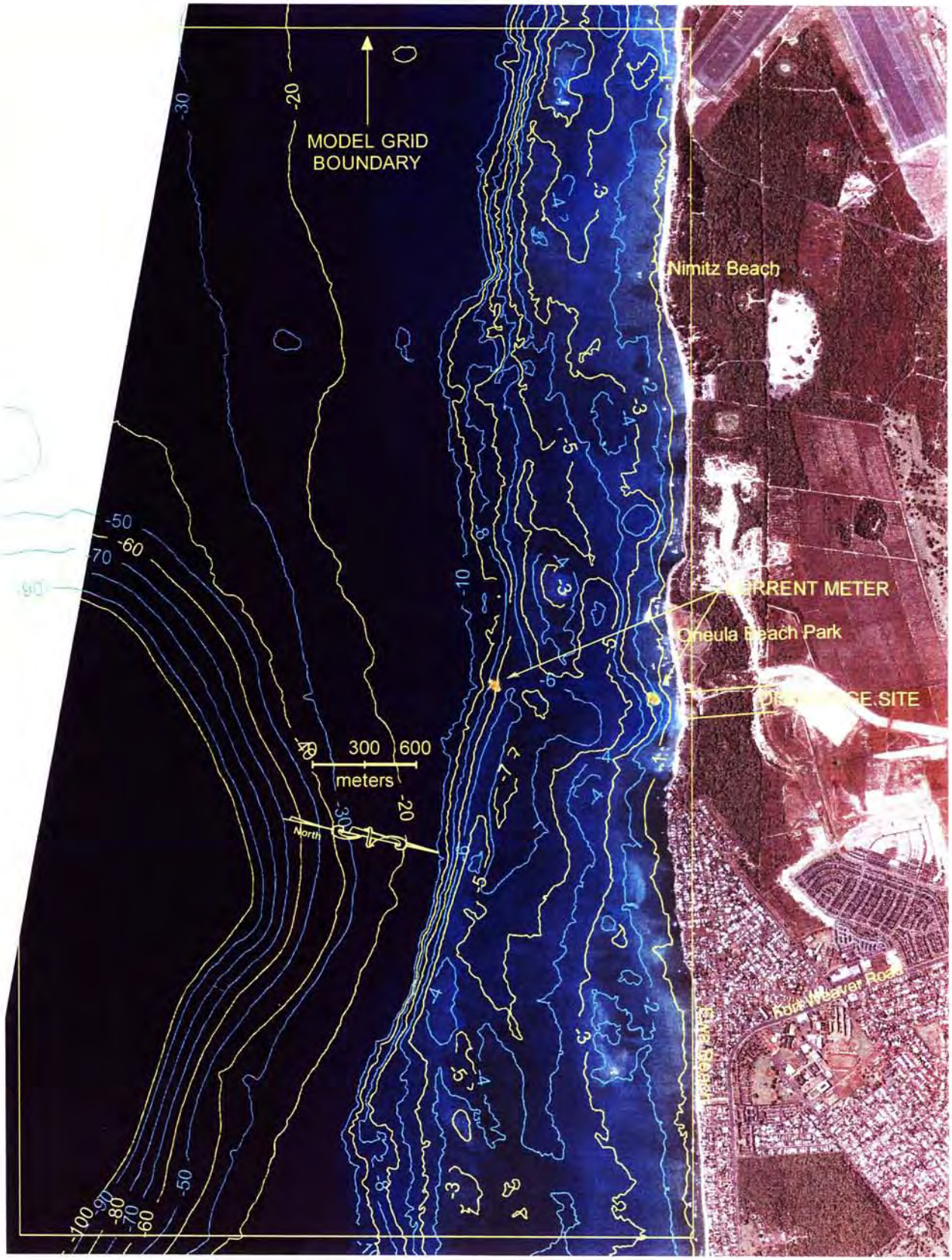


Figure 2-1. Project Site (depth contours in meters)

3. NUMERICAL MODEL

As described above, circulation and mixing in the project site are controlled by a combination of winds, tides and waves. During large wave events, the wave effects can dominate the nearshore currents and mixing. Our modeling approach was therefore structured to capture complex wave induced currents and mixing, as well as tide and wind-driven currents. This required use and integration of both a wave model, and a transport/circulation model. The wave model was used to calculate wave transformation, radiation stresses, and wave energy dissipation for input to the primary transport/circulation model.

3.1 Wave Model

The wave model REF/DIF, developed at the Center for Applied Coastal Research at the University of Delaware, is a wave propagation model that is used to calculate the change in wave characteristics due to refraction and diffraction as the wave progresses from deepwater to the shoreline. REF/DIF calculates zones of wave breaking, wave heights, wave direction, and wave energy dissipation. These are then used to drive nearshore mixing and transport.

3.2 Transport Model

The circulation/transport model used, EFDC (Environmental Fluid Dynamics Code), is an EPA approved, state-of-the-art, three dimensional hydrodynamic model developed at the Virginia Institute of Marine Science by John Hamrick (1996) to simulate hydrodynamics and water quality in rivers, lakes, estuaries, and coastal regions. The EPA describes the model as "one of the most widely used and technically defensible hydrodynamic models in the world." This model was selected because it has the following capabilities:

- The model is 3-dimensional, which allows for variations in water properties and currents at different depths.
- It allows input of nearshore wave radiation stresses and wave energy dissipation for simulation of surf zone circulation and transport.
- There are options for the input of numerous alternative discharge control structures such as culverts, weirs and spillways.
- The model allows input of time varying flows with time varying concentrations of contaminants.

To accurately model the transport of a freshwater plume or fine sediments in the coastal environment, it is critical to describe both the advective and diffusive transport. Currents are responsible for advective transport. The advective flux (q) can be quantitatively calculated by the mass concentration, C, of the substance of interest multiplied by the velocity, u, yielding $q = uC$. The advective flux generally accounts for the majority of transport in coastal systems. The nearshore currents move masses around much more rapidly than diffusive processes. At the project site, EFDC handles advective transport through the water column velocities. These velocities, as previously shown, are a result of tidal forces, wave forces, and wind.

Diffusive transport is due to molecular and turbulent transport processes. The molecular component is dispersion of a dissolved mass caused by the random motion of molecules in the water. The turbulent component of diffusion is the dispersion of mass due to the random motions in the fluid associated with turbulent flow. In coastal systems, turbulent diffusion generally exceeds molecular diffusion rates by many orders of magnitude.

When described mathematically in one dimension, the summation of the advective and diffusive components of mass transport into a mass flux (i.e. transport, q) term is

$$q = uC - K\frac{\partial C}{\partial x}$$

The second term is where the diffusive transport is quantified and K is the coefficient of turbulent diffusivity. The determination of K is a key component of mass transport and must be considered carefully. The diffusivity must be described in both the vertical and horizontal directions.

Horizontal Diffusivity - Turbulent eddies are responsible for mixing fluid in the horizontal, and the larger eddies mix more fluid. The size of these eddies can range from meters to kilometers. In general, the horizontal diffusivity (K_H) responsible for the dispersion of freshwater and/or sediments, is proportional to the velocity in the fluid and the physical size of the eddies. The range of K_H is therefore very large. Observations in the ocean have shown K_H ranges of 1 – 1000 m^2/s (Polzin et al., 1997; Ledwell et al., 1991).

EFDC uses the Smagorinsky (1963) method to calculate the horizontal diffusivity. The magnitude of the diffusivity in the model is proportional to the horizontal current shear. The Smagorinsky model has been well validated in coastal modeling studies over the past three decades. In addition to the diffusivity due to the current shear, wave dissipation plays a role in K_H. As waves move into shallow water regions, they disperse energy in the form of turbulence. This can be calculated as the wave dissipation. The dissipation of wave energy through the generation of turbulence increases as the wave shoals and is at a maximum as the wave breaks. This dissipation is calculated in the REF/DIF model and used as an input to EFDC. The wave dissipation acts as another source of turbulence and is hence added to the K_H determined from the currents in the Smagorinsky model.

Vertical Diffusivity - Vertical mixing is the product of not only current gradients in the vertical, but also buoyancy gradients. The buoyancy gradients, due to differences in density in the water column, can be responsible for stabilizing the water column and dampening vertical mixing. The force of gravity will work to achieve a stable equilibrium with less dense fluid over more dense fluid. Values for the vertical diffusivity, K_v, have been determined through observation to range from $1x10^{-5}$ – $1x10^{-3}$ m^2/s in the open ocean (Polzin et al., 1997; Ledwell et al., 1991). These values are up to 6 orders of magnitude smaller than horizontal mixing.

EFDC implements the Mellor and Yamada (1982) second moment turbulence closure model in the vertical that has been well validated for coastal ocean applications. The model as implemented in EFDC has been improved and further validated by Galperin et al. (1988). The

Mellor and Yamada model relates vertical turbulent diffusivity to turbulent intensity, turbulent length scale, and the Richardson number (a measure of the buoyancy effects in the flow). Once the vertical diffusivity has been calculated through the Mellor and Yamada model, the wave dissipation from the REF/DIF model is added in as a source of turbulence. The wave dissipation has a much larger relative effect in the vertical than the horizontal mixing and is responsible for significant vertical mixing.

Suspended sediment impacts are also assessed using EFDC. A suspended sediment concentration is included in the freshwater plume input. For a given distribution of sediments, the extent of suspended sediment transport is determined from the waves, turbulent diffusion, and offshore currents. Additionally, settling and deposition are calculated. Sediment deposition is evaluated by calculation of the critical shear stress term. Sediments will only deposit onto the bottom when the shear stress exerted by waves and currents on the bottom is less than the critical shear stress for deposition of particular sediment. The bottom shear stresses throughout the region due to waves and currents are calculated in EFDC, and sediment deposition determined. Sediment resuspension is not included in this analysis.

4. MODEL SETUP AND INPUTS

4.1 Model Domain and Grid

Both EFDC and REF/DIF require input of the regional coastal bathymetry. Figure 2-1 shows the bathymetry in the project area, derived from high-resolution lidar data. The figure show that the bathymetry is characterized by a broad fringing reef with water depths less than 7 meters; offshore of the storm drainage outlet, the reef is about 1,000 meters wide, to the east the reef broadens to about 2,000 meters wide. Immediately offshore of the drainage outlet (inshore of the -7 meter depth contour), a broad, shallow channel is present in the reef. Between the 40-meter and 100 meter water depths, a broad embayment is evident in the depth contours.

Bathymetry is represented in the numerical model through the creation of a grid and the specification of depth at each grid point. The model grid dimensions are a tradeoff between desired resolution and computer computation capability. Figure 4-1 shows the EFDC model grid. The grid was rotated to be aligned in the alongshore direction. The grid cell size is 100 meters on a side, and the overall grid dimensions are 70 grid cells in the alongshore direction (Pearl Harbor to Barbers Point) and 39 in the onshore-offshore direction (7,000 meters by 3,900 meters). The grid extends 3,800 meters to the west and 3,200 meters to the east of the discharge site. Figure 4-2 shows a color-coded representation of bathymetry overlain on the model grid.

Vertical variability in the water is modeled by dividing the water column into six layers whose thickness is a percentage of the total water depth, as shown in the table below.

Layer	Thickness (percentage of total depth)
6 (surface)	16.67
5	16.67
4	16.67
3	16.67
2	16.67
1 (bottom)	16.67

Figures 4-3 shows the depth variable vertical model grid.

4.2 Flow

Current flow into the model is specified along the bottom (east) boundary of the grid. Figure 4-1 shows these cells marked with an "x". EFDC requires that the flow be specified as a volume flux in units of cubic meters per second (m^3/s). To create realistic currents in the model, actual currents measured by the offshore current meter were used to apply the boundary flow condition. The current meter record was scanned to select a period with a strong tidal signal, and relatively calm wind and wave conditions. February 12, 2004 was selected; the measured currents in the 1.5- to 4.5-meter water depth layer, and the measured water level are shown in Figure 4-4.

Negative currents are directed to the west (Barbers Point), and positive currents flow toward the east (Diamond Head). The figure shows that flood tide flows to the west, and ebb tide flows to the east. The peak current speeds are 24 cm/s to the west, and 13 cm/s to the east. This tidal current record was converted into flow volumes, repeated to span three days, and applied to the bottom (east) boundary of the model. The February 12 currents represent relatively strong tidal currents at the project site. Moderate and weak tidal conditions were also simulated by reducing the strong tidal boundary flow conditions by 33% and 50%, respectively. The tidal flow boundary conditions used in the model are shown in Figure 4-5.

4.3 Water Level

The tidal water level variations corresponding to the February 12 currents were also incorporated into the model. The water level was applied along the top (west) boundary of the grid – designated with an "N" in Figure 4-1. Figure 4-6 shows that the peak flood tide elevations were 0.38 meters and 0.55 meters (mean lower low water datum), and the ebb tide levels were 0.19 meters and –0.05 meters.

4.4 Wind

Wind conditions at the project site can be categorized into three types: trade winds with average speed of 7.2 m/s and direction of 70 degrees, Kona winds with average speeds of 4.6 m/s and direction of 215 degrees, and calm conditions. The easterly tradewinds are most common, and occur nearly 70% of the time. Heavy rainfalls on the south shore, however, are most commonly associated with Kona winds or calm conditions. For this reason, Kona winds and calm conditions were used for our modeling analyses.

4.5 Waves

Waves are an important factor driving nearshore currents at the project site. In this modeling analysis, therefore, great effort was focused on incorporating the effects of waves into the EFDC transport model. This was accomplished by utilizing the wave model REF/DIF to transform the prevailing deep-water waves as they move into the nearshore waters at the project site. REF/DIF computes the nearshore wave direction, wave height, radiation stresses, and energy dissipation at each grid point in the model area. These parameters are then input into EFDC to drive nearshore currents and mixing.

The general Hawaiian wave climate can be described by four primary wave types; northeast tradewind waves, south swell, North Pacific swell, and Kona waves. Tradewind waves may be present in Hawaiian water throughout most of the year, but are most frequent between April and September, the summer season, when they usually dominate the Hawaiian wave climate. They result from the strong and steady tradewinds blowing from the northeast quadrant over long fetches of open ocean. The deepwater tradewind waves typically have periods of 6 to 8 seconds and heights of 1.2 to 3 meters.

South swell is generated by southern hemisphere storms and is most prevalent during the months of April through October. These long, low waves approach from the southeast through

southwest, with periods of 12 to 20 seconds and deepwater heights of 0.3 to 2 meters. North and northwest Pacific swell is produced by severe winter storms in the North Pacific Ocean. North and northwest swell may arrive in the Hawaiian Islands throughout the year but are largest and most frequent during the winter months of October through March. North or northeast swell is sometimes generated by winter storms northeast of the islands. North Pacific swell typically has periods of 12 to 20 seconds and heights of 1.5 to 4.5 meters.

Kona waves are generated by intense winds associated with local fronts or low-pressure systems and typically have periods ranging from 6 to 10 seconds and heights up to 3+ meters. These waves approach from the south to west, with the largest waves usually from the southwest. Deepwater wave heights during a severe Kona storm in January 1980 were about 5 meters with a period of 9 seconds.

The project site is partially sheltered from North swell, but is directly exposed to south swell and Kona storm waves, and partially exposed to tradewind waves wrapping around the island. The table below shows typical wave characteristics for the Ocean Pointe area. This data is derived from NOAA wave buoy 51027, which recorded directional wave data for a one year period in 1995. The buoy was located about 24 miles south of Lanai, and has similar wave exposure as the south coast of Oahu. Typical deepwater wave conditions for the project site are listed below.

Wave Type	Height (m)	Period (sec.)	Direction
Trade-wind Wave	1.8	6	120
South Swell	1.4	14	180
Kona Wave	1.3	9	215

As mentioned previously, heavy rainfalls along this coast are most often associated with Kona winds or calm conditions. Model runs were therefore completed using Kona wave conditions, and calm wave conditions. In addition, the south swell wave conditions produced a well developed rip current dynamic at the project site in the model; a model run was therefore also completed using south swell wave conditions to show the effect of rip currents on the plume transport.

4.6 Storm Discharge

The storm discharge scenarios were developed by the project hydraulic engineer – R.M. Towill Corporation – and included the following events:

- The actual November 5, 1996 severe rainfall applied to the project site assuming that the upland housing development was completed. This corresponds to a 9-inch rainfall, designated as a 20-year event. The discharge lasts 7 hours, begins at time 0.1 days, peaks at 0.33 days, and ends at 0.48 days. Peak flow is 98 cubic meters per second.
- An 8-inch rainfall classified as a 10-year event. The discharge begins at time 0.292 days, peaks at 0.33 days, and ends at 0.417 days, a total duration of 3 hours. Peak flow is 13.4 cubic meters per second.

Figure 4-7 shows the discharge hydrographs for these storms. The Ocean Pointe storm discharge system is designed to have an extremely large inland retention capacity to limit discharges into the ocean. The 8-inch (10-year) rainfall represents the approximate threshold for discharge meaning that any lesser rainfall event will be retained inland, and will not discharge to the ocean. Because of the large retention capacity, the hydrographs are characterized by very sharp peaks, which occur when the retention capacity is suddenly exceeded, and short durations of outflow. The 10-year event lasts 3 hours while the November 5, 1996 event (20-year) lasts 7 hours.

The 10 and 20-year flow events were selected for analysis because they represent significant events that have a reasonable probability of occurrence in any given year, and thus would likely be responsible for evident environmental impacts due to the outlet. Larger events, such as the 50 and 100-year flows are catastrophic, and would result in widespread discharge all around the island, and a continual discharge plume from multiple sources. Assessment of impacts of such catastrophic events would require analysis of the entire regional discharge system composed of multiple outlets.

4.7 Suspended Sediment Discharge

Total suspended sediment (TSS) loads and compositions corresponding to the storm discharges described in the previous section were also provided by R. M. Towill Corporation, the project hydraulic engineer. Suspended sediment transport and deposition were calculated for the 20-year and 10-year discharge events. Figure 4-8 shows the suspended sediment loads corresponding to these storms. The suspended sediment loads are assumed to be composed of 55% silt sized particles and 45% clay sized particles. Peak suspended solids concentrations are 3,045 mg/L silt and 2,491 mg/L clay (5,536 mg/L total) for the 20-year event, and 498 mg/L silt and 408 mg/L clay (906 mg/L total) for the 10-year event (Figure 4-8). The total sediment discharges for the 20-year and 10-year storms are approximately 1,703,000 kg and 55,875 kg, respectively.

The silt particle size diameter is 15 microns (.015 mm) and the clay particle size diameter is 1.5 microns (.0015 mm). The corresponding settling velocities for these particles are 0.0128 cm/s and 0.000128 cm/s, respectively. The approximate time required for silt and clay particles to settle 1 meter is 2.17 and 217 hours, respectively. This means that clay size particles can remain is suspension for several days.

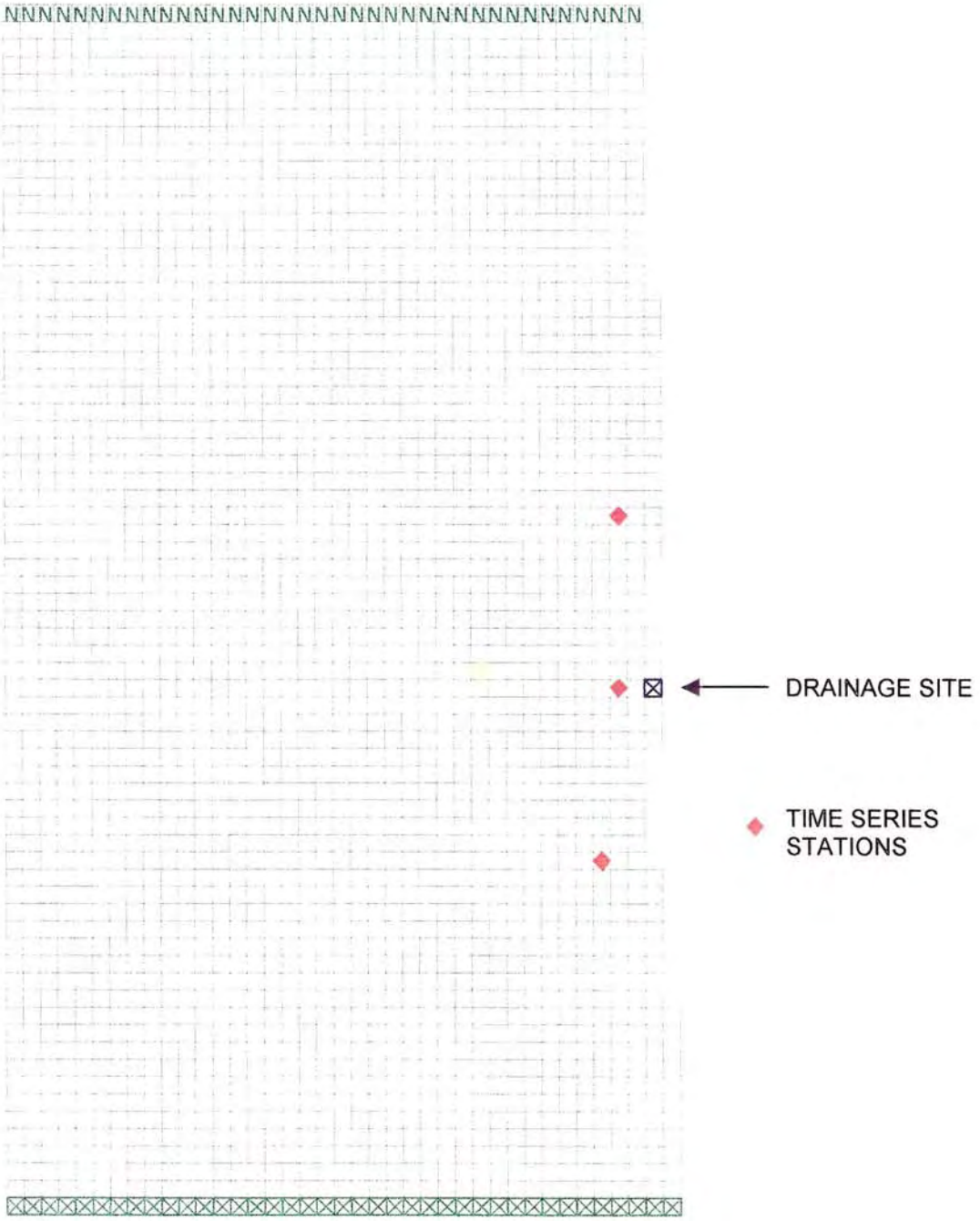


Figure 4-1. Model Grid with 39x70 cells. The cell size is 100x100 meters. Marked cells indicate boundary inputs.

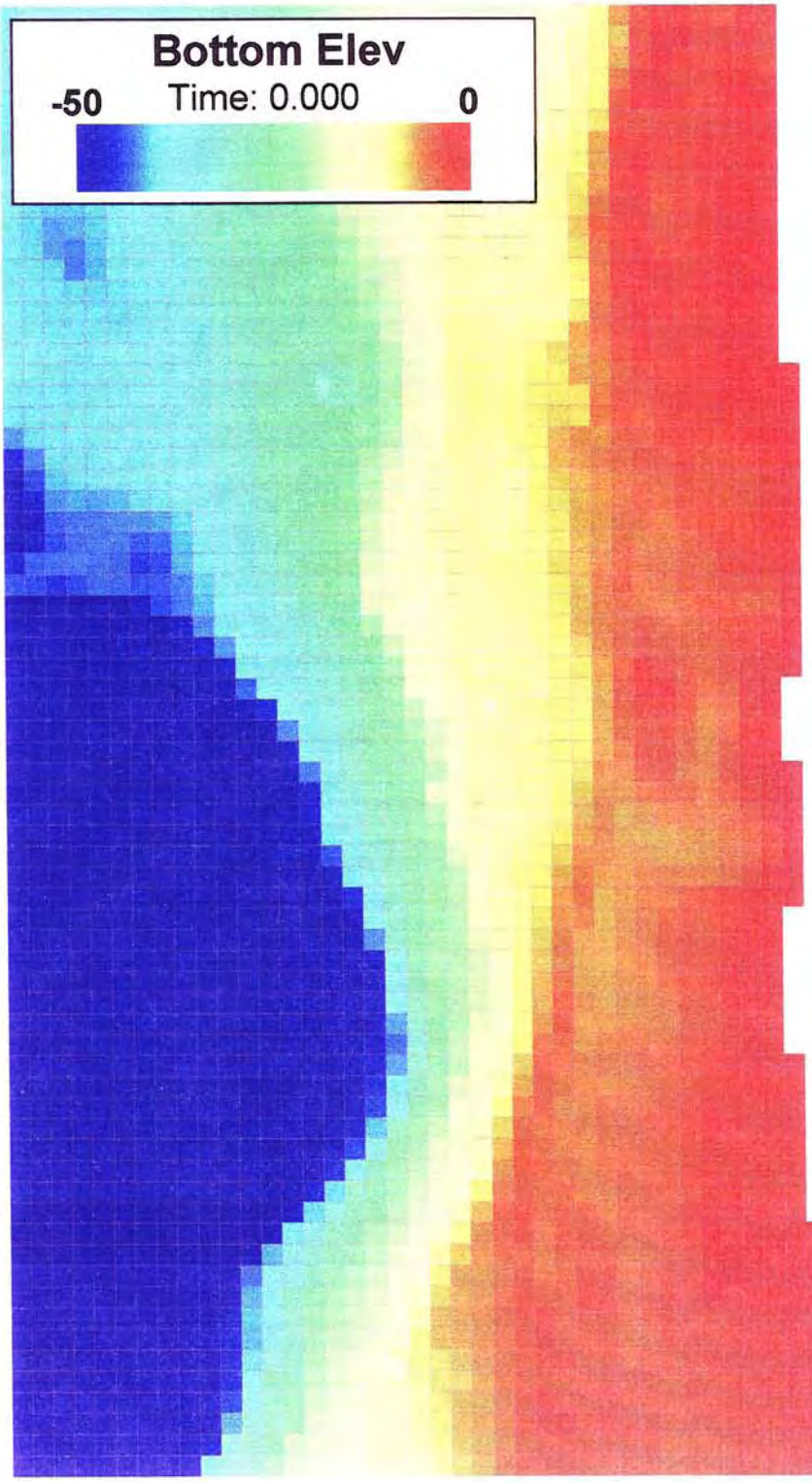


Figure 4-2. Color-coded model bathymetry (in meters) overlain on model grid.

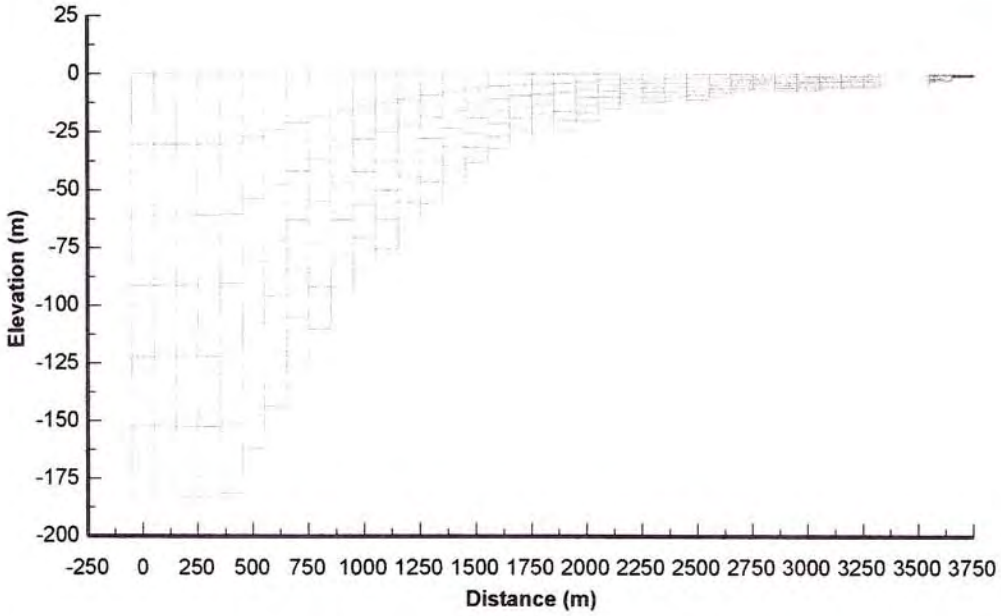


Figure 4-3. Vertical Layers in Model

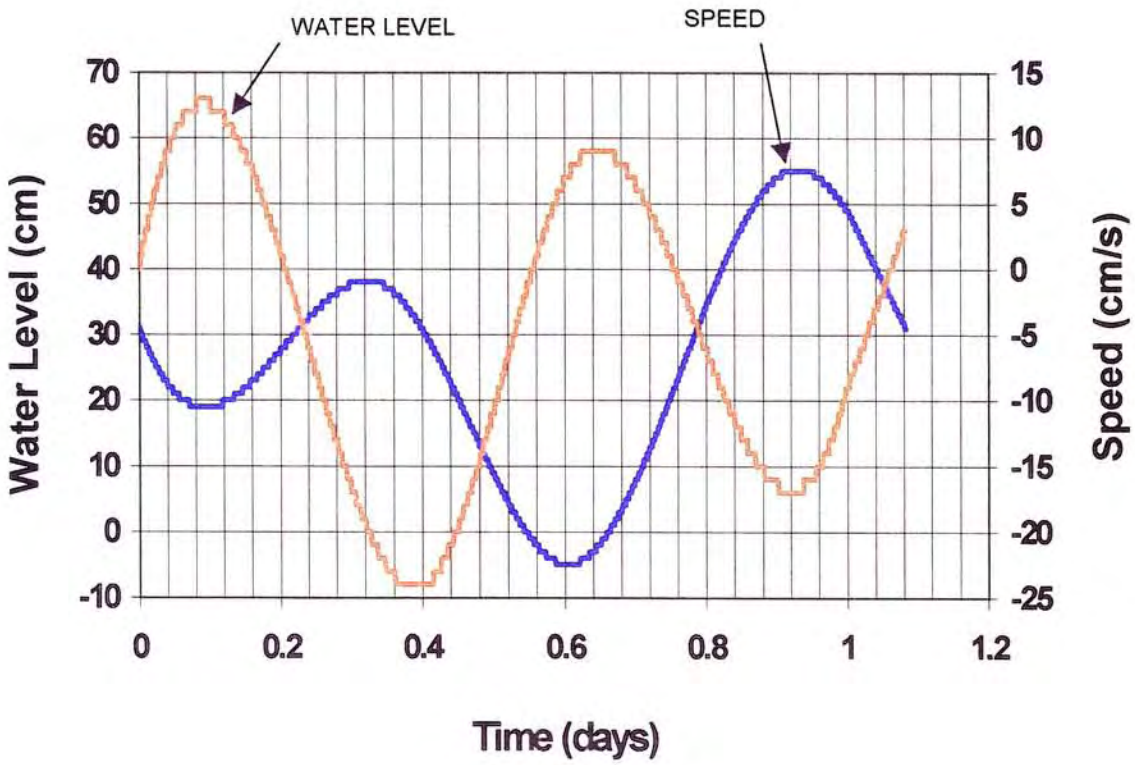


Figure 4-4. Water Level and Currents (5-15-foot water depth) measured at the offshore current meter on February 12, 2004. Positive speed indicates flow to the east, while negative values indicate flow to the west.

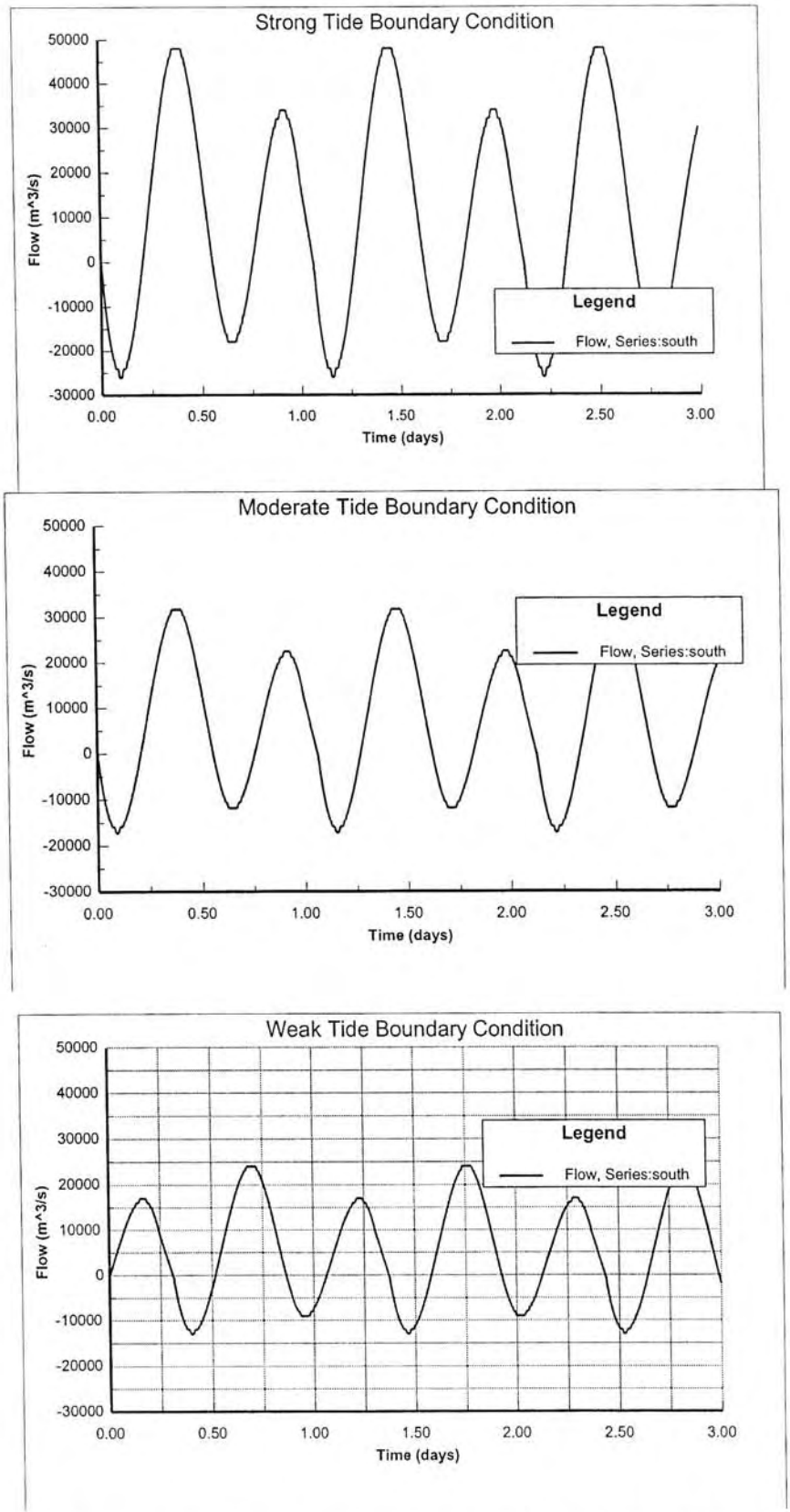


Figure 4-5. Strong (top), moderate (middle) and weak (bottom) tidal boundary flows.

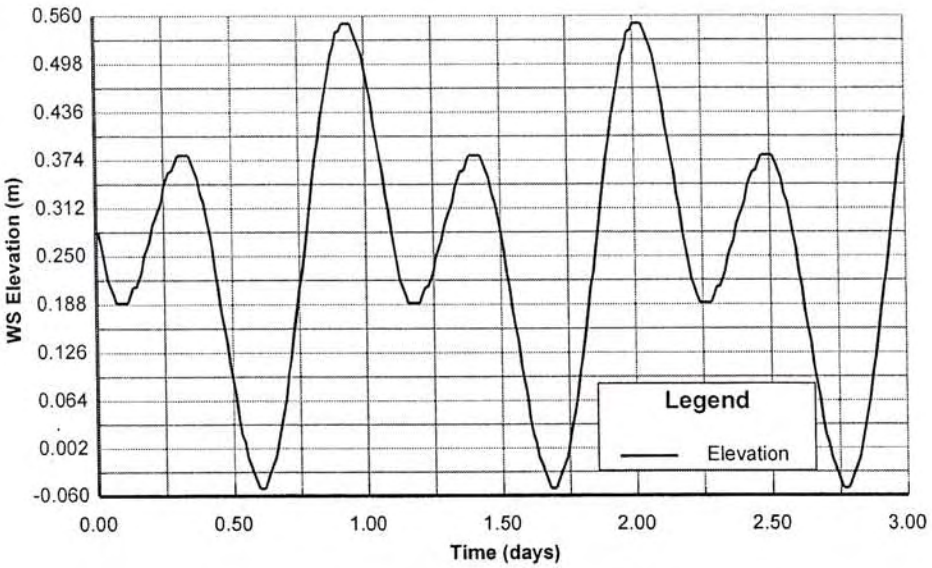


Figure 4-6. Water Surface Elevation Boundary Condition.

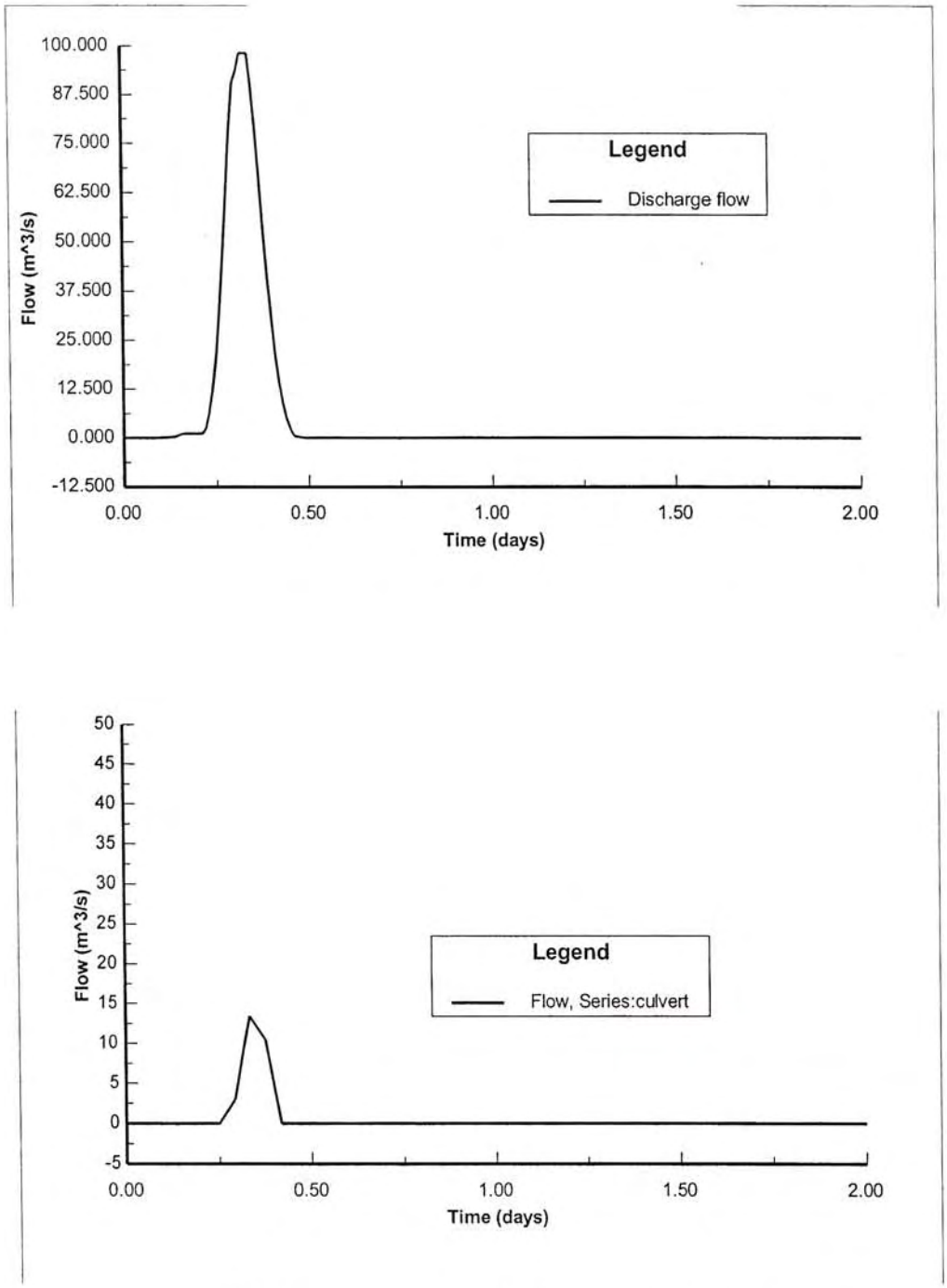
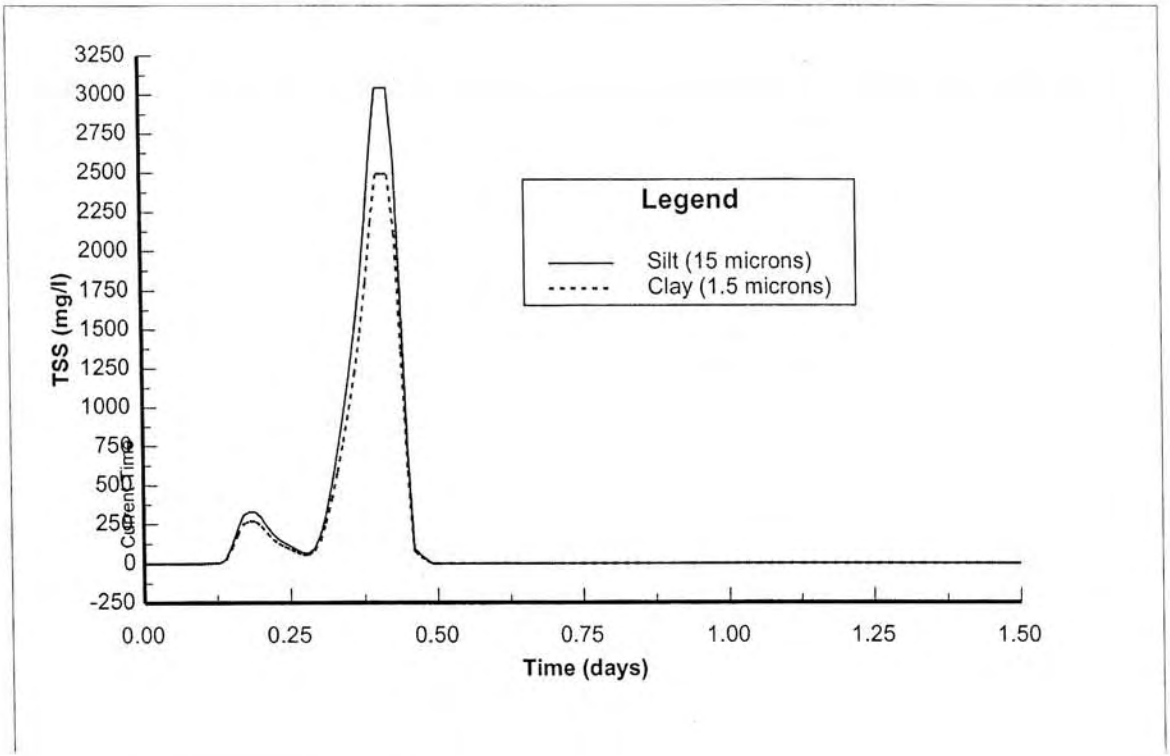


Figure 4-7. November 5, 1996 20-Year Discharge Hydrograph (top) and 10-Year Storm Discharge Hydrograph (bottom)



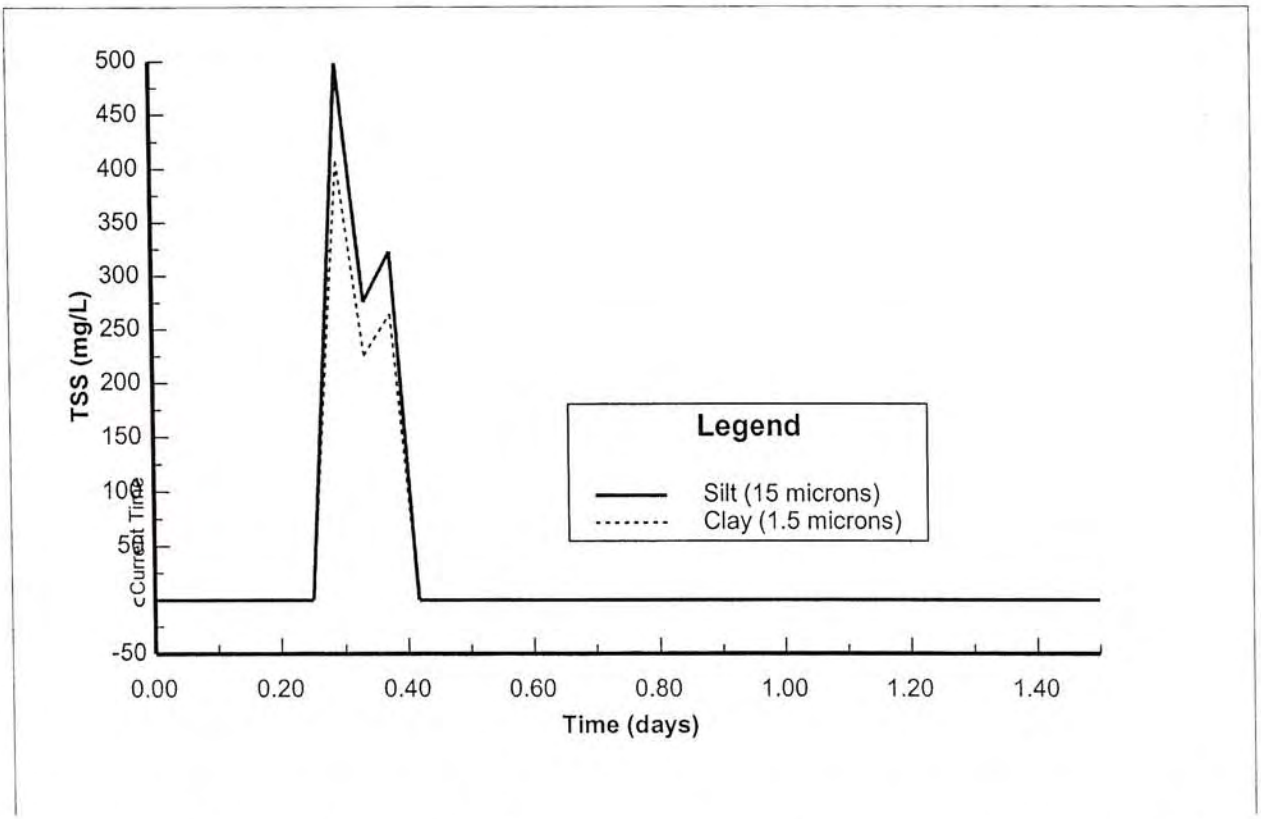


Figure 4-8. Suspended sediment loads corresponding to the 20-year storm discharge event (top) and 10-year discharge event (bottom).

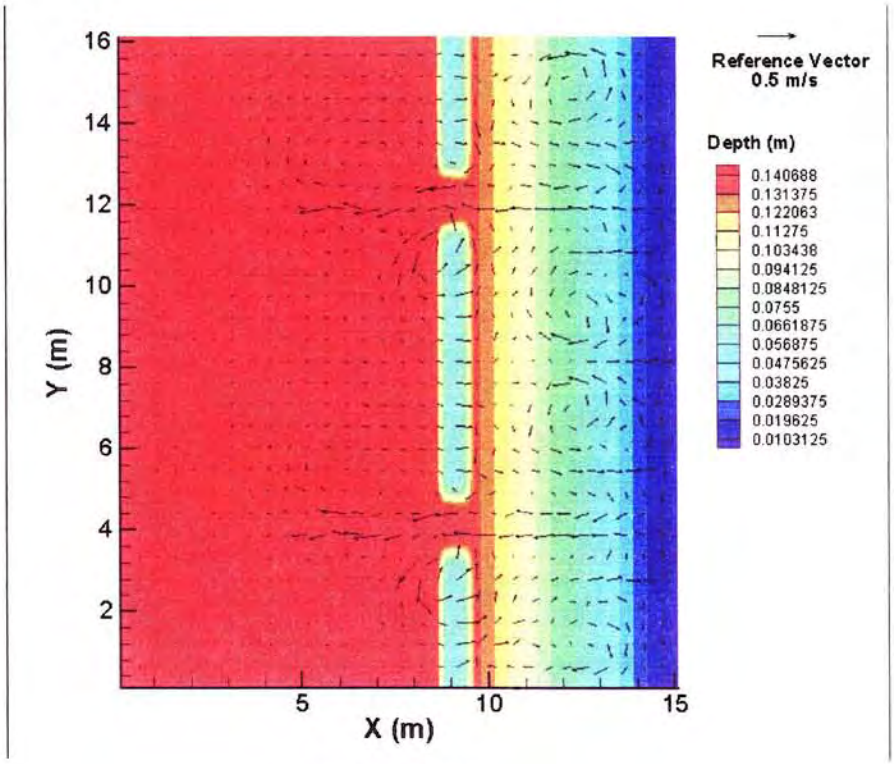
5. MODEL VERIFICATION

The first phase of modeling analyses is verifying that the model is both working correctly and also reasonably simulating the natural processes occurring at the site. As mentioned previously, EFDC has been successfully used previously to simulate circulation and transport in a multitude of environments, including the Chesapeake Bay, the Florida Everglades, the James and York River Estuaries, the Potomac River, San Francisco Bay, and Puget Sound. It has been calibrated and verified with extensive field data sets (Tetra Tech, 2002; www.epa.gov/athens/research/modeling/efdc.html). The incorporation of wave-driven currents and mixing into the transport model, however, represented a new development and application of the EFDC model, and therefore required careful verification. This verification was accomplished by comparing the EFDC results with SHORECIRC results published in a paper entitled *Analysis of Rip Current Systems* (Svendsen et al., 2000). The accuracy of SHORECIRC for modeling rip currents has been previously established in other studies. The rip current system we tested involved a longshore bar rising 10cm from a seafloor depth of 15 cm, with two evenly spaced gaps, at the base of an evenly sloping beach. Waves 7 cm high with a period of 1 second were modeled approaching the bar with no angle. The test results are shown in Figure 5-1, which overlays current vectors on the model bathymetry. The results show that EFDC replicates well the current patterns and magnitudes generated by SHORECIRC.

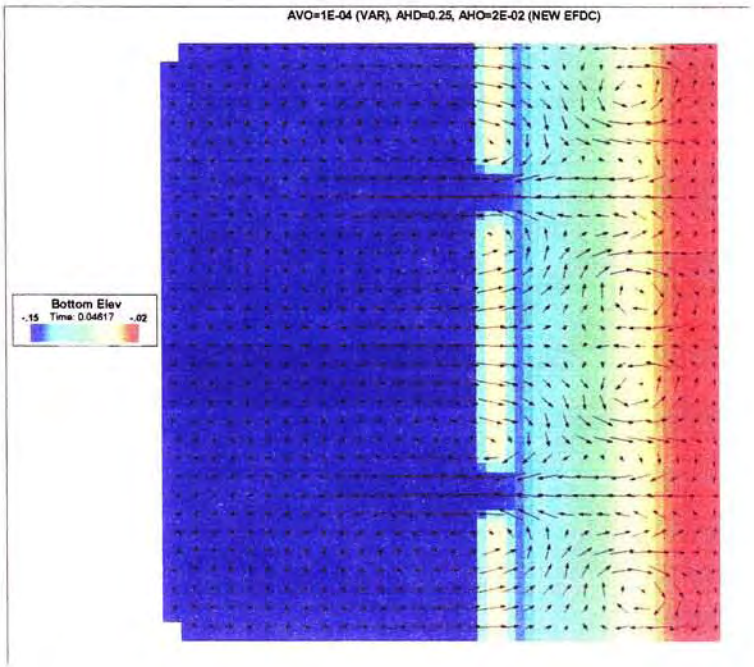
To ensure that the model closely simulated currents in the project area, actual currents measured by the DCM12 offshore current meter were imposed on the east (bottom) boundary of the model grid. To verify that the model was replicating these currents in the project area, the current meter data was compared with currents calculated by the model at the location of the current meter, during a test run assuming calm wave and wind conditions, and only the tidal flow input. The results are shown in Figure 5-2, which plots actual current meter data with the model generated currents. The results show that the model accurately reproduces the tidal phase and current magnitudes. Currents at the inshore meter location were much weaker. The maximum measured current speed on February 12, 2004 was 9 cm/s, and typical speeds were 2 to 3 cm/s. The maximum model-generated current at this location was 7 cm/s, and typical speeds were consistent with those measured in the field.

The EFDC model was also able to produce the rip current systems that occasionally occur at the project site during wave events. Figure 5-3 shows velocities computed by the model assuming a typical south swell event, and moderate tides. The figure shows that a well developed, offshore directed rip current is present offshore of the discharge site. This is consistent with field observations and drogue studies completed at the project site during the current study. Evidence of offshore directed flow was also recorded by the current meters during the strong Kona storm of February 27, 2004. The maximum current speeds recorded by the meters occurred on this day, – 57 cm/s to the southwest at the offshore current meter. EFDC model runs for strong tide conditions and both kona and south swell waves produced maximum current speeds of 53 cm/s and 60cm/s, respectively, at the offshore meter location. The direction of maximum current for the kona wave case was to the west, while for the south swell case it was to the southwest.

The verification results indicate that the EFDC model reproduces the important transport dynamics occurring at the discharge site.



SHORECIRC



EFDC

Figure 5-1. Comparison of SHORECIRC (top) and EFDC (bottom) generated rip currents.

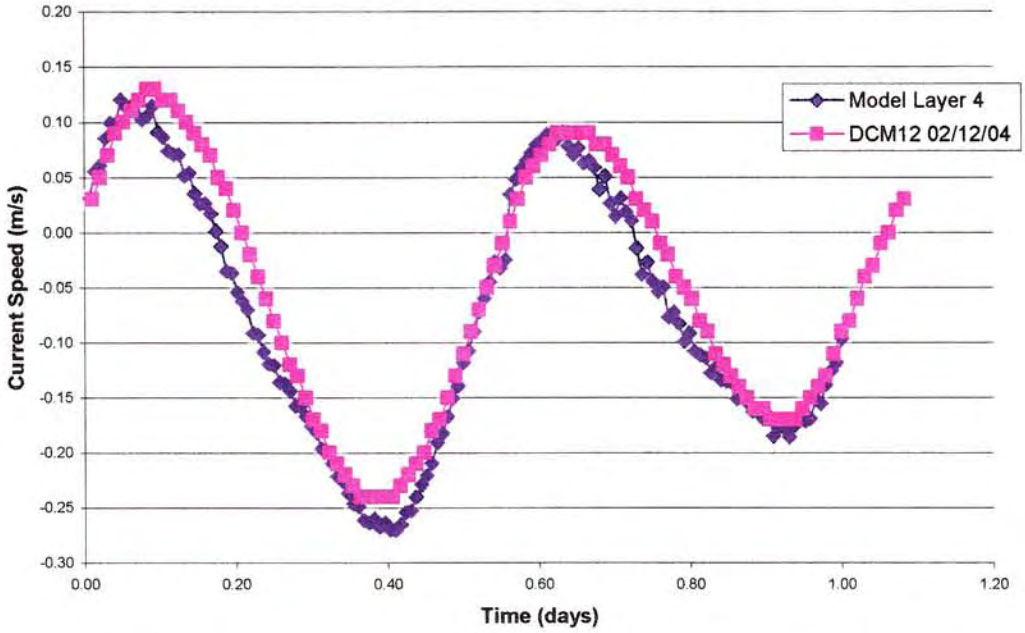


Figure 5-2. Comparison of currents recorded by the DCM12 offshore current meter on February 12, 2004 with EFDC model generated currents.

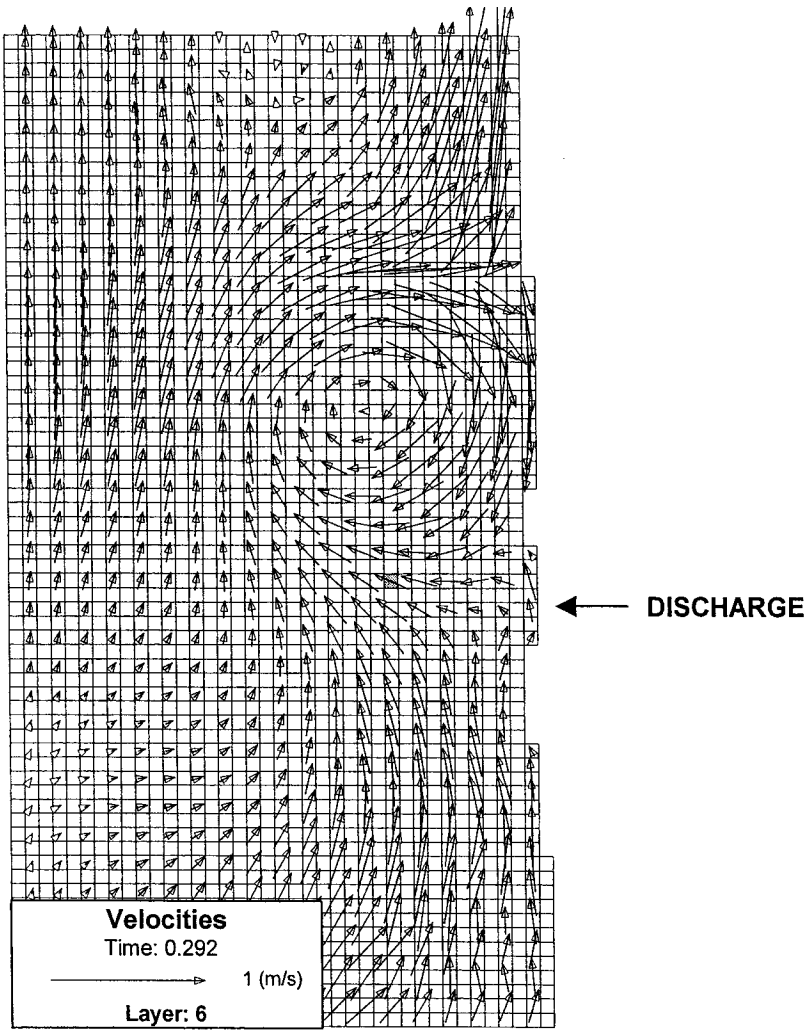


Figure 5-3. Model generated current field for south swell and moderate tide conditions.

6. MODEL RESULTS

A series of 8 different model runs were completed using combinations of the input parameters described in Section 3 above. These model runs are listed in Table 6-1. At every time step for the specified duration of the model run, EFDC calculates currents and water properties at each model grid point. These values can be output at specified times and locations during the model run. Models were run for a time period of 1.5 days. Model output is referenced to decimal days, beginning at 0 and ending at 1.5 days.

The model results were presented in several different formats:

1. Salinity Contour Plots – Salinity is used as the primary indicator of plume dilution and possible impacts. Contour plots were prepared showing concentrations of salinity, plotted in parts per thousand (ppt). Typical oceanic water has a salinity of approximately 35 ppt, while fresh water has a salinity of 0. These values were used in the model. State water quality standards indicate that salinity shall not vary more than ten percent from natural conditions, i.e. fall below approximately 31.5 ppt (State of Hawaii, Department of Health, 1992). In the modeling analysis and discussion of results, the plume boundary is therefore defined by the 31.5 ppt salinity contour (or 10% dye contour); measurements of plume size refer to these contours, unless otherwise stated. Research on salinity tolerance of corals, however, has shown that corals generally have a much wider range of tolerance than this (Coles, 1992). Experiments exposing several types of Hawaii corals to different levels of salinity for 20 days showed high mortality at salinity levels of 20 ppt and below, but good survivability at salinity levels of 25 ppt and higher (Coles, 1992). In general, the salinity contour plots were prepared showing the maximum plume excursion for both the surface and bottom water layers. These figures show a snapshot of the plume at its maximum size.

2. Dye Contour Plots - Conservative water quality constituents were also modeled, using dye as a representative tracer. Conservative constituents are defined as those constituents whose concentration can be altered only by advection and diffusion; by contrast, the concentration of non-conservative constituents can be changed by chemical processes such as photosynthesis, or physical processes such as abrasion and settling. Dye plots were included to show conservative constituent concentrations because determining this from the salinity contour plots is not straightforward. For the model runs, the ocean waters were set to have dye concentration of 0, while a concentration of 100 was applied to the discharge. The dye contours therefore indicate directly the extent of dilution of the plume and conservative constituents in the plume. For example, a dye contour of 10 indicates that the dye concentration is 10% of the initial discharge concentration, or conversely, has been diluted 90%. Dye contour plots were shown only for the surface water layer.

3. Total Suspended Sediment (TSS) - Suspended sediment transport and deposition were calculated for Runs 1, 5, 7 and 8. Suspended sediments are considered non-conservative because their concentration is altered by settling out of the water column, as well as by

advection and diffusion. The peak concentrations of suspended sediment are displayed in color-coded plots overlain on the model grid.

4. Salinity and Total Suspended Sediment (TSS) Time Series – To show how the plume concentrations change with time, graphs were prepared showing how surface salinity and TSS change with time at 3 time series station in the model area: 300 meters directly offshore of the discharge site (grid cell i=38,j=33), 300 meters offshore and 1,000 meters west of the discharge site (grid cell i=38,j=43), and 300 meters offshore and 1,000 meters east of the discharge site (grid cell i=38,j=23). The location of the time series stations is shown in Figure 4-1. These graphs indicate how quickly the ocean waters return to ambient conditions following a discharge event.

5. Salinity Water Column Profiles – To show the thickness of the discharge plume, color-coded salinity concentrations are displayed along vertical profiles of the water column. The vertical profiles extend approximately 1,300 meters offshore to a water depth of about 10 meters. They are located directly offshore of the discharge location and 1,000 meters to the west and east of the discharge location. The profiles are shown for the maximum plume size. They represent snap-shots of the plume at its maximum thickness.

Table 6.1. Model Runs

Run No.	Discharge Event	Tide	Waves	Wind	Suspended Sediment	Figures
1	11/5/96 – 20 yr.	Moderate			yes	6-1A to H
2	11/5/96 – 20 yr.	Ebb-Moderate				6-2A to D
3	11/5/96 – 20 yr.	Strong				6-3A to E
4	11/5/96 – 20 yr.	Weak				6-4A to E
5	11/5/96 – 20 yr.	Moderate	Kona	Kona	yes	6-5A to H
6	11/5/96 – 20 yr.	Moderate	South swell			6-6A to E
7	10 year	Moderate			yes	6-7A to H
8	10 year	Moderate	Kona	Kona	Yes	6-8A to G

6.1 Run 1 – 20-year discharge event with moderate tides

Run 1 is a calculation of plume transport assuming a moderate tide and a 20-year discharge event. Results are shown in Figures 6-1A to E. This represents a worst case for the project site because the discharge event is extreme, yet mixing conditions are poor because winds and waves are absent. The discharge event coincides with a flooding tide with flow to the west. Moderate tides produce maximum currents of 19 cm/s at the offshore current meter site. Figures 6-1A and B show that in the surface water layer, the plume (as defined by the 32 ppt salinity concentration, and 10% dye concentration) is transported to the west, hugs the shoreline, and at its peak, extends about 1,200 meters offshore of the shoreline and 4,500 meters to the west of the discharge site. The extent of plume where the salinity exceeds 28 ppt is approximately 900 meters x 3,600 meters. Figures 6-1C and 6-1E, however, show that the plume is largely confined

to the surface. Peak plume waters with salinity below 28 ppt that contact the seafloor extend only 200 meters offshore and 600 meters west of the discharge. Within 1,000 meters west of the discharge site, plume waters with a salinity below the water shoreline quality standard of 31.5 ppt are confined to the upper 1 meter of the water column, extending approximately 1,100 meters offshore, and do not contact the seafloor.

Time series plots of salinity in the surface layer (Figure 6-1D) show that at the discharge site the salinity drops to a minimum of 7 ppt during the peak discharge flow, and reaches the State water quality standard of 31.5 ppt at time 0.75, only 9.6 hours (0.4 days) after the discharge peak. 1,000 meters west of the discharge (I=38,j=43), the salinity drops to a minimum of 22 ppt shortly after peak discharge, and reaches 31.5 ppt at 0.8 days. This figure also shows that a pulse of the plume is transported to the east of the discharge site at 0.75 days, with a salinity of about 31.25. In summary, the model calculates that within approximately 12 hours (1/2 days) of the peak discharge (0.33 days), the plume salinity in the project area has reached the State water quality standard of 31.5 ppt.

Suspended sediment transport and deposition were also calculated in this run. During the storm discharge, approximately 1,703,000 kg of suspended sediment are discharged. At the end of the model run of 1.5 days, approximately 873,000 kg of sediment are deposited in the model area, 700,000 kg of suspended sediments are transported to the west out of the model area, and 130,000 kg remain suspended in the water column within the model domain. The clay fraction remains entirely suspended, while most of the silt fraction is deposited. Maximum deposition occurs immediately offshore of the drainage outlet, where approximately 1.9 mm of sediment are calculated to be deposited. Sediment thickness rapidly drops with distance from the discharge site. Sediment thicknesses calculated at the time series stations located 300 meters offshore of the discharge site, 1,000 meters west of the discharge site and 1,000 meters east of the discharge site are 0.17 mm, 0.25 mm and 0.00054 mm respectively.

Surface layer suspended sediment concentrations immediately after the end of the storm discharge (time 0.573 days) and at the end of the model run (time 1.48 days) are shown in Figures 6-1F and 6-1G. A time series of suspended sediment concentrations is presented in Figure 6-1H. Total suspend solids measurements conducted by Marine Research Consultants (2004) for the Ocean Pointe development indicate that ambient nearshore TSS concentrations are about 10 mg/L. Model results show that initial plume concentrations greatly exceed these levels; the peak TSS levels were 3,125 mg/L 300 meters offshore of the discharge site, 875 mg/L 1,000 meters west of the discharge site, and 300 mg/L 1,000 meters east of the discharge site. Figure 6-1H shows that TSS levels approach ambient levels of about 10mg/L only at the end of the model run (1.5 days), approximately 1 day after the end of the storm discharge. TSS requires more time than salinity to reach ambient levels because much greater dilution is required to reduce TSS levels from 5,500 mg/L to about 10 mg/L.

6.2 Run 2 – 20-year discharge event with moderate ebb tide

This run utilizes the same input parameters as Run 1, however, the tide phase has been shifted so that peak discharge occurs during an ebb tide flow to the east. This case was completed to show possible transport to the east of the discharge site. Figures 6-2A and 6-2B show that the plume at

its peak (time=0.54 days, 4.8 hours after peak discharge) extends approximately 1,400 meters offshore, 2,400 meters to the east and 1,800 meters to the west of the discharge site. The plume is defined by the 31.5 ppt contour representing State water quality standards, or a dye concentration of 10% of initial concentration. Ebb currents to the east are weaker and of shorter duration than the flood tide to the west (Figure 4-4). Thus, compared with Run 1, the maximum plume transport to the east (2,400 meters) is less than the maximum transport to the west (4,500 meters). Mixing conditions are similar to those in Run 1, thus salinity time series plots show that the plume reaches State water quality standards of 31.5 ppt within 12 hours of the peak discharge (Figure 6-2C). Similarly, plume waters with salinity below 28 ppt only contact the seafloor only within 200 meters directly offshore of the discharge, and only for a brief period during the peak discharge. (Figure 6-2D)

6.3 Run 3 – 20-year discharge event with strong tides

The model calculated results for the 20-year discharge event with strong tides are shown in Figures 6-3A to 6-3E. Strong tides result in maximum current speeds of 27 cm/s at the offshore current meter site. This results in further transport of the plume to the west. Figures 6-3A and B illustrate that the plume at its peak is 900 meters wide, and extends beyond the model domain, approximately 5,000 to 5,500 meters west of the discharge site. Figure 6-3C shows that the lower concentrations of salinity are largely confined to the surface layer; plume waters with salinity below 28 ppt that contact the seafloor extend only 100 meters offshore and 600 meters west of the discharge. Within 1,000 meters west of the discharge site, plume waters with a salinity below the water quality standard of 31.5 ppt are confined to the upper 1 meter of the water column, extending approximately 800 meters offshore, and do not contact the seafloor.

Mixing conditions are similar to Run 1. Time series plots of salinity in the surface layer (Figure 6-3D) show that at the discharge site the salinity drops to a minimum of 7.5 ppt during the peak discharge flow, and reaches the State water quality standard of 31.5 ppt at time 0.65, only 7.7 hours (0.32 days) after the discharge peak. 1,000 meters west of the discharge (I=38,j=43), the salinity drops to a minimum of 20 ppt shortly after peak discharge, and reaches 31.5 ppt at 0.75 days. This figure also shows that a pulse of the plume is transported to the east of the discharge site at 0.75 days, with a salinity of about 32.7. In summary, the model calculates that within approximately 8 hours (1/3 days) of the peak discharge (0.33 days), the plume salinity in the project area has reached the State water quality standard of 31.5 ppt. Similar to Runs 1 and 2, this represents a worst-case condition of extreme discharge with poor mixing conditions.

6.4 Run 4 – 20-year discharge event with weak tides

This run presents plume transport during weak tidal conditions, with peak discharge flow occurring during ebb tidal flow to the east. Weak tidal flow generates maximum currents of 12 cm/s at the offshore meter site. Because the currents are weak, plume transport to the east and west is less, but the plume diffuses further offshore. Figures 6-4A and B show that the maximum plume size is approximately 1,500 meters offshore, and 2,600 meters to the east and 1,000 meters to the west of the discharge site. This maximum plume size occurs about 0.13 days (3 hours) after the peak discharge flow. Figures 6-4C and D show the plume transport and diffusion with time. By 9.6 hours after the peak discharge flow, the plume concentrations have

been greatly diluted, and the plume shape has been elongated by transport to the west (Figure 6-4C). Surface layer plume salinities are almost entirely greater than 28 ppt; only a small part of the plume contains water with salinity below 31.5 ppt. By approximately 20 hours after the peak storm discharge, the plume salinity is entirely greater than 32 ppt (Figure 6-4D). The surface salinity time series (Figure 6-4E) show that off the discharge site, the salinity drops to 6.5 ppt during the peak discharge flow, and rapidly drops thereafter, reaching 31.5 ppt, 12 hours (0.5 days) after peak outflow. Salinity 1,000 meters east of the discharge drops to 22.5 ppt shortly after peak storm outflow, but because of the short duration of ebb flow to the east, rapidly increases to greater than 31.5 approximately 7.5 hours after peak storm discharge. Because the initial storm discharge occurs during current flow to the east, the plume does not reach the salinity station located 1,000 meters west of the discharge site until 4 hours after the peak outflow. By this time the plume has diluted significantly, and minimum surface layer salinity is only 26.5 ppt. The salinity returns to 31.5 ppt 13 hours (0.54 days) after the peak storm outflow.

6.5 Run 5 – 20-year discharge event with moderate tides and Kona waves and winds

This run utilizes the same input parameters as Run 1, but additionally incorporates the effects of Kona winds and waves. As mentioned previously, EFDC utilizes as input the wave height, dissipation and radiation stresses computed by the wave model REF/DIF. As mentioned in Section 4.5, the Kona wave input consists of deep-water wave heights of 1.3 meters and periods of 9 seconds from a southwest direction. The Kona wind input is winds of 4.6 m/s from the southwest. Figures 6-5A, B and C show the maximum plume size and shape, which occurs less than two hours after the peak storm outflow. The surface plume is greatly reduced in size and concentration relative to the results with no wave input (Run 1, Figures 6-1A, B and C). The maximum plume excursion with water below the State standard of 31.5 ppt is 800 meters offshore of the shoreline, and 3,300 meters to the west. By comparison, the plume in Run 1 extended 1,200 meters offshore and 4,500 meters to the west. This is because the breaking waves efficiently mix and diffuse the plume throughout the water column. This is clearly shown in Figure 6-5C, the contour plot of bottom layer salinity. Bottom water layer salinities below 31.5 ppt extend 300 to 500 meters offshore and 3,000 meters to the west; when wave effects are not included (Run 1), the plume is almost entirely confined to the surface layer. Bottom water layer salinities below 28 ppt are calculated to occur in an area up to 300 meters offshore and 2500 meters to the west (Figure 6-5C). Figure 6-5E presents the vertical water column profiles at the discharge site and 1,000 meters west of the discharge site. Offshore of the discharge, the water column is fully mixed to a distance of 300 meters offshore; the water column salinities are 6.3 ppts within 100 meters of shore, 16 ppt within 100 to 200 meters of shore, and 27 ppt within 200 to 300 meters of shore. The plume however is rapidly diluted in both time and space. At a distance of 1,000 meters west of the discharge site, the water column is fully mixed to a distance of 200 meters offshore, and the salinities are 25 ppt within 100 meters of shore, and 28 ppt within 100 to 200 meters of shore. The salinity time series (Figure 6-5D) shows how rapidly the plume is diffused and diluted. The minimum surface layer salinity reached 300 meter offshore of both the discharge site and 1,000 meters west of the discharge site is approximately 27.5 ppt. Surface layer salinities reach meet the State standard of 31.5 ppt within about 2 hours after the peak discharge outflow.

Results of the suspended sediment modeling are presented in Figures 6-5F and G. During the storm discharge, approximately 1,703,000 kg of suspended sediment are discharged. At the end of the model run of 1.5 days, approximately 594,000 kg of sediment are deposited in the model area, 716,000 kg of suspended sediment are transported to the west out of the model area, and 350,000 kg remain suspended in the water column within the model domain. A significant portion of the silt fraction remains suspended by the wave energy in this run; only 594,000 kg of sediment are deposited, as compared to 873,000 during Run 1. Maximum deposition occurs immediately offshore of the drainage outlet, where approximately 0.7 mm of sediment are calculated to be deposited. Sediment thickness rapidly drops with distance from the discharge site. Sediment thicknesses calculated at the time series stations located 300 meters offshore of the discharge site, 1,000 meters west of the discharge site and 1,000 meters east of the discharge site are 0.04 mm, 0.03 mm and 0.00001 mm, respectively.

Surface layer suspended sediment concentrations near the end of the storm discharge (time 0.469 days) are shown in Figure 6-1F. The time series of suspended sediment concentrations is presented in Figure 6-1G. Model results show that initial plume concentrations are greatly reduced as compared to Run 1; the peak TSS levels were 230 mg/L 300 meters offshore of the discharge site, 310 mg/L 1,000 meters west of the discharge site, and 0 mg/L 1,000 meters east of the discharge site. Approximately 0.5 days after the end of the storm discharge, the TSS levels at the control stations have diminished to background levels. Thus, the model results show that Kona wave and wind conditions result in greatly reduced sediment deposition and greatly increased suspended sediment mixing and dispersion.

6.6 Run 6 – 20-year discharge event with moderate tides and south swell

This run utilizes the same input parameters as Run 1, but additionally incorporates the effects of south swell. As described in Section 4.5, the south swell consists of deepwater wave heights and periods of 1.2 meters and 14 seconds, respectively, from a direction of due south. This run was completed to show plume transport during wave conditions that produce a rip current off of the discharge site. Figure 5-3 presents a snap shop of the current field generated by a south swell and moderate waves, characterized by southwesterly currents of about 27 cm/s at the offshore current meter site. Figures 6-6A, B and C show that, in contrast to the previous model runs, the plume is not attached to the shore and is transported offshore to the southwest and west. The plume, as defined by salinity levels less than 31.5 ppt or dye concentrations greater than 10, is 300 to 500 meters wide and curves 2,400 meters offshore to the southwest at its maximum extent. This occurs at time 0.4 day, or 2 hours after the peak discharge outflow. The salinity time series (Figure 6-6D) and water column profile (Figure 6-6E) illustrate that, similar to Run 5, the south swell waves quickly mix the entire water column and dilute the plume concentrations. The minimum surface layer salinity reached 300 meters offshore of the discharge site is 22 ppt; at this location, the salinity reaches 31.5 ppt within approximately 2 hours of the peak outflow. Because of the rip current, the plume passes through the salinity time series station 1,000 meters west of the discharge site only briefly at time 0.5 days (Figure 6-6D) and with salinity of 34 ppt. The model calculates that the water column is well mixed to a depth of greater than 3 meters and a distance of 300 meters offshore of the discharge site. Bottom layer salinity is 3 ppt within 100 meters of the shore and 13 ppt within 100 to 200 meters of the shore.

6.7 Run 7 – 10-year discharge event and moderate tides

Run 7 presents results for a 10-year discharge event, and moderate tides. As described in Section 4.6, the discharge corresponds to an 8-inch rainfall, begins at time 0.292 days, peaks at 0.33 days, and ends at 0.417 days, a total duration of 3 hours (Figure 4-7). This event represents the threshold for flow into the ocean; smaller storms will be retained inland. Because of the large retention capacity, peak flow is only 13.4 meters per second. Figures 6-7A and B show that the maximum plume excursion is 500 meters offshore and 2,300 meters to the west. In the absence of wave mixing, however, the plume is largely confined to the surface water layer (Figures 6-7C and E). Plume salinities below 28 ppt contact the seafloor only within 100 meters directly offshore of the discharge site. The minimum salinities reached at the time series stations are 27 ppt at the discharge site, and 31 ppt 1,000 meters west of the discharge site. Plume salinities meet the State standard of 31.5 ppt within approximately 6 hours of the peak outflow at time 0.33 days.

Suspended sediment transport and deposition were also calculated in this run. Results are shown in Figures 6-7F, 6-7G and 6-7H. During the storm discharge, approximately 55,000 kg of suspended sediment are discharged, less than 1/20 the quantity discharged during the 20-year event. At the end of the model run of 1.5 days, approximately 29,000 kg of sediment are deposited in the model area, 22,000 kg of suspended sediment are transported to the west out of the model area, and 877 kg remain suspended in the water column within the model domain. Similar to Run 1, the clay fraction remains entirely suspended, while most of the silt fraction is deposited. Figure 6-7F shows the sediment deposition. Sediment deposition is confined to a narrow stretch along the shoreline immediately north of the discharge site, and is less than 0.12 mm everywhere. Maximum deposition occurs immediately offshore of the drainage outlet, where only 0.12 mm of sediment is deposited. Sediment thicknesses calculated at the time series stations located 300 meters offshore of the discharge site, 1,000 meters west of the discharge site and 1,000 meters east of the discharge site are 0.0015 mm, 0.026 mm and 0 mm respectively.

Surface layer suspended sediment concentrations near the end of the storm discharge (time 0.49 days) are shown in Figure 6-7G. A time series of suspended sediment concentrations is presented in Figure 6-7H. Model results show that the peak TSS levels were 100 mg/L 300 meters offshore of the discharge site, 80 mg/L 1,000 meters west of the discharge site, and negligible 1,000 meters east of the discharge site. In the absence of wind and wave mixing, TSS levels approach ambient levels of about 10mg/L, approximately 1 day after the end of the peak storm discharge.

6.8 Run 8 – 10-year discharge event with moderate tides and Kona waves and winds

This run utilizes the same input parameters as Run 7, but additionally incorporates the effects of Kona winds and waves. The Kona wave input consists of deepwater wave heights of 1.3 meters and periods of 9 seconds from a southwest direction. The Kona wind input is 4.6 m/s from the southwest. Figures 6-8A, and B show the surface plume is greatly reduced in size and concentration relative to the results with no wave input (Run 7, Figures 6-7A, B and C). The breaking waves efficiently mix and diffuse the plume throughout the water column. Thus, plume salinities almost immediately meet the State water quality standard of 31.5 ppt, and the bottom

layer plume is almost the same size as the surface layer plume. Plume salinities never fall below 28 ppt (Figure 6-8E). The salinity time series (Figure 6-8D) shows that the plume is rapidly diluted. The minimum salinities reached at the time series stations are 33.8 at the discharge site, and 33.5 ppt 1,000 meters west of the discharge site.

Results of suspended sediment transport and deposition are shown in Figures 6-8F and 6-8G. The wave energy at the site results in significantly quicker mixing of the suspended sediments in the water and in diminished sediment deposition. At the end of the model run only 19,000 kg of sediment are deposited in the model area, as compared to 29,000 kg during Run 7. Maximum sediment thickness is only 0.035 mm directly offshore of the discharge site.

Water surface suspended sediment concentrations near the end of the storm discharge (time 0.417 days) are shown in Figure 6-8F. A time series of suspended sediment concentrations is shown in Figure 6-8G. The peak TSS levels at the time series stations was 24 mg/L. TSS levels returned to background levels approximately 6 hours after the peak storm discharge.

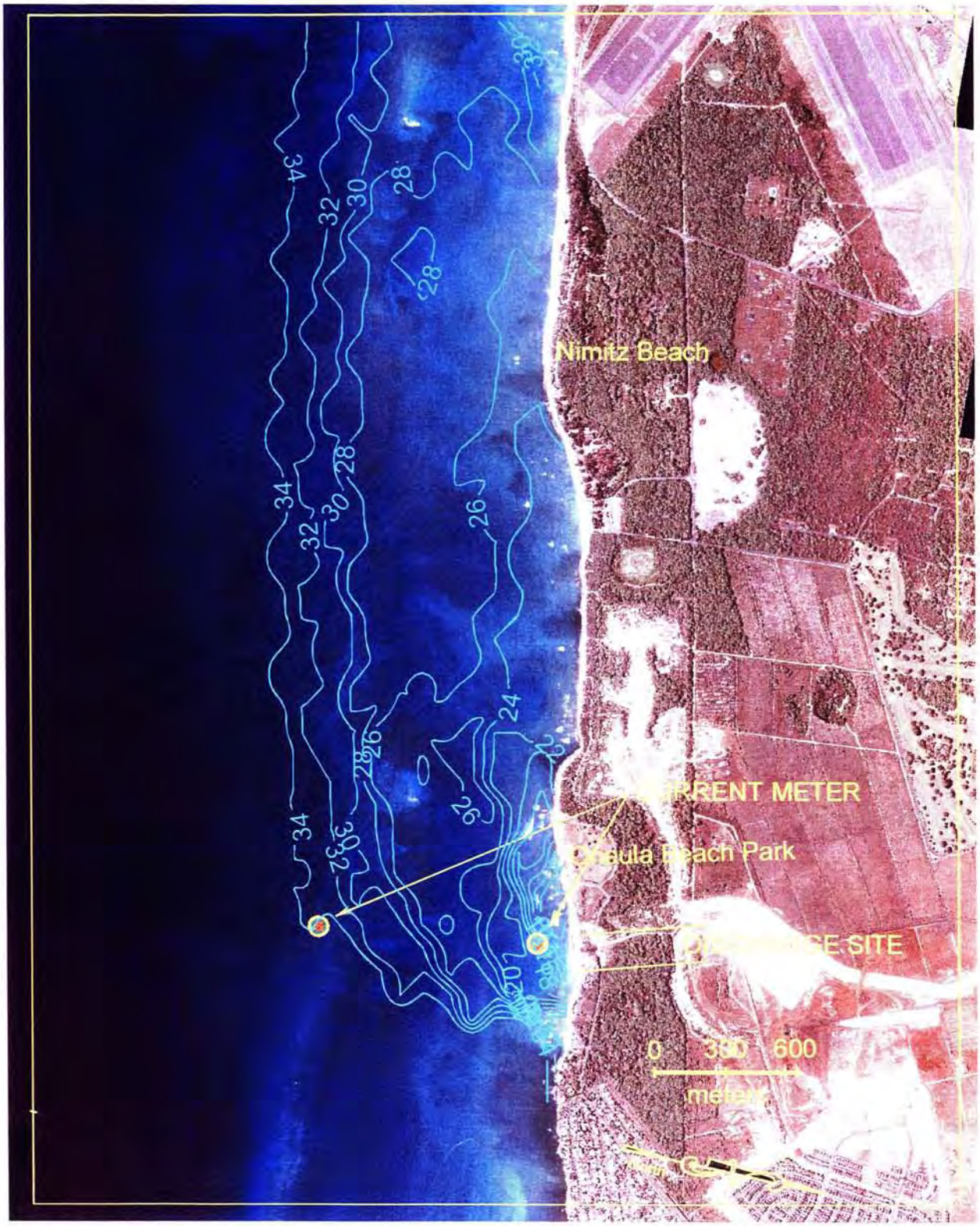


Figure 6-1A. Minimum Surface Layer Salinity for 20-year Discharge Event and Moderate Tides. Contours in ppt.



Figure 6-1B. Peak Surface Layer Plume (Dye) Concentrations for a 20-year Discharge Event and Moderate Tides. Contours show percentage of initial concentration.



Figure 6-1C. Minimum Bottom Layer Salinity for 20-year Discharge Event and Moderate Tides. Contours in ppt.

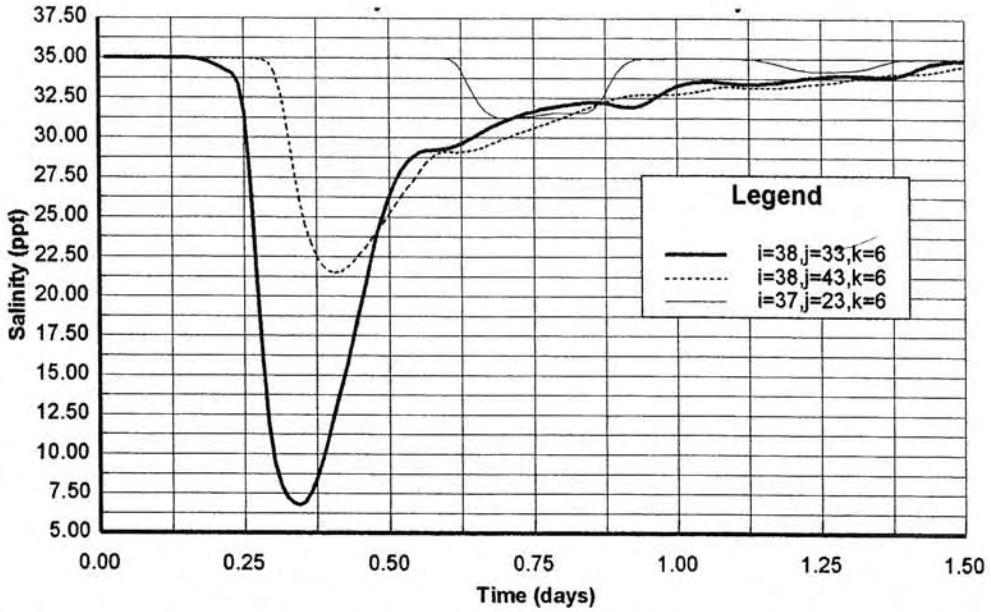
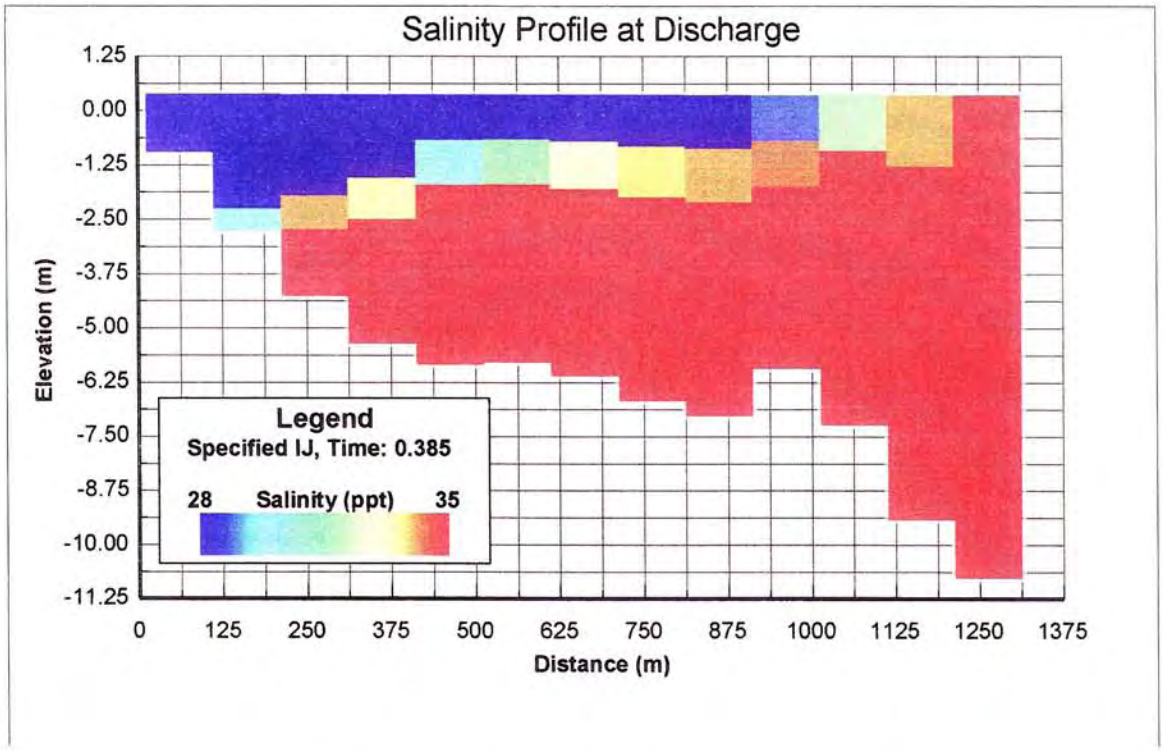


Figure 6-1D. Surface layer salinity time series offshore of discharge site (i=38,j=33), 1000 meters west of discharge site (i=38,j=43) and 1000 meter east of discharge site (i=37,j=23)



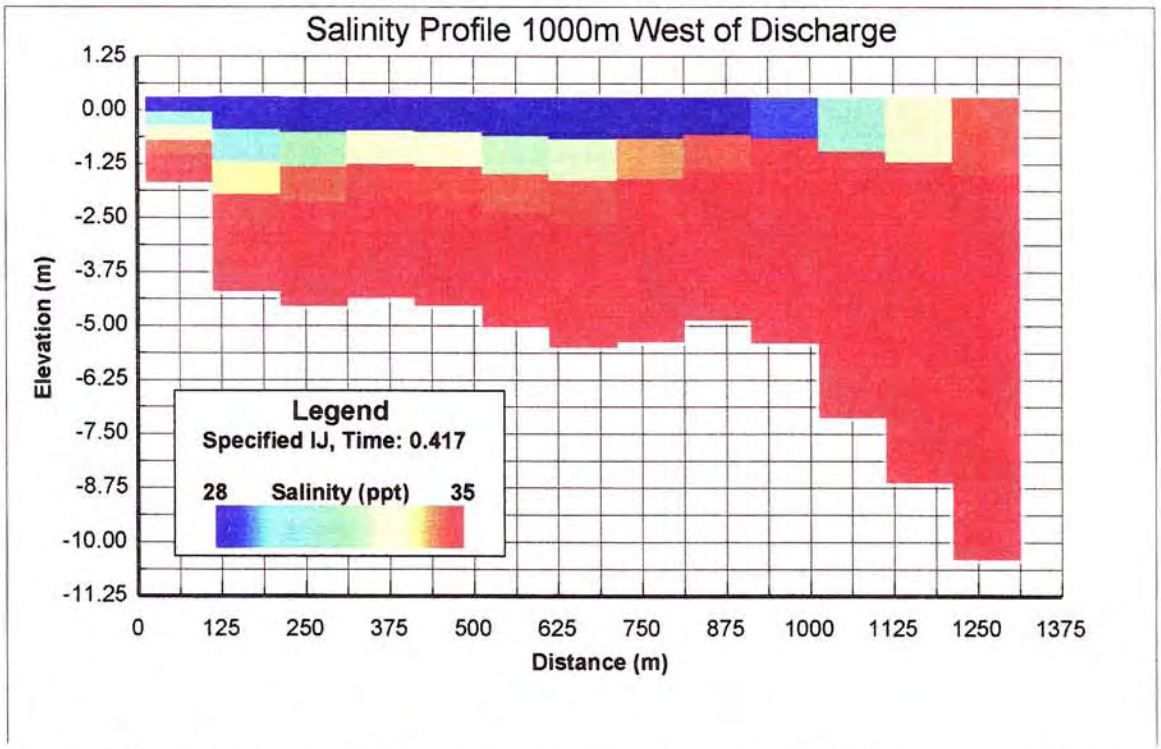


Figure 6-1E. Maximum plume thickness at discharge site (top) and 1000 meters west of discharge (bottom).

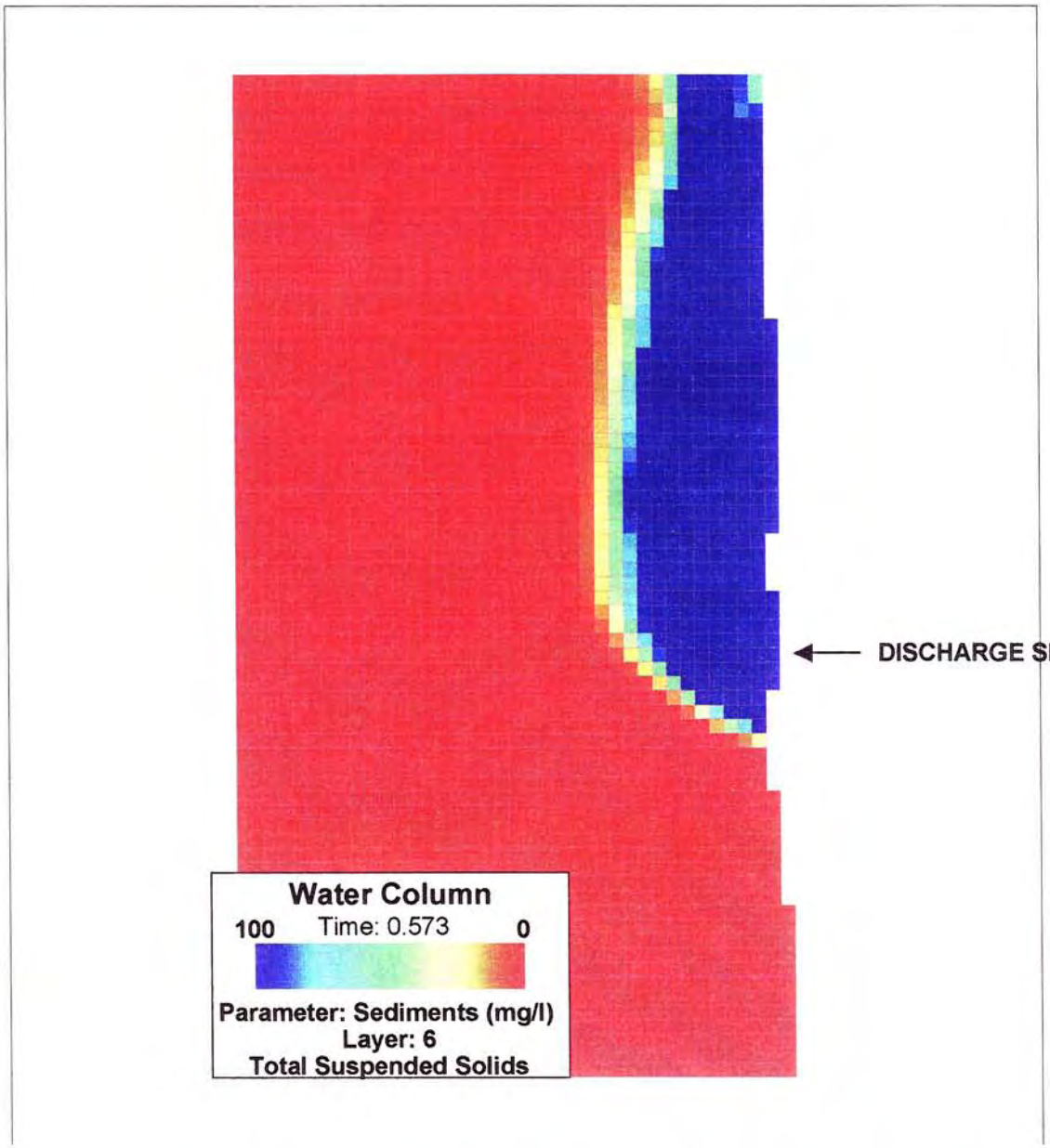


Figure 6-1F. Surface layer suspended sediment concentration at time 0.573 days. Each grid cell is 100x100 meters.

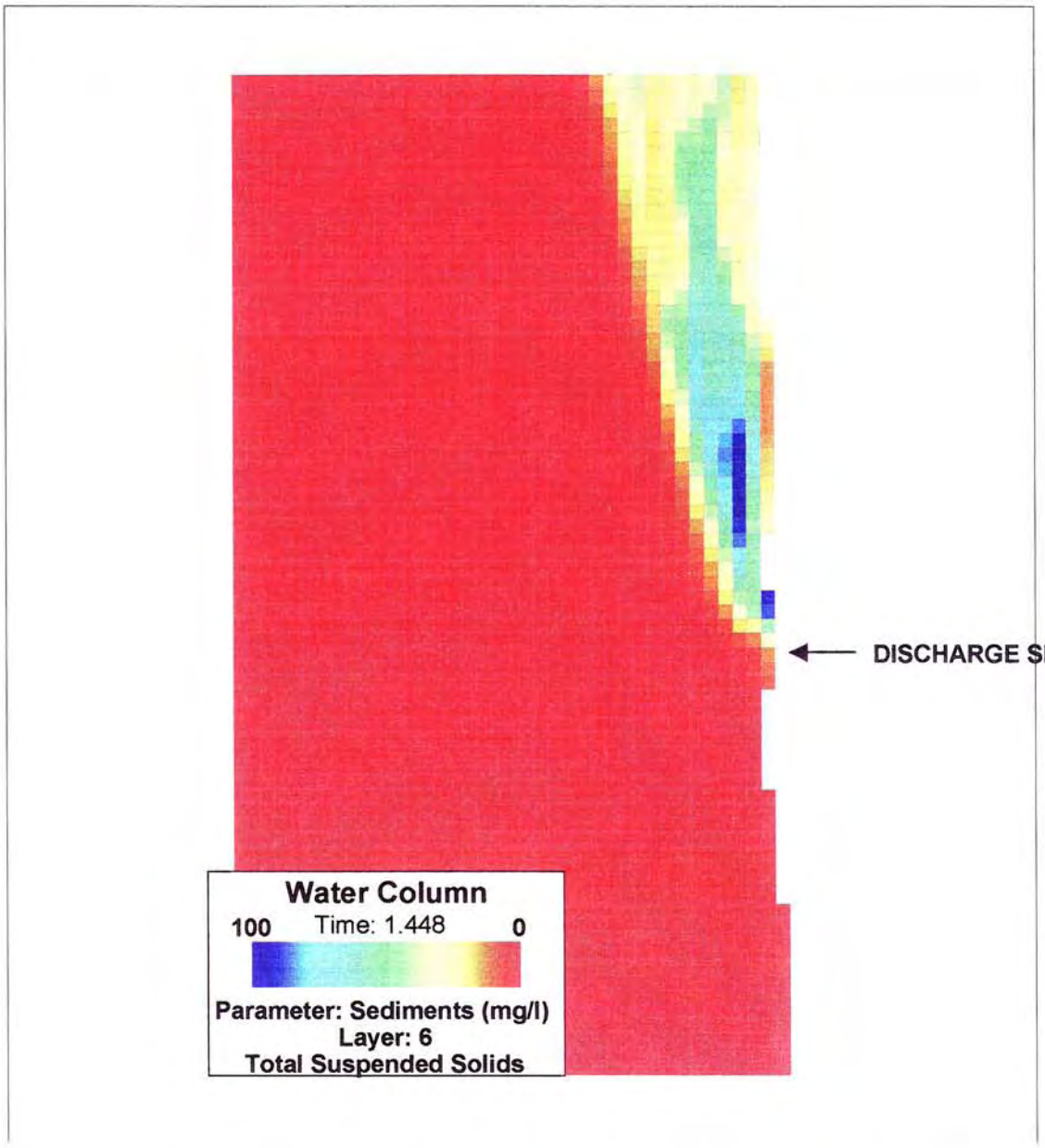


Figure 6-1G. Surface layer suspended sediment concentration at time 1.448 days. Each grid cell is 100x100 meters.

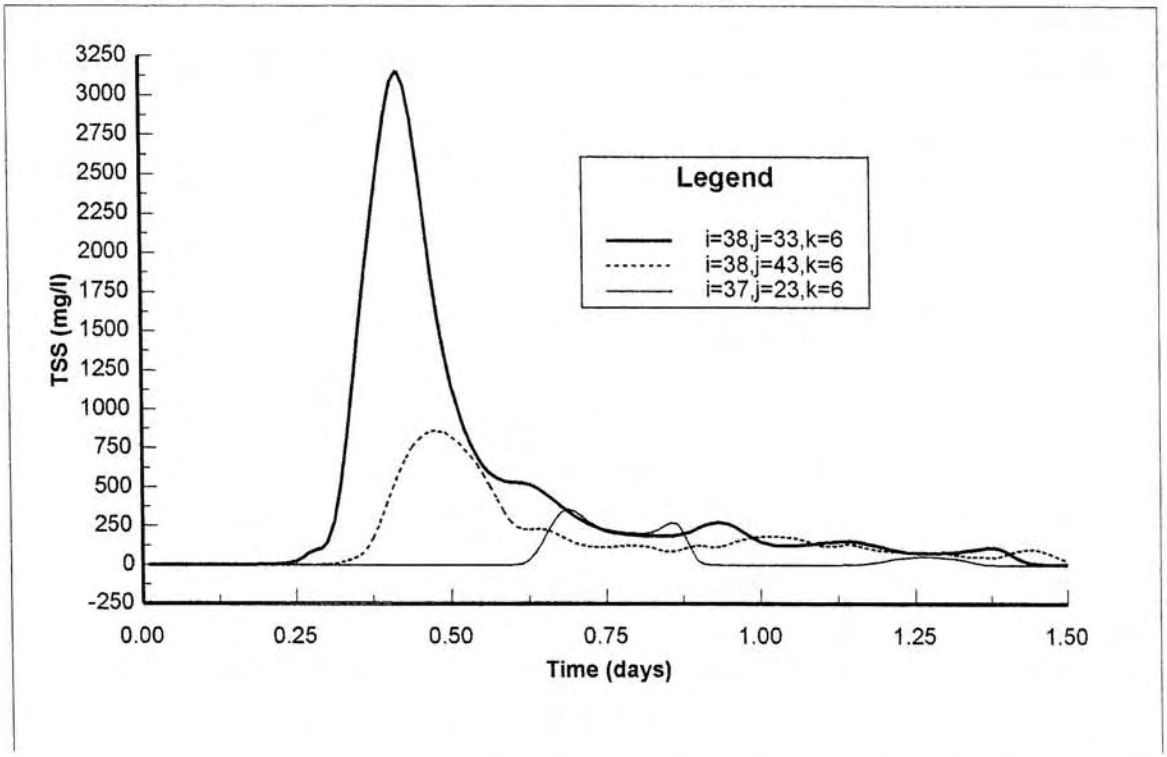


Figure 6-1H. Surface layer TSS time series offshore of the discharge site (I=38,j=33), 1000 meters west of the discharge site (i=38,j=43) and 1000 meters east of discharge site (i=37,j=23).



Figure 6-2A. Minimum Surface Layer Salinity for a 20-year Discharge Event and Moderate Ebb Tide. Contours in ppt.

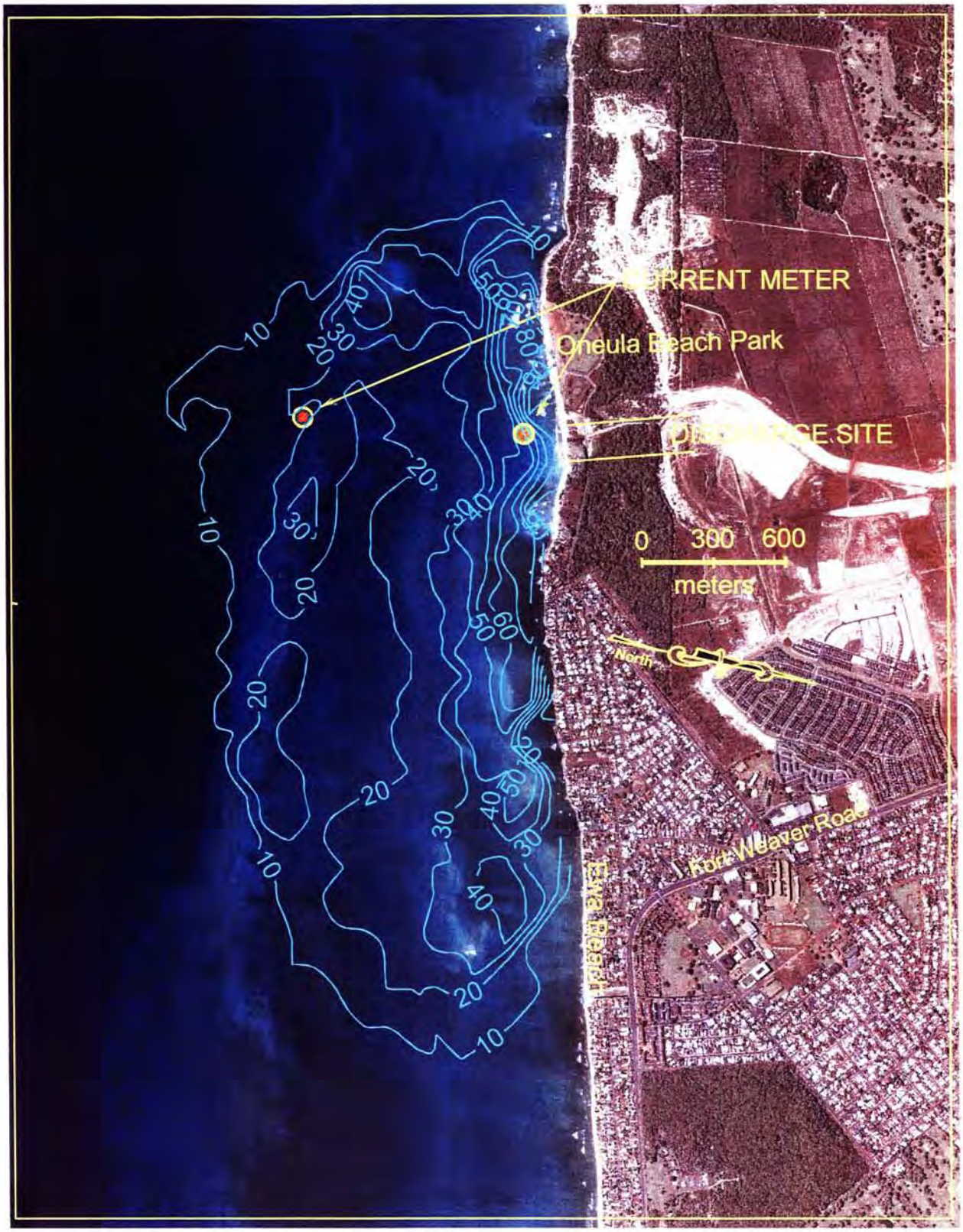


Figure 6-2B. Peak Surface Layer Plume (dye) Concentrations for a 20-year Discharge Event and Moderate Ebb Tide. Contours show percentage of initial concentration.

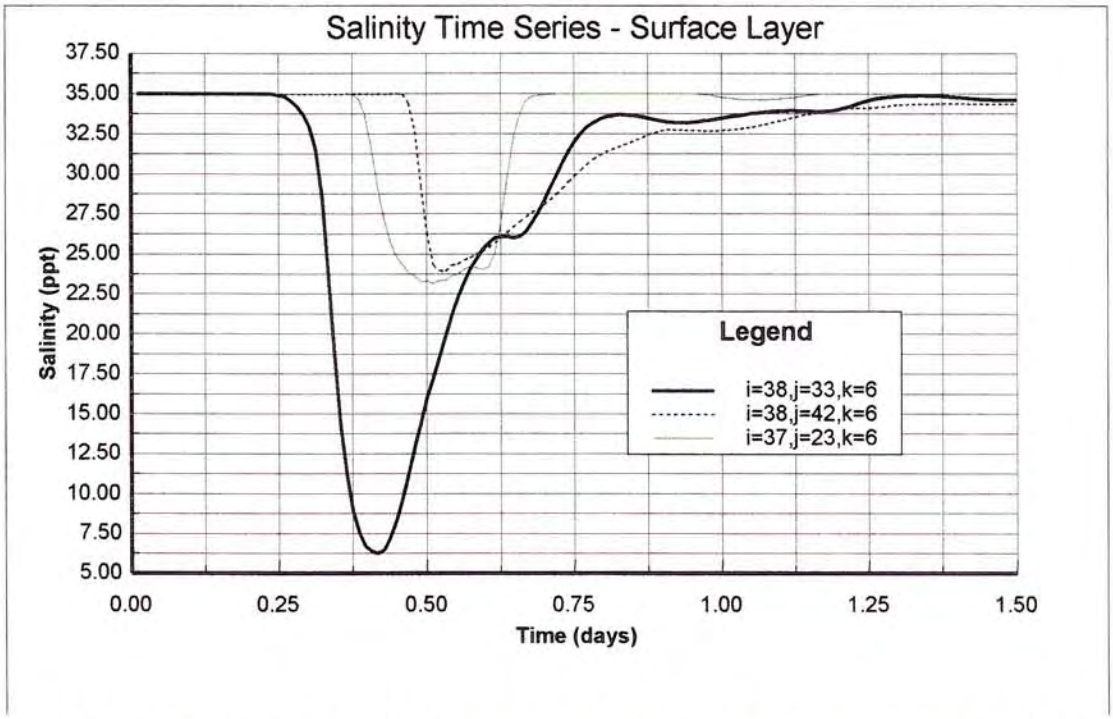


Figure 6-2C. Surface layer salinity time series offshore of discharge site (i=38,j=33), 1000 meters west of discharge site (i=38,j=43) and 1000 meter east of discharge site (i=37,j=23)

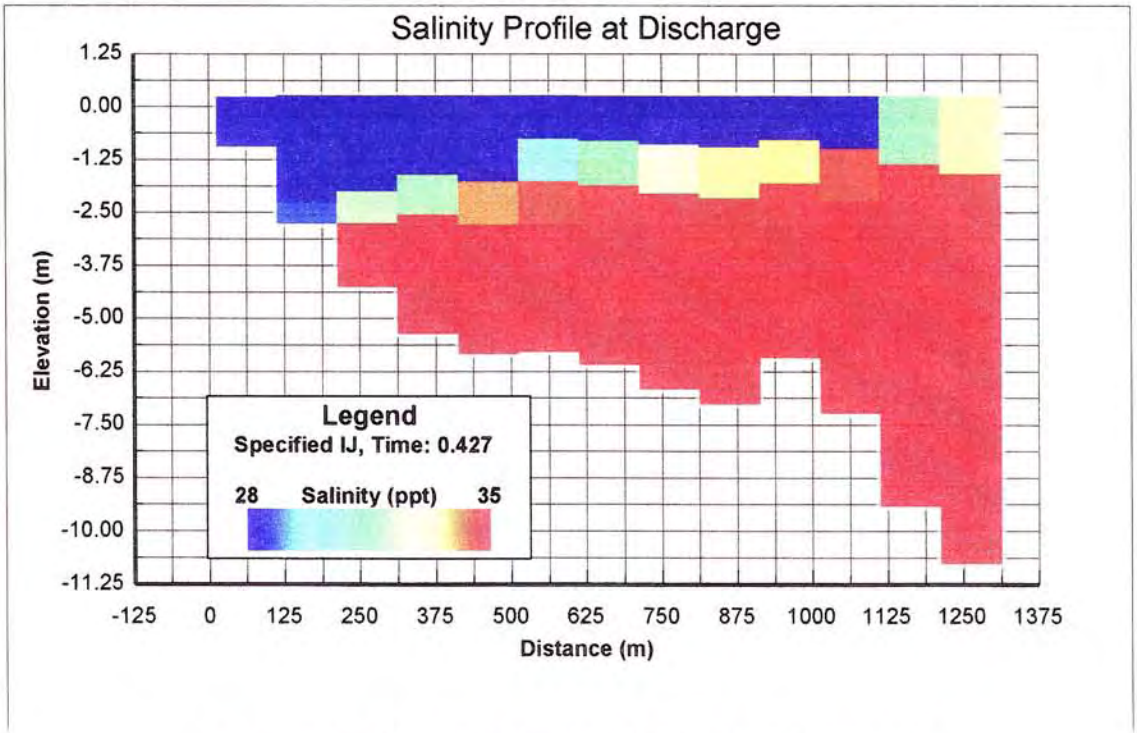


Figure 6-2D. Maximum plume thickness at discharge site.



Figure 6-3A. Minimum Surface Layer Salinity for a 20-year Discharge Event and Strong Tides. Contours in ppt.

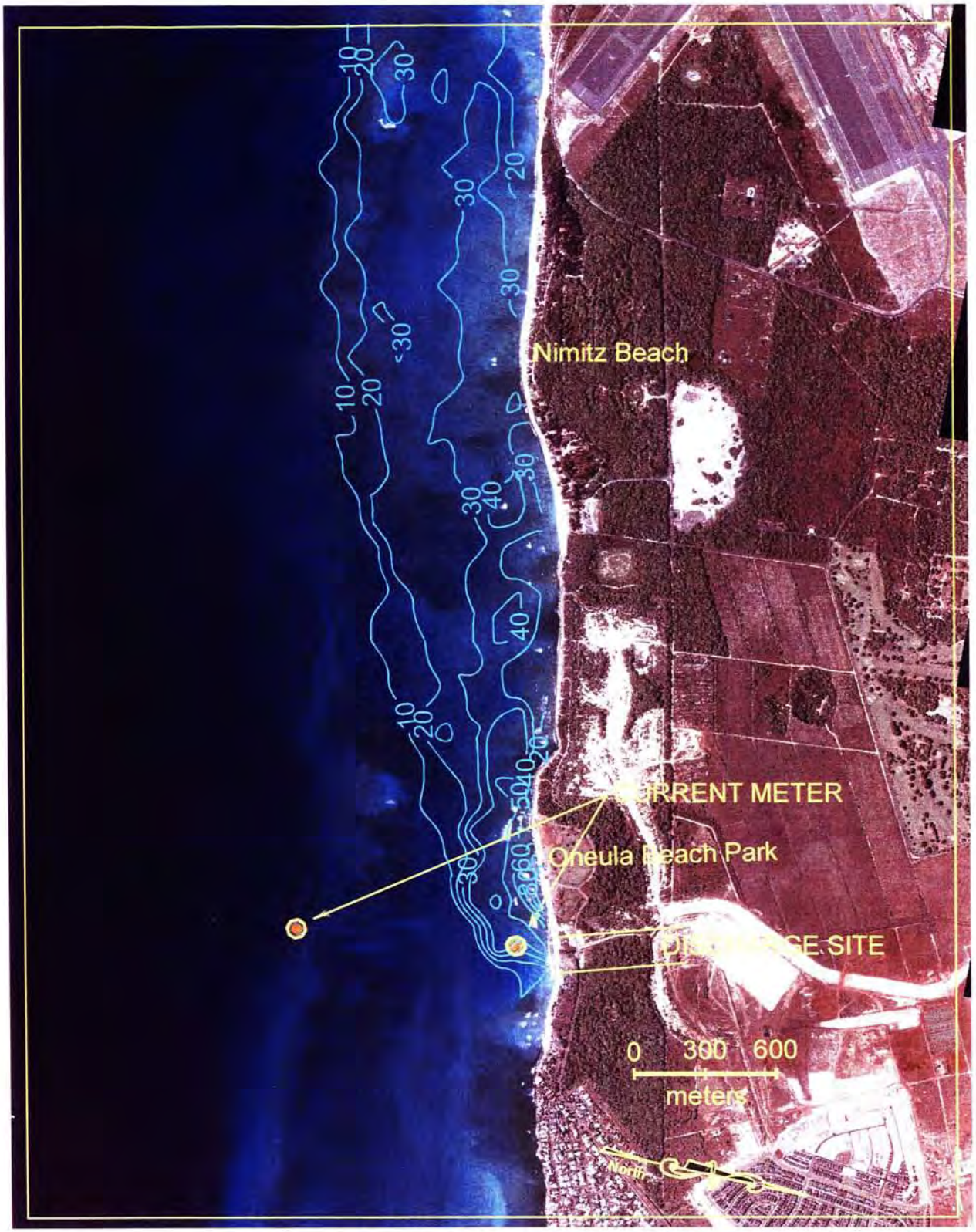


Figure 6-3B. Peak Surface Layer Plume (dye) Concentrations for a 20-year Discharge Event and Strong Tides. Contours show percentage of initial concentration.

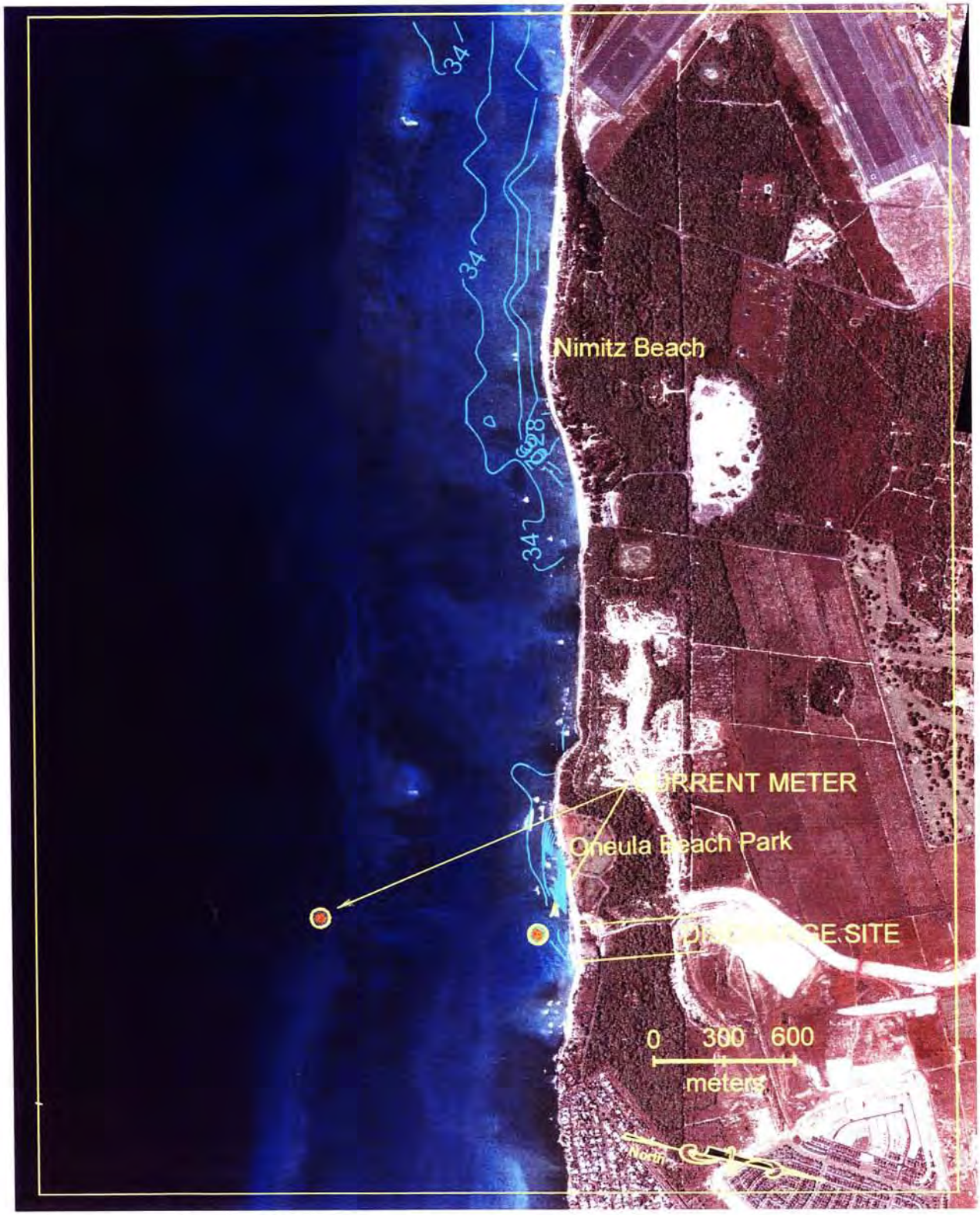


Figure 6-3C. Minimum Bottom Layer Salinity for a 20-year Discharge Event and Strong Tides. Contours in ppt.

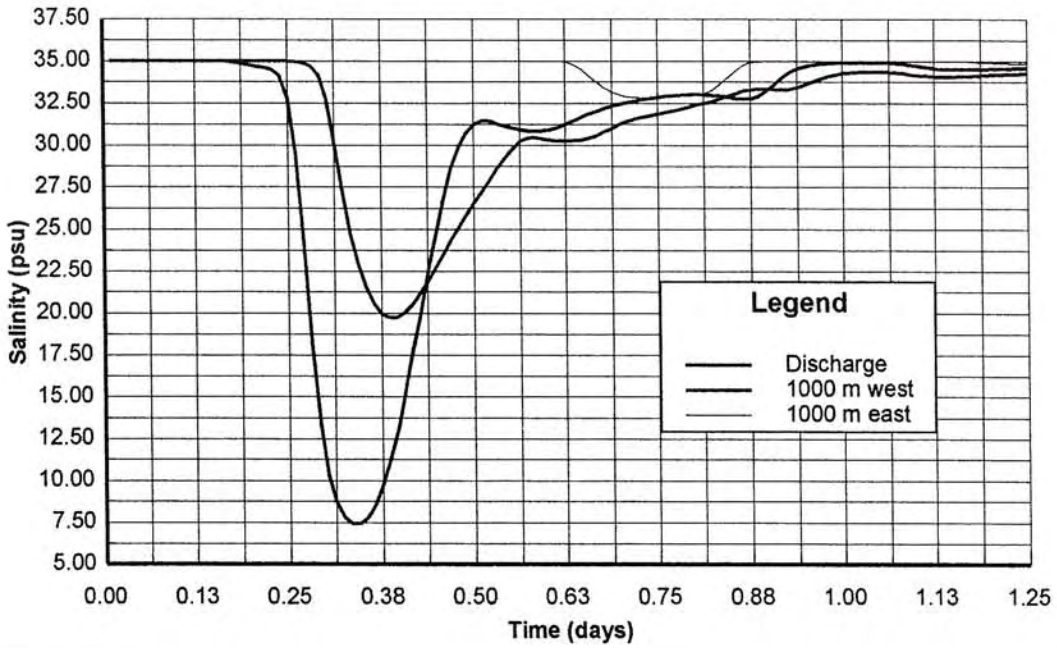
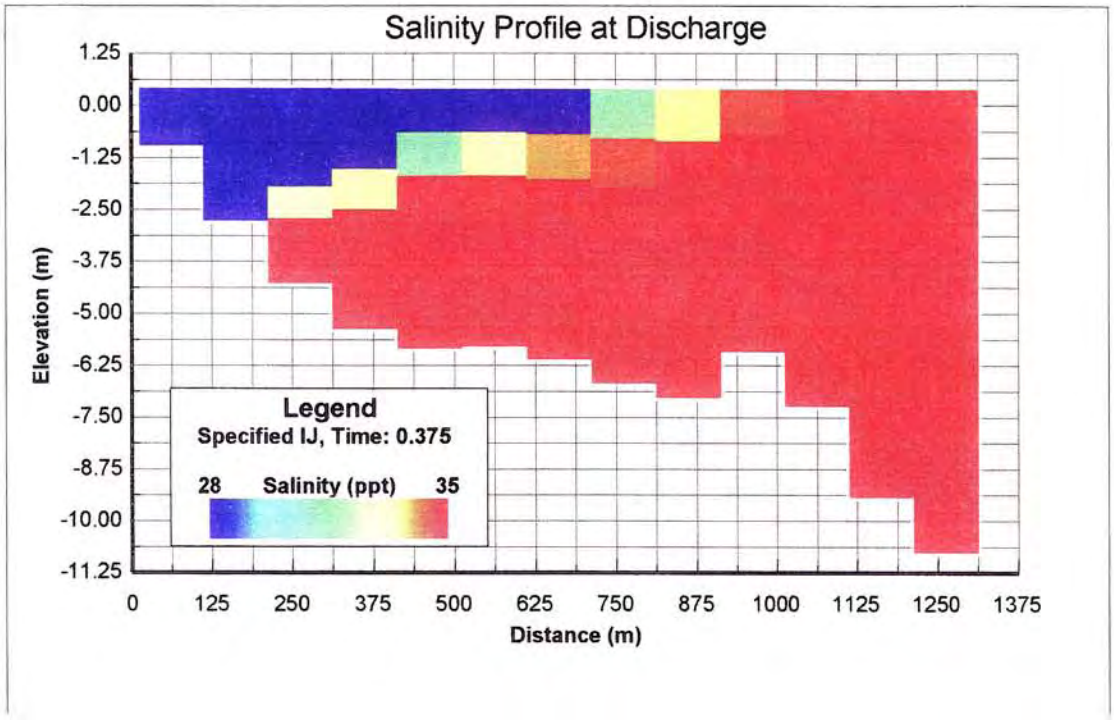


Figure 6-3D. Surface layer salinity time series offshore of discharge site (i=38,j=33), 1000 meters west of discharge site (i=38,j=43) and 1000 meter east of discharge site (i=37,j=23)



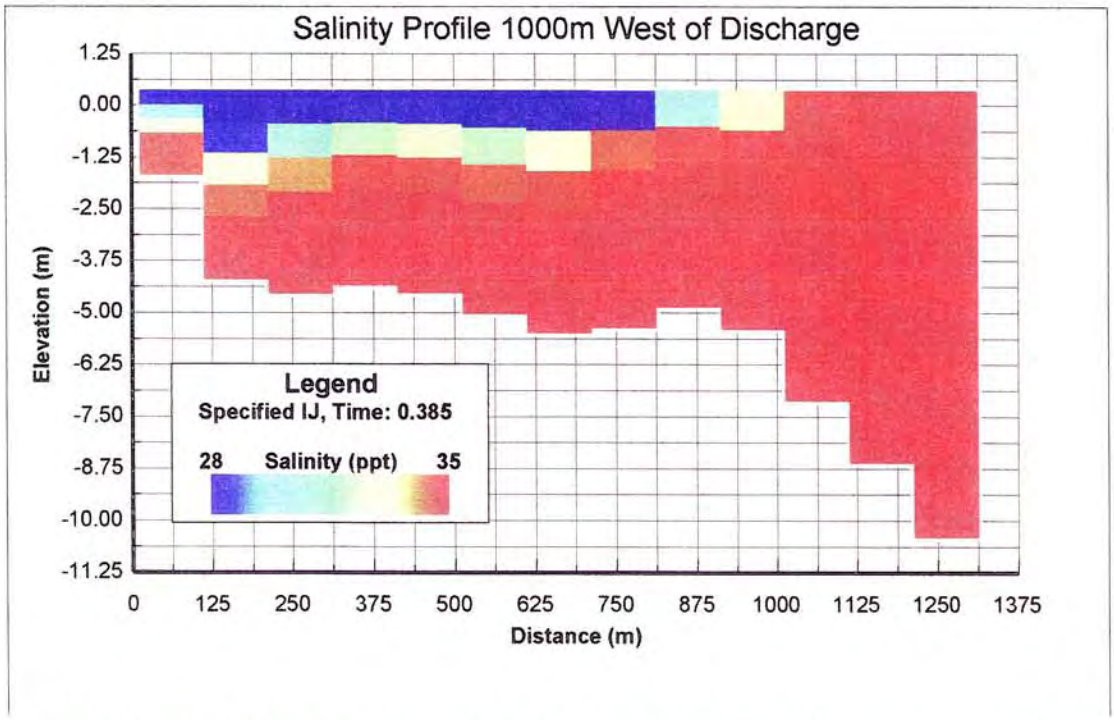


Figure 6-3E. Maximum plume thickness at discharge site (top) and 1000 meters west of discharge (bottom).

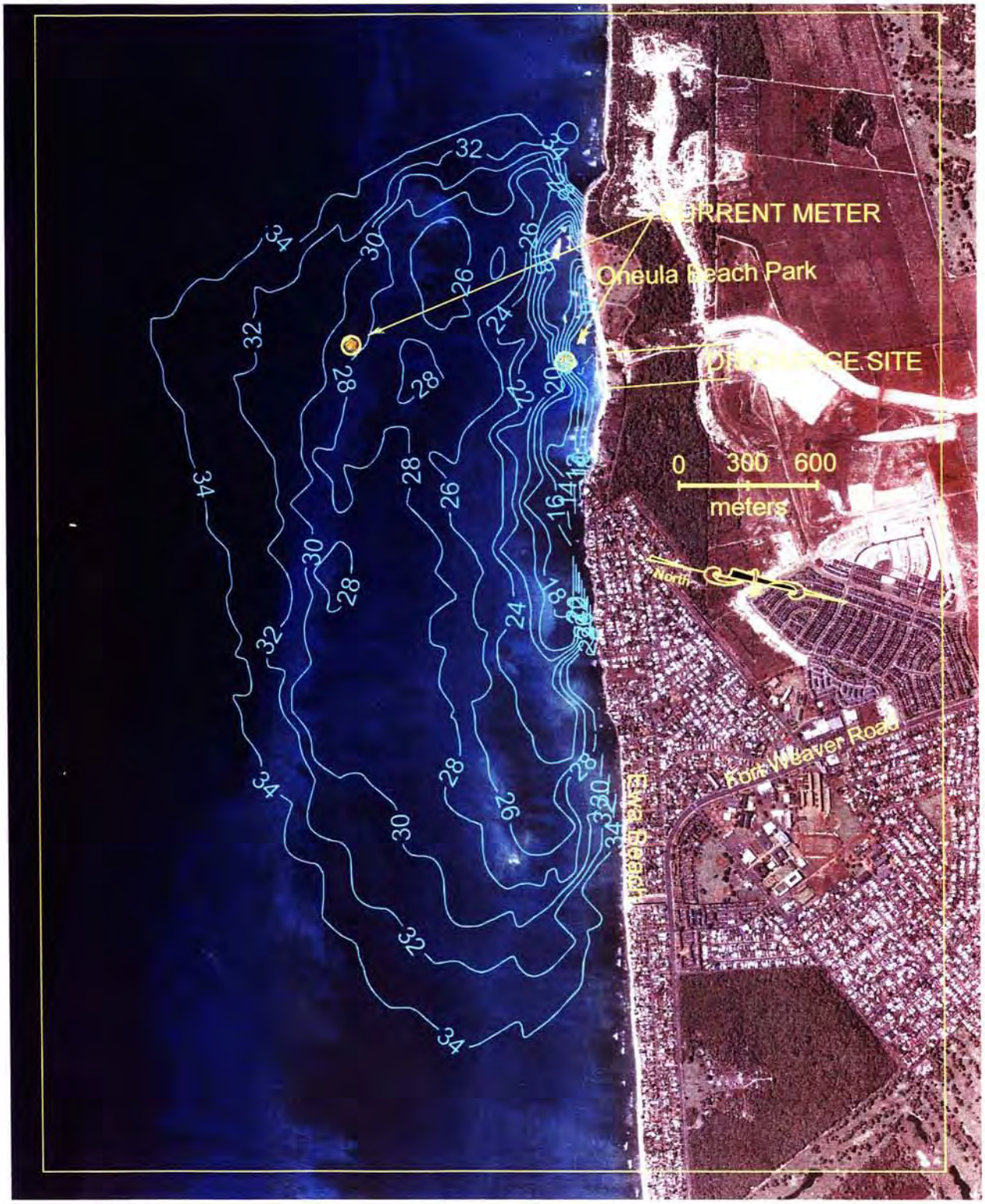


Figure 6-4A. Minimum Surface Layer Salinity for a 20-year Discharge Event and Weak Ebb Tides. Contours in ppt. Time is 3 hours after peak outflow.

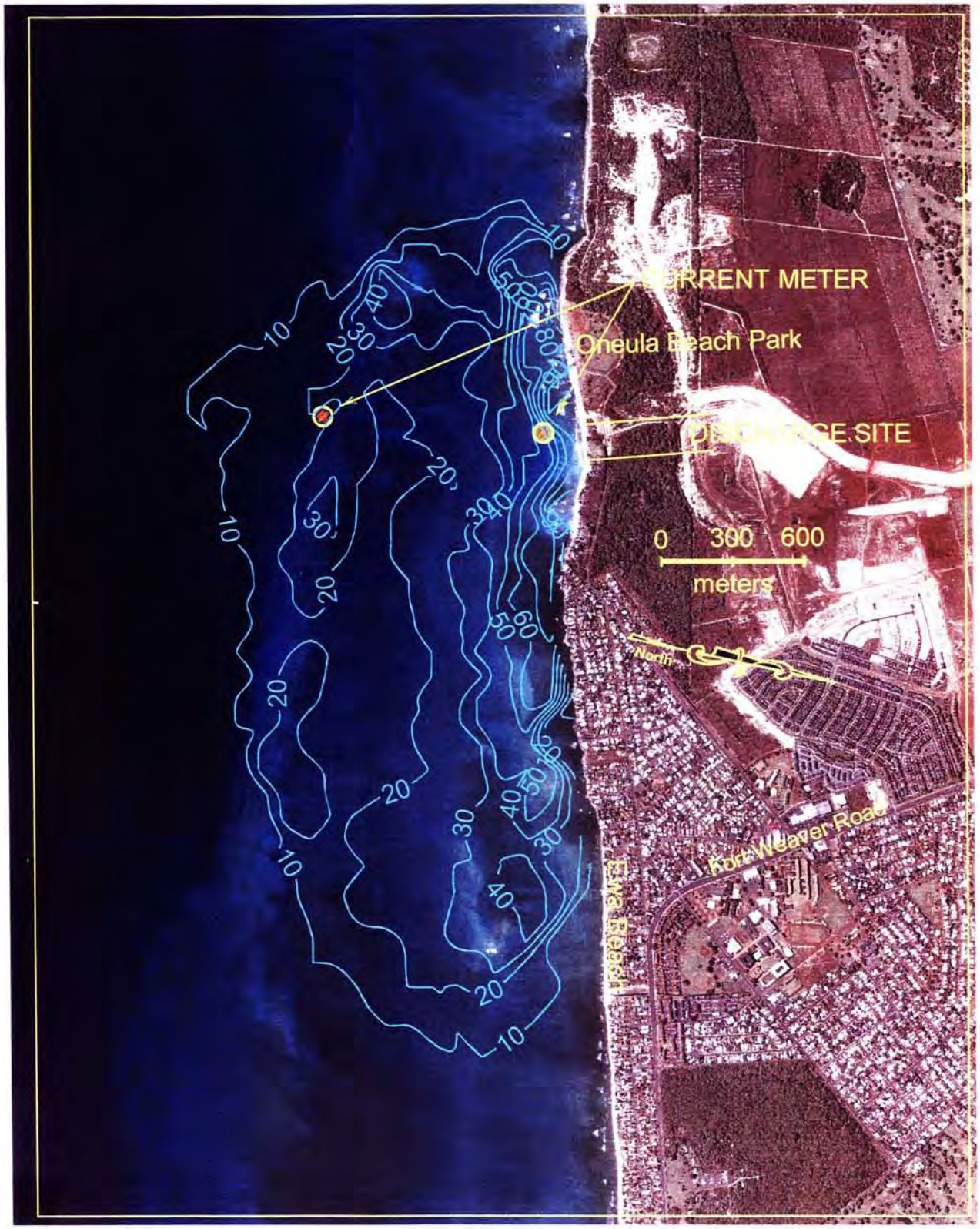


Figure 6-4B. Peak Surface Layer Plume (dye) Concentrations for a 20-year Discharge Event and Weak Ebb Tides. Contours show percentage of initial concentration. Time is 3 hours after peak outflow.

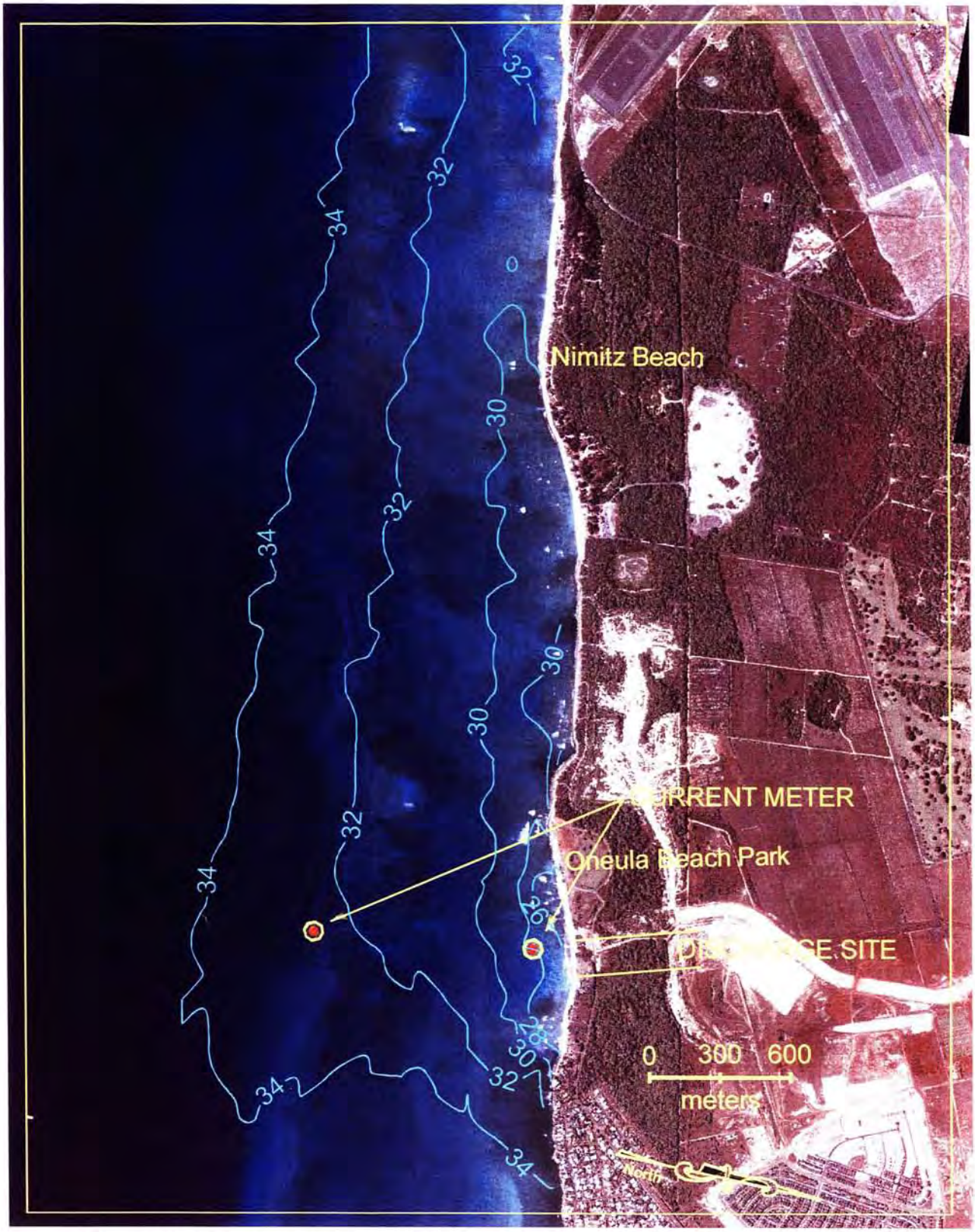


Figure 6-4C. Surface Layer Salinity 9.6 hours After Peak Outflow. Contours in ppt.



Figure 6-4D. Surface Layer Salinity 20 hours After Peak Outflow. Contours in ppt.

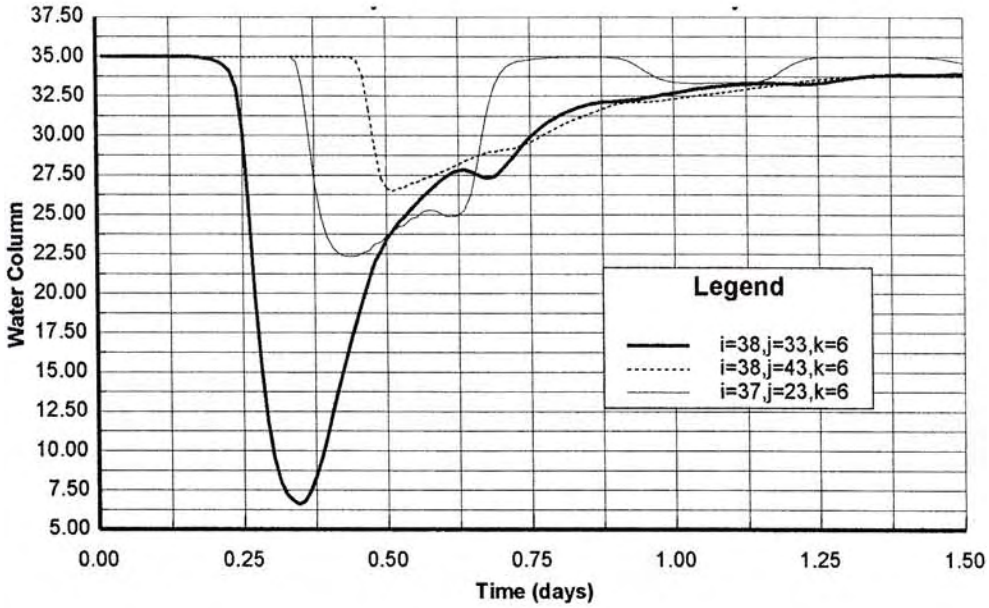


Figure 6-4E. Surface layer salinity time series offshore of discharge site (i=38,j=33), 1000 meters west of discharge site (i=38,j=43) and 1000 meter east of discharge site (i=37,j=23)



Figure 6-5A. Minimum Surface Layer Salinity for a 20-year Discharge Event, Moderate Tides, and Kona Winds and Waves. Contours in ppt.



Figure 6-5B. Peak Surface Layer Plume Concentrations for a 20-year Discharge Event, Moderate Tides, and Kona Winds and Waves. Contours show percentage of initial concentration.



Figure 6-5C. Minimum Bottom Layer Salinity for a 20-year Discharge Event, Moderate Tides, and Kona Winds and Waves. Contours in ppt.

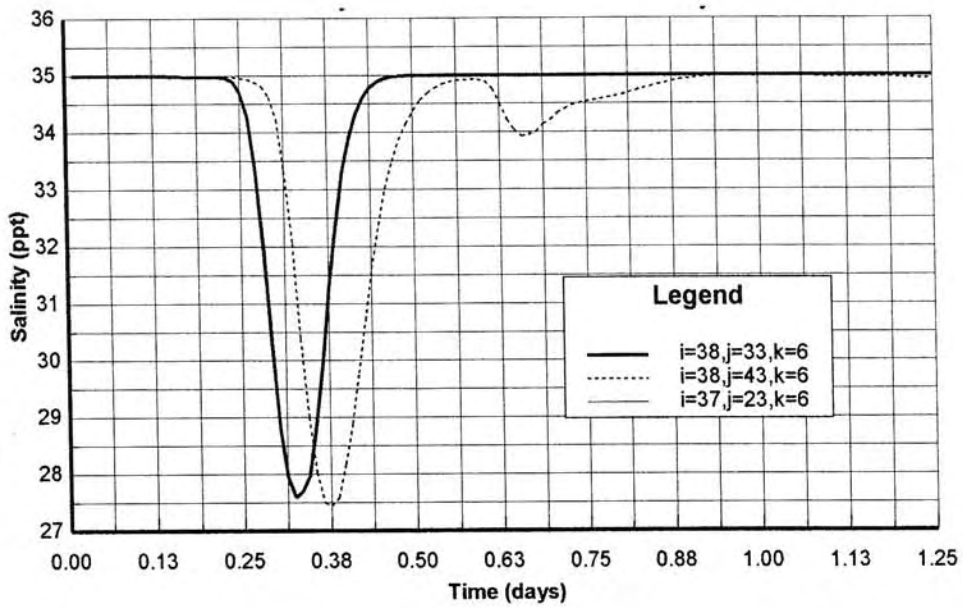
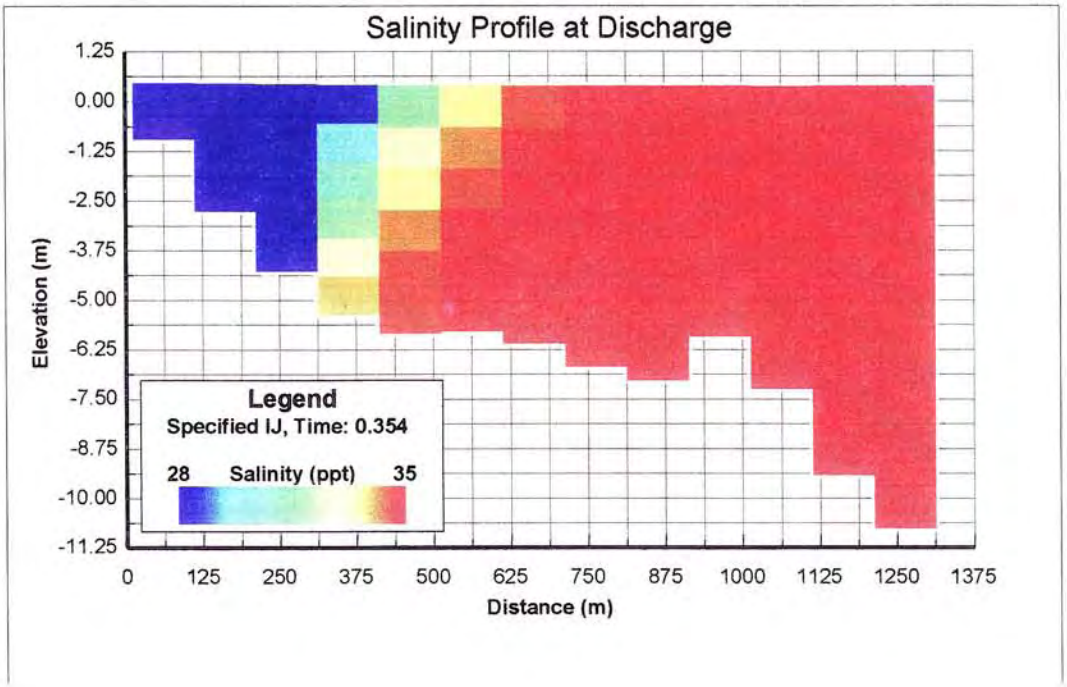


Figure 6-5D. Surface layer salinity time series offshore of discharge site (i=38,j=33), 1000 meters west of discharge site (i=38,j=43) and 1000 meter east of discharge site (i=37,j=23)



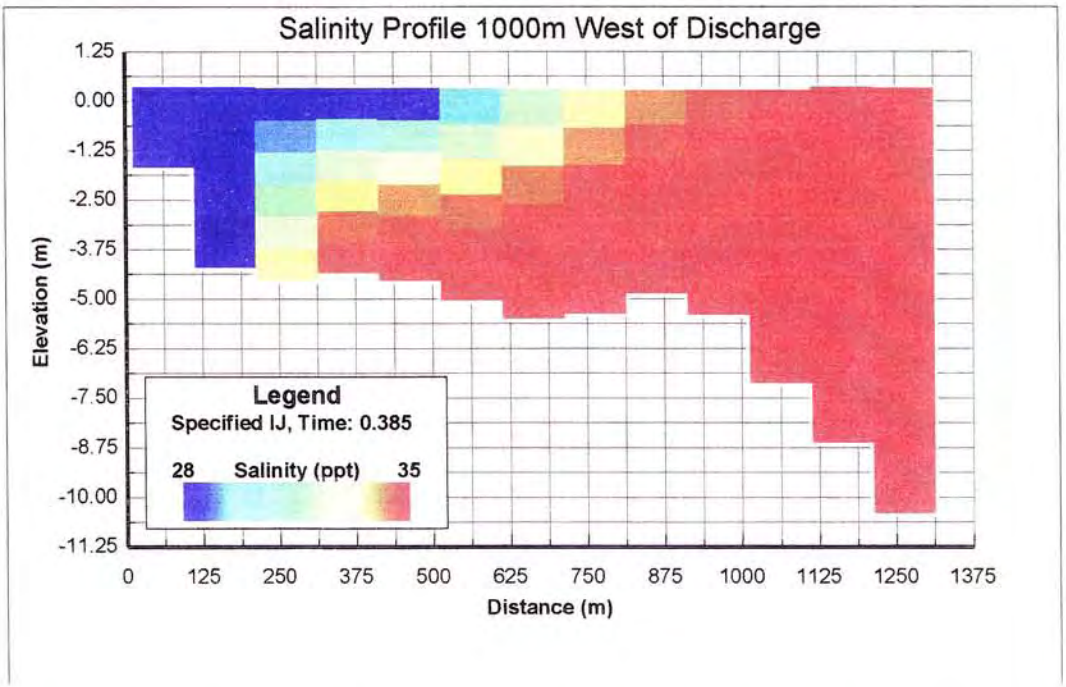


Figure 6-5E. Maximum plume thickness at discharge site (top) and 1000 meters west of discharge site (bottom).

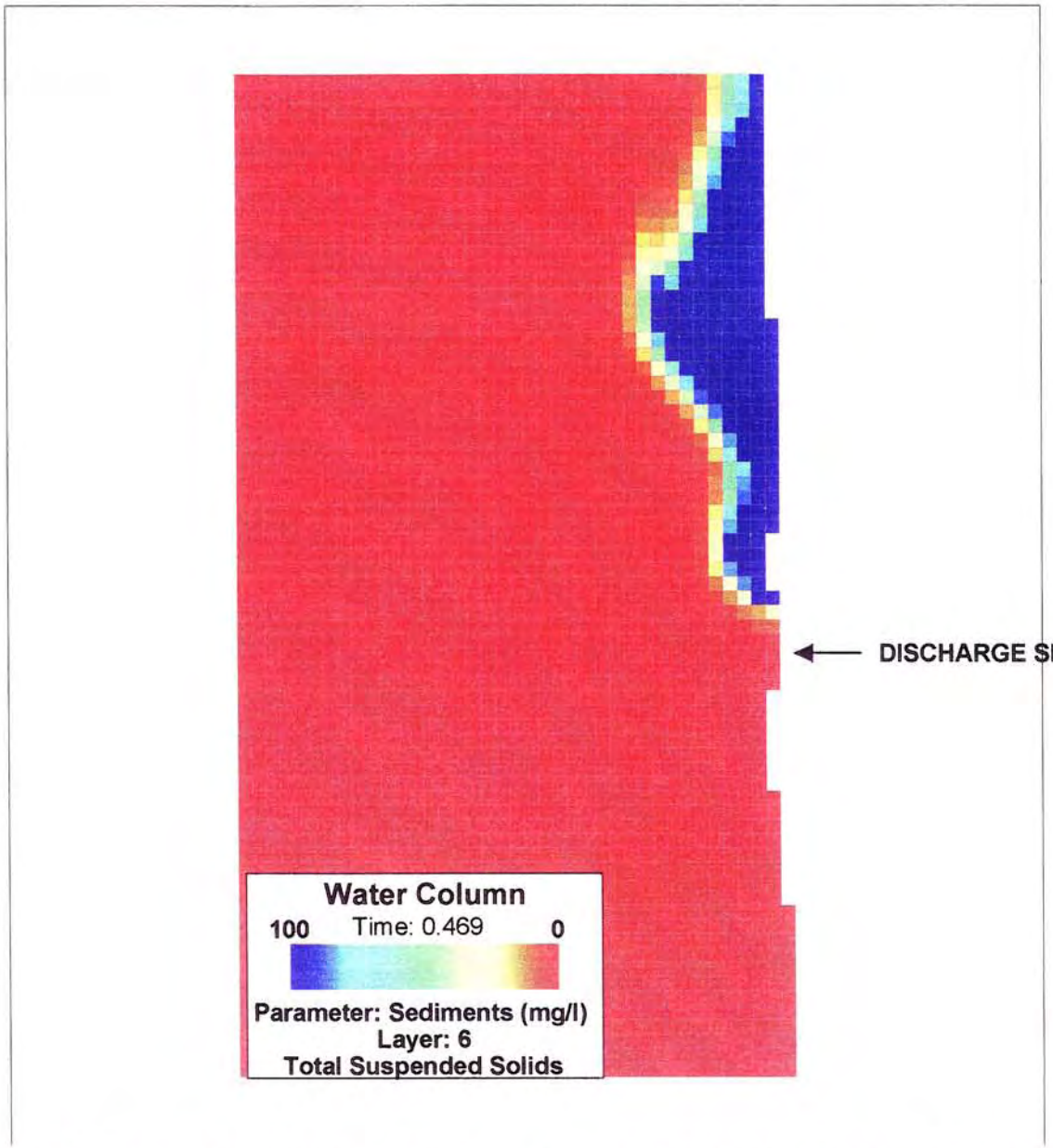


Figure 6-5F. Surface layer suspended sediment concentration at time 0.469 days. Each grid cell is 100x100 meters.

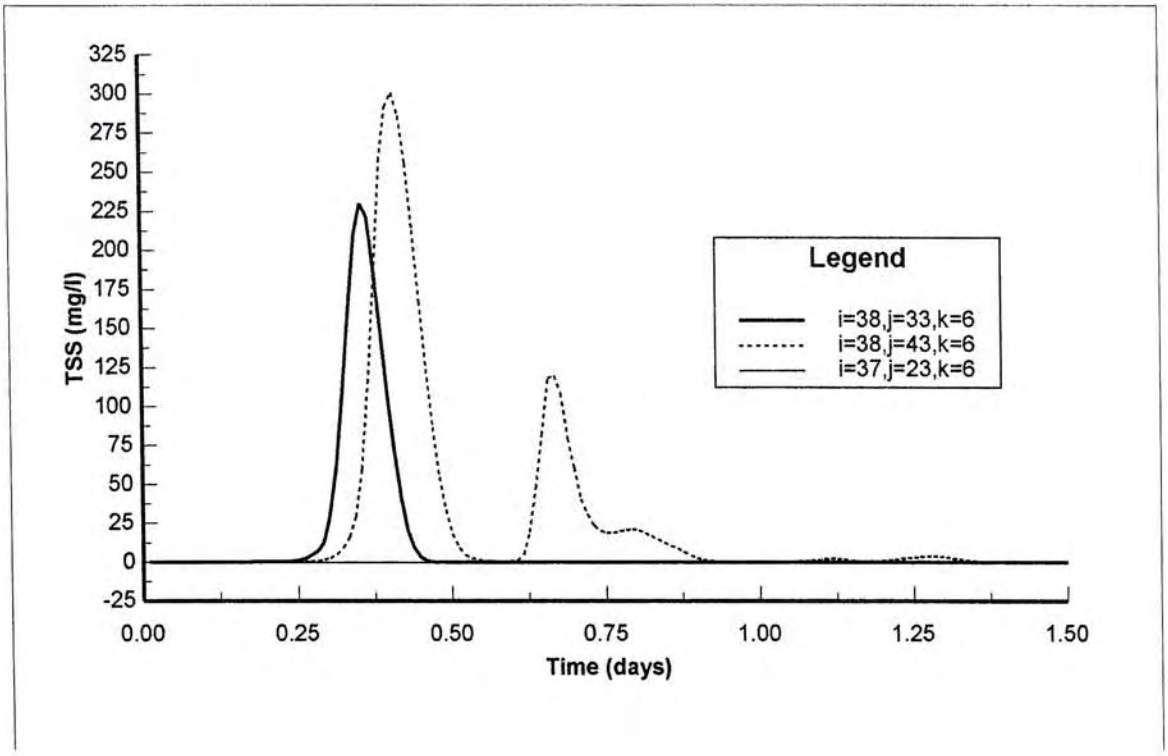


Figure 6-5G. Surface layer TSS time series offshore of the discharge site (i=38,j=33), 1000 meters west of the discharge site (i=38,j=43) and 1000 meters east of discharge site (i=37,j=23).

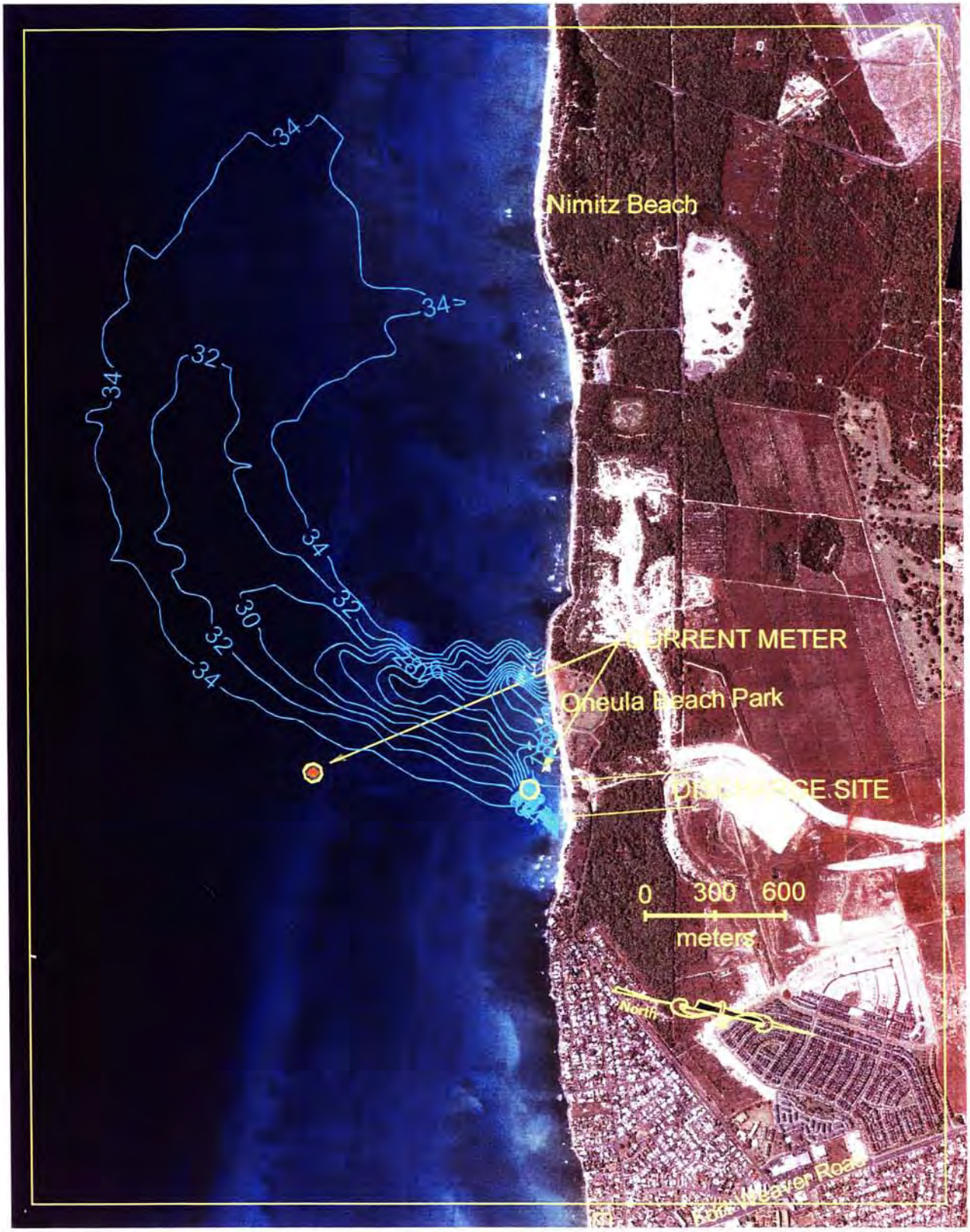


Figure 6-6A. Minimum Surface Layer Salinity for a 20-year Discharge Event, Moderate Tides and South Swell. Contours in ppt.

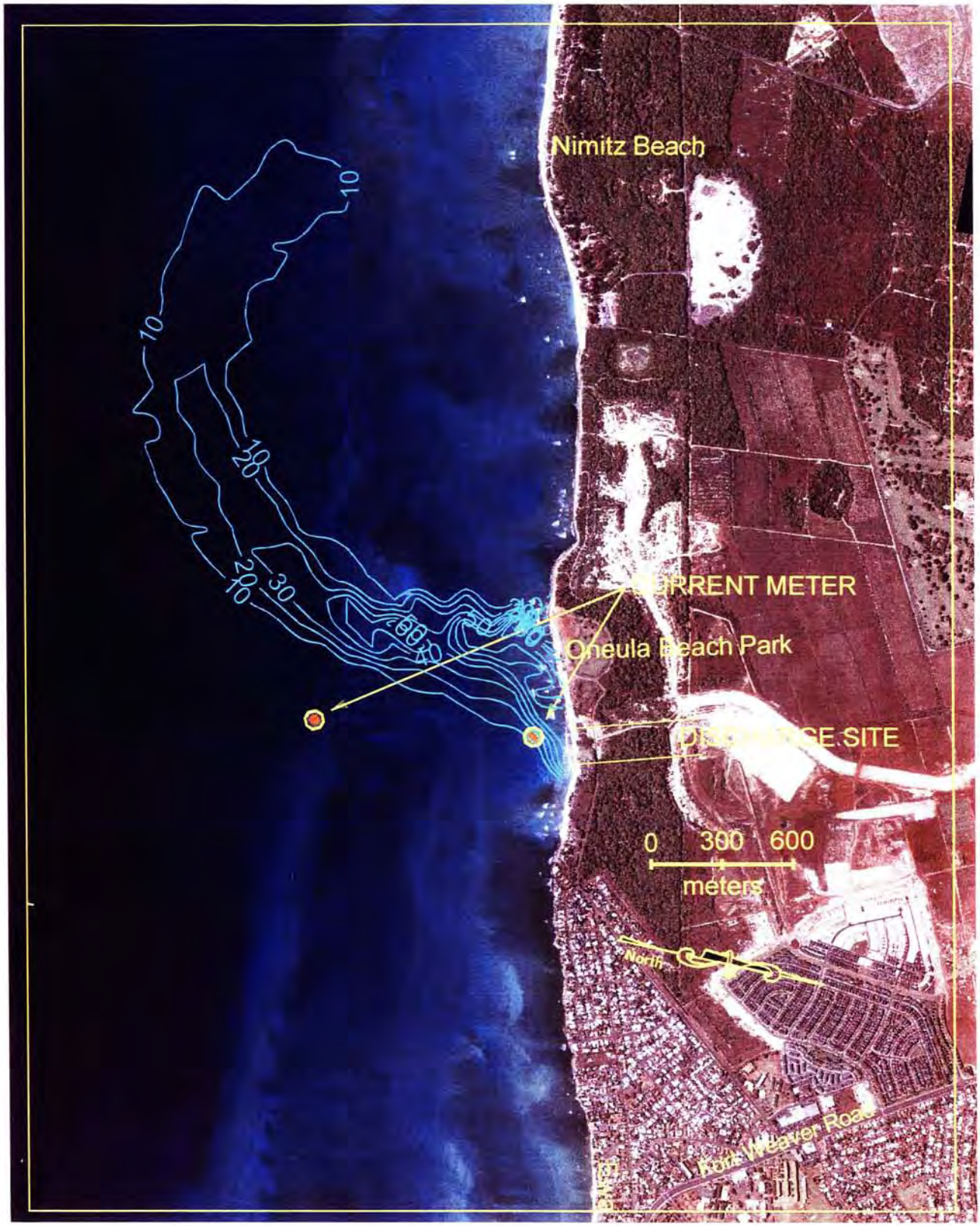


Figure 6-6B. Peak Surface Layer Plume (dye) Concentration for a 20-year Discharge Event, Moderate Tides and South Swell. Contours show percentage of initial concentration.

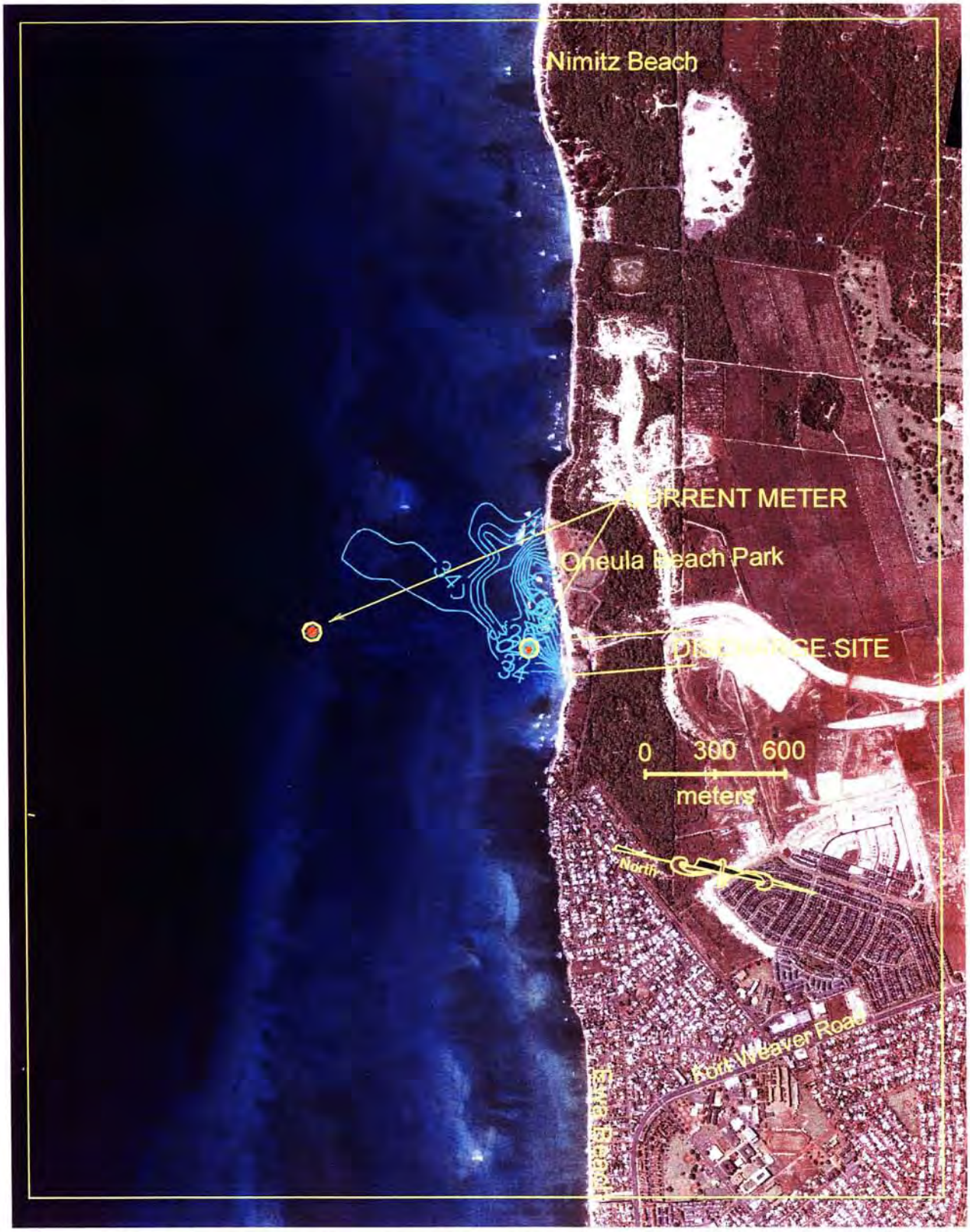


Figure 6-6C. Minimum Bottom Layer Salinity for a 20-year Discharge Event, Moderate Tides and South Swell. Contours in ppt.

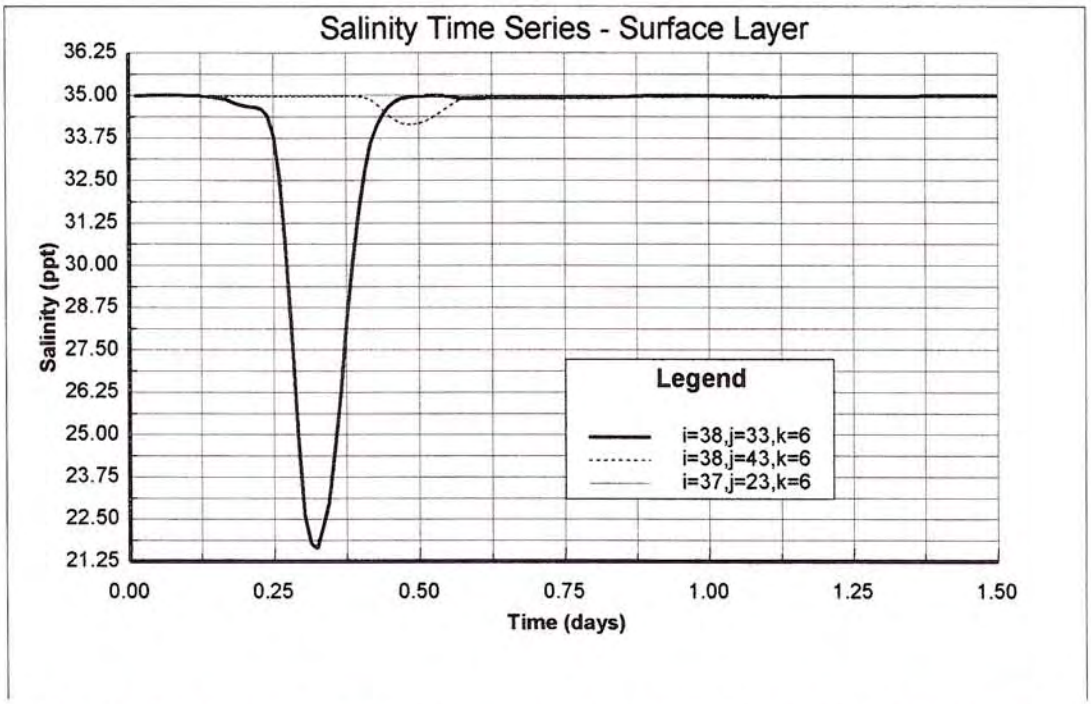


Figure 6-6D. Surface layer salinity time series offshore of discharge site (i=38,j=33), 1000 meters west of discharge site (i=38,j=43) and 1000 meter east of discharge site (i=37,j=23)

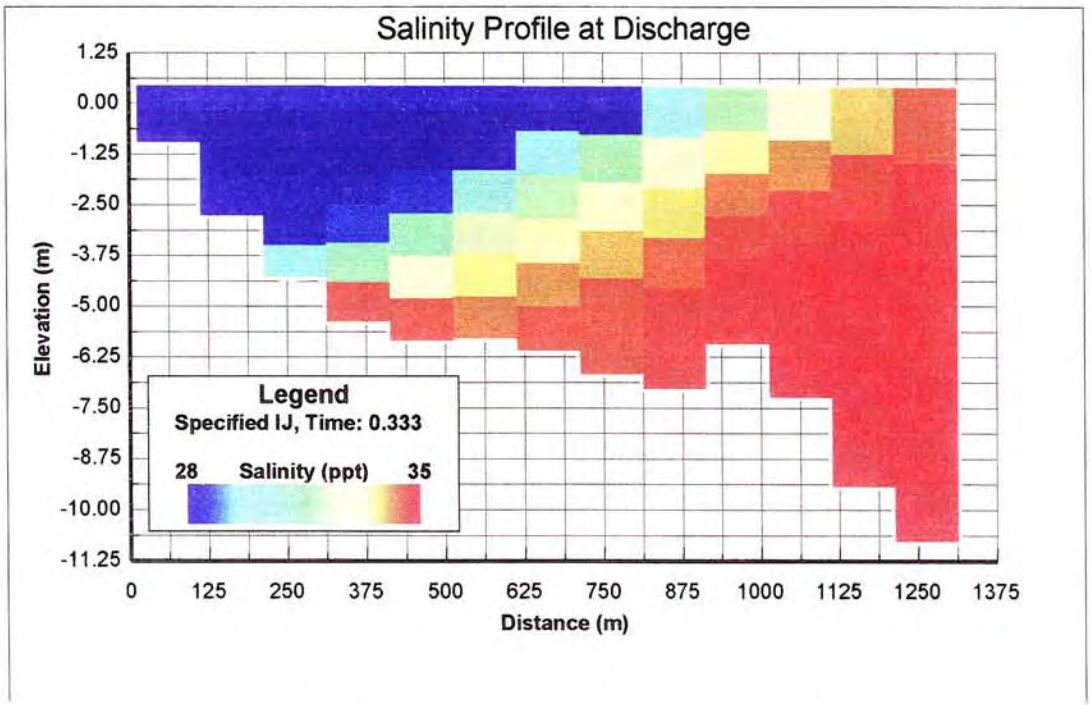


Figure 6-6E. Maximum plume thickness at discharge site.

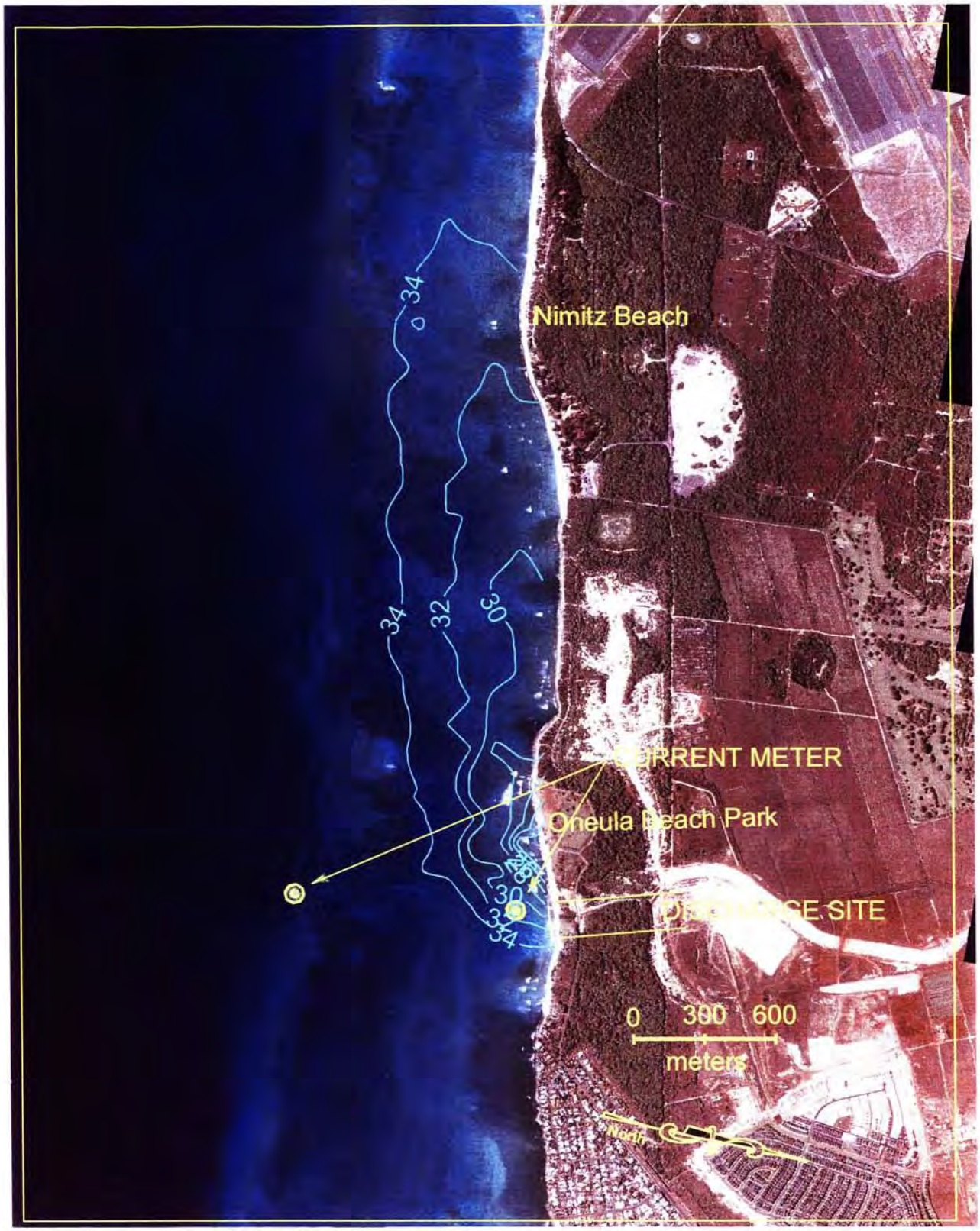


Figure 6-7A. Minimum Surface Layer Salinity for a 10-year Discharge Event and Moderate Tides. Contours in ppt.

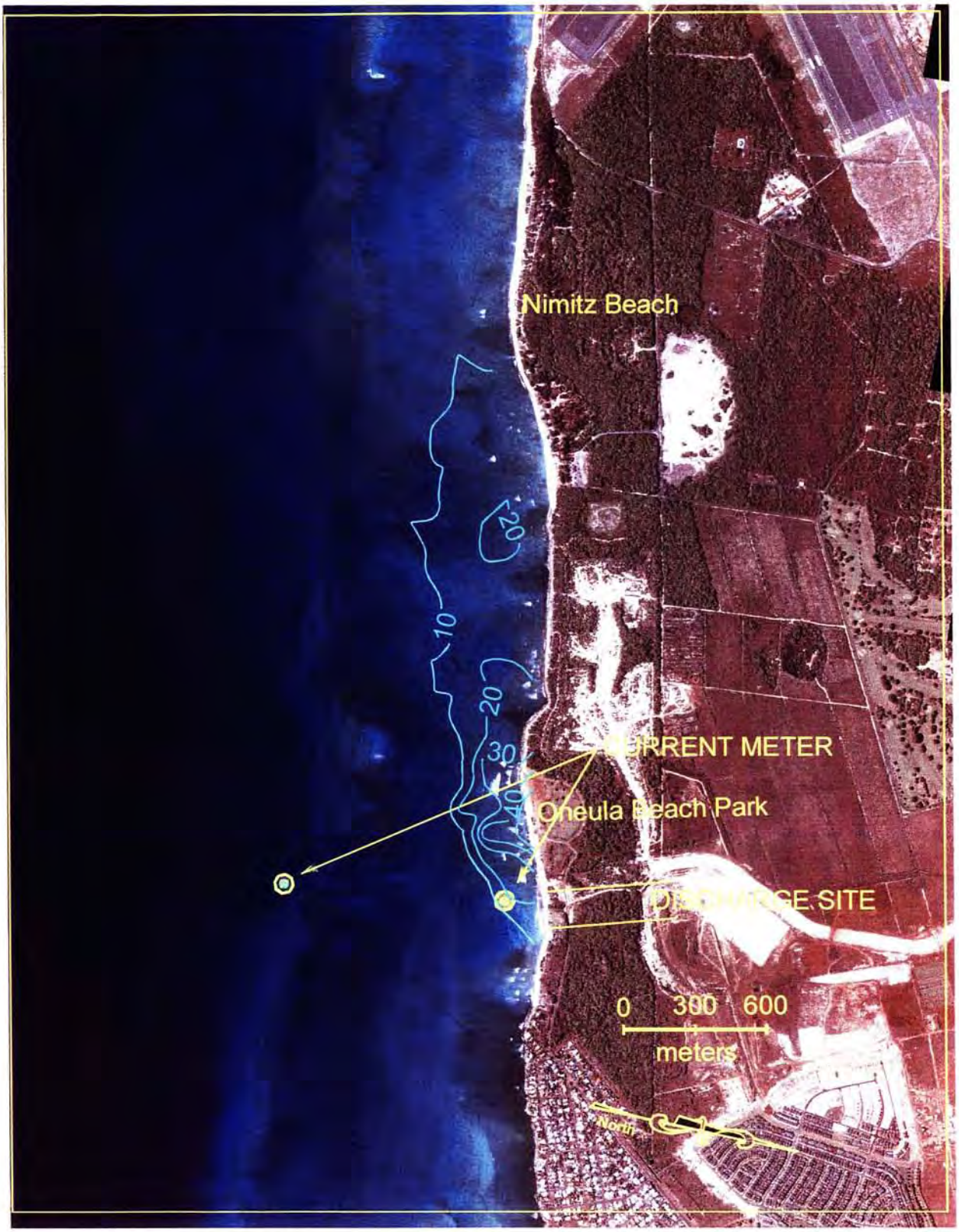


Figure 6-7B. Peak Surface Layer (dye) Concentration for a 10-year Discharge Event and Moderate Tides. Contours show percentage of initial concentration.

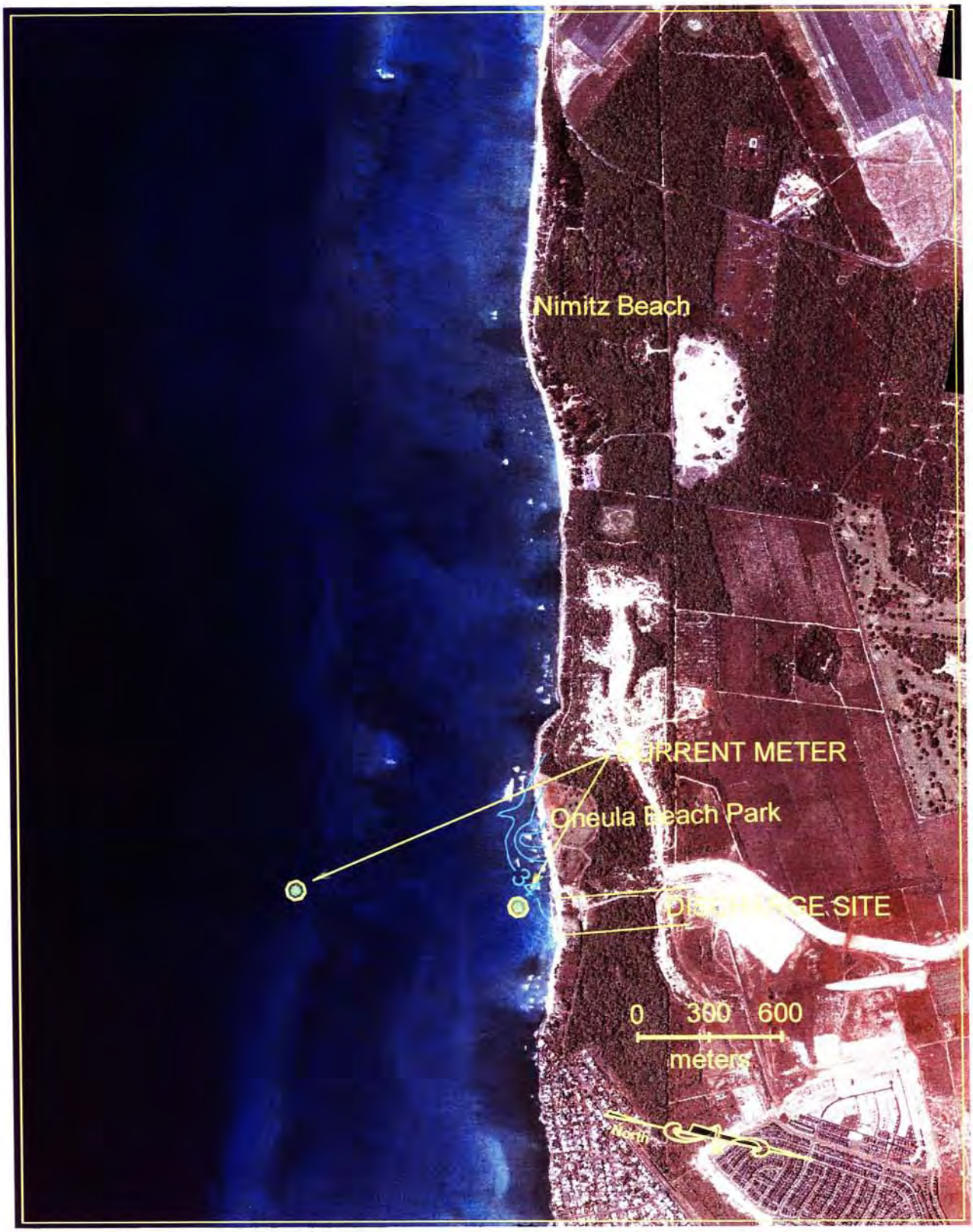


Figure 6-7C. Minimum Bottom Layer Salinity for a 10-year Discharge Event and Moderate Tides. Contours in ppt.

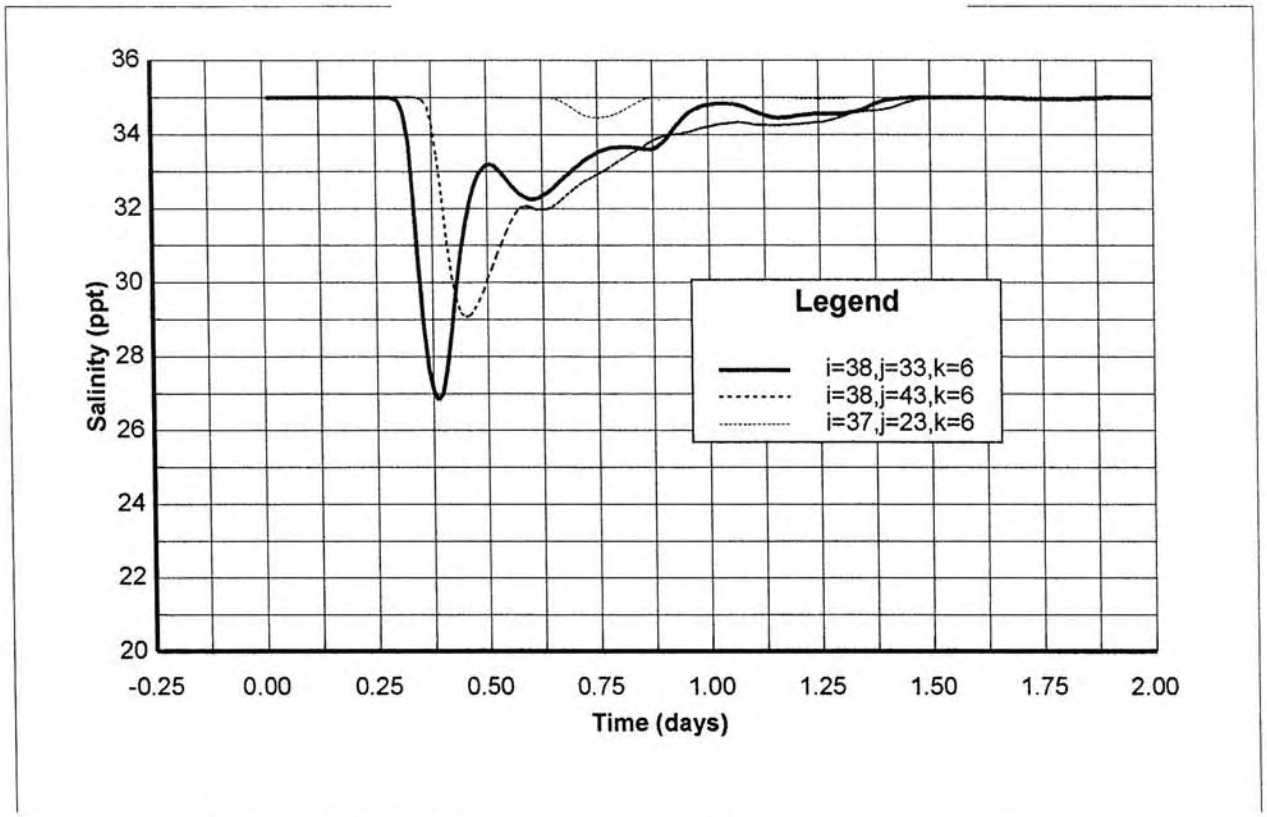


Figure 6-7D. Surface layer salinity time series offshore of discharge site (i=38,j=33), 1000 meters west of discharge site (i=38,j=43) and 1000 meter east of discharge site (i=37,j=23)

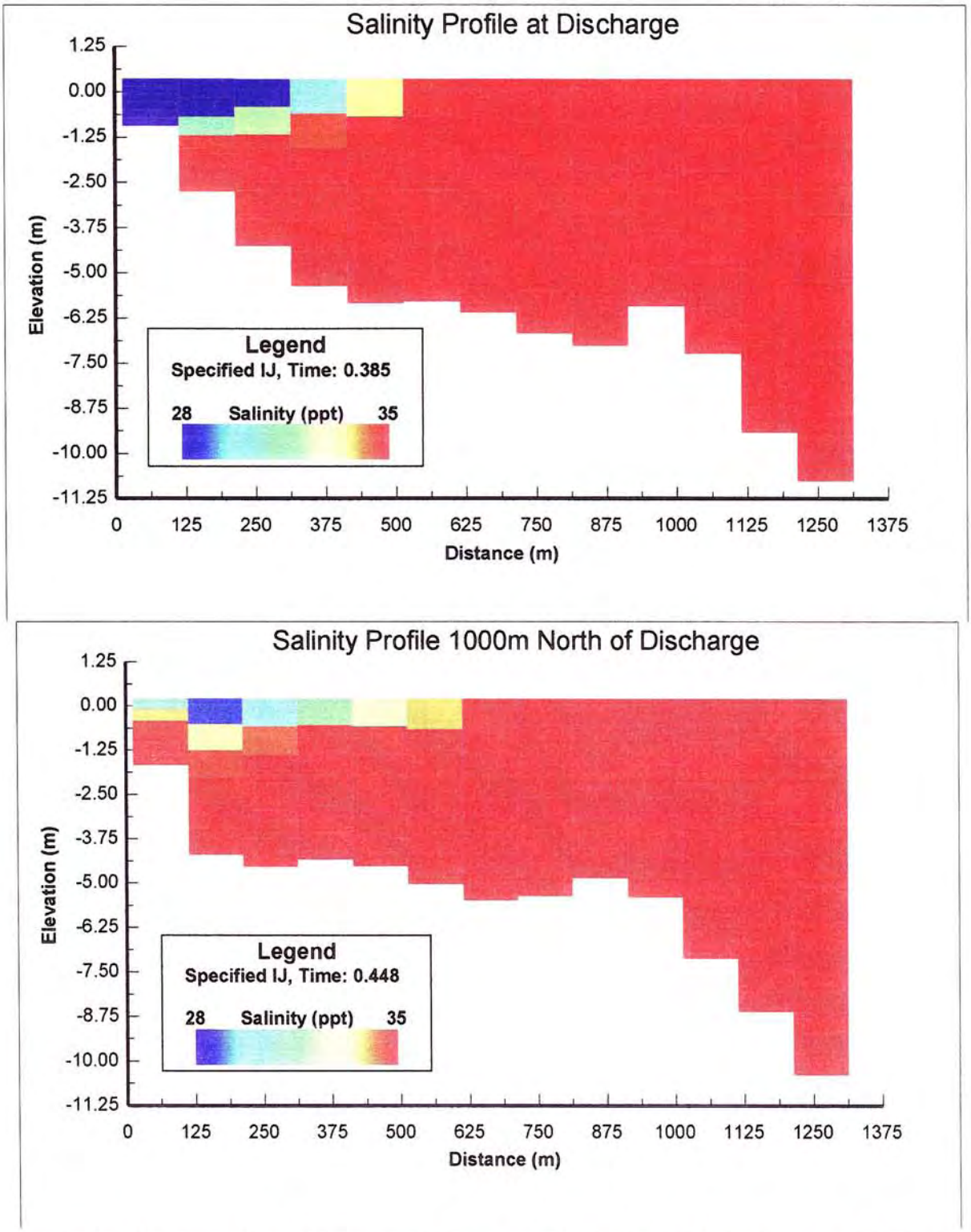


Figure 6-7E. Maximum plume thickness at discharge site (top) and 1000 meters west of discharge site (bottom).

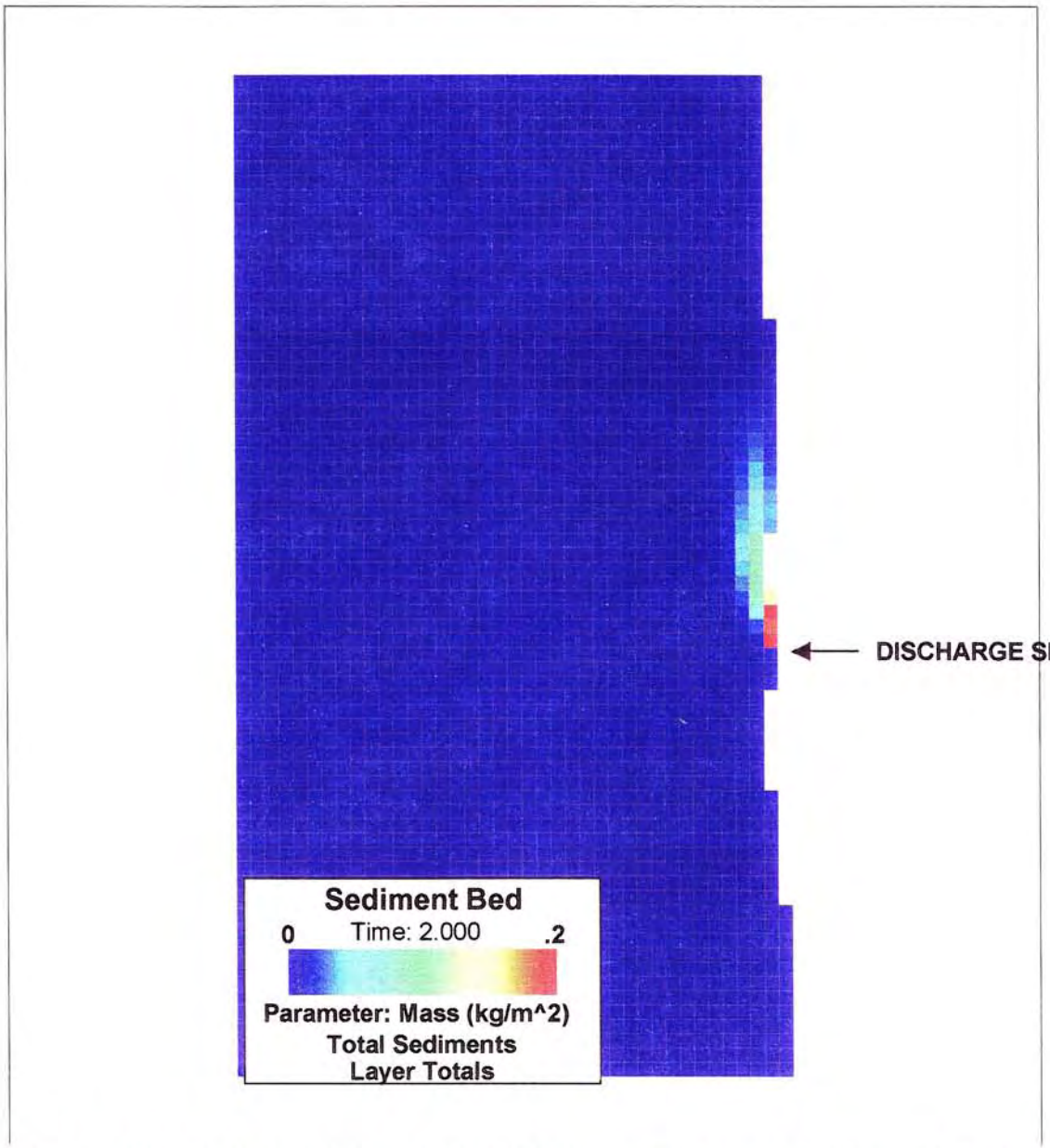


Figure 6-7F. Sediment deposition expressed in kilograms per square meter. 0.2 kilogram per square meter is equivalent to a layer 0.1 mm thick.

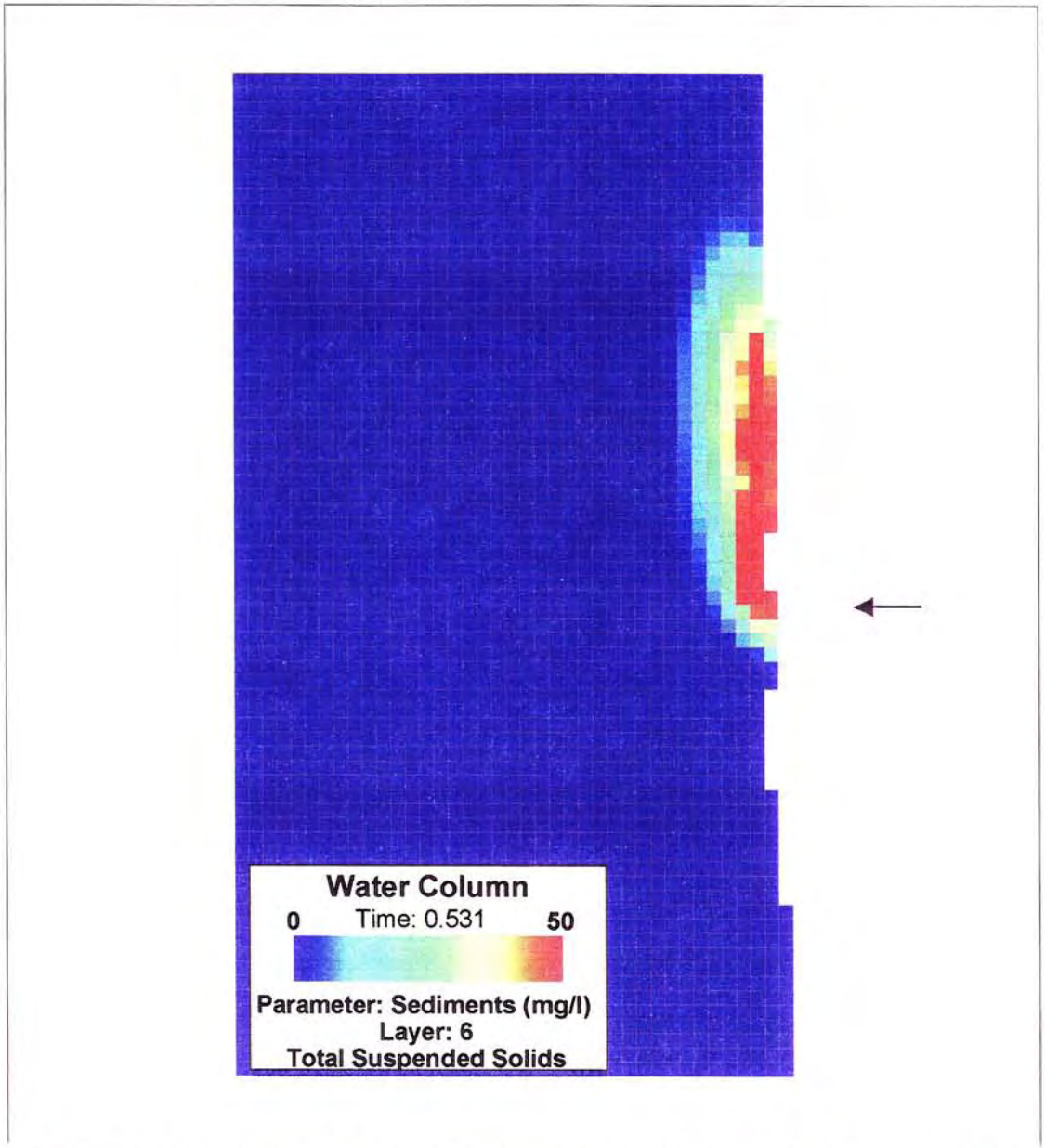


Figure 6-7G. Surface layer suspended sediment concentration at time 0.531 days. Each grid cell is 100x100 meters.

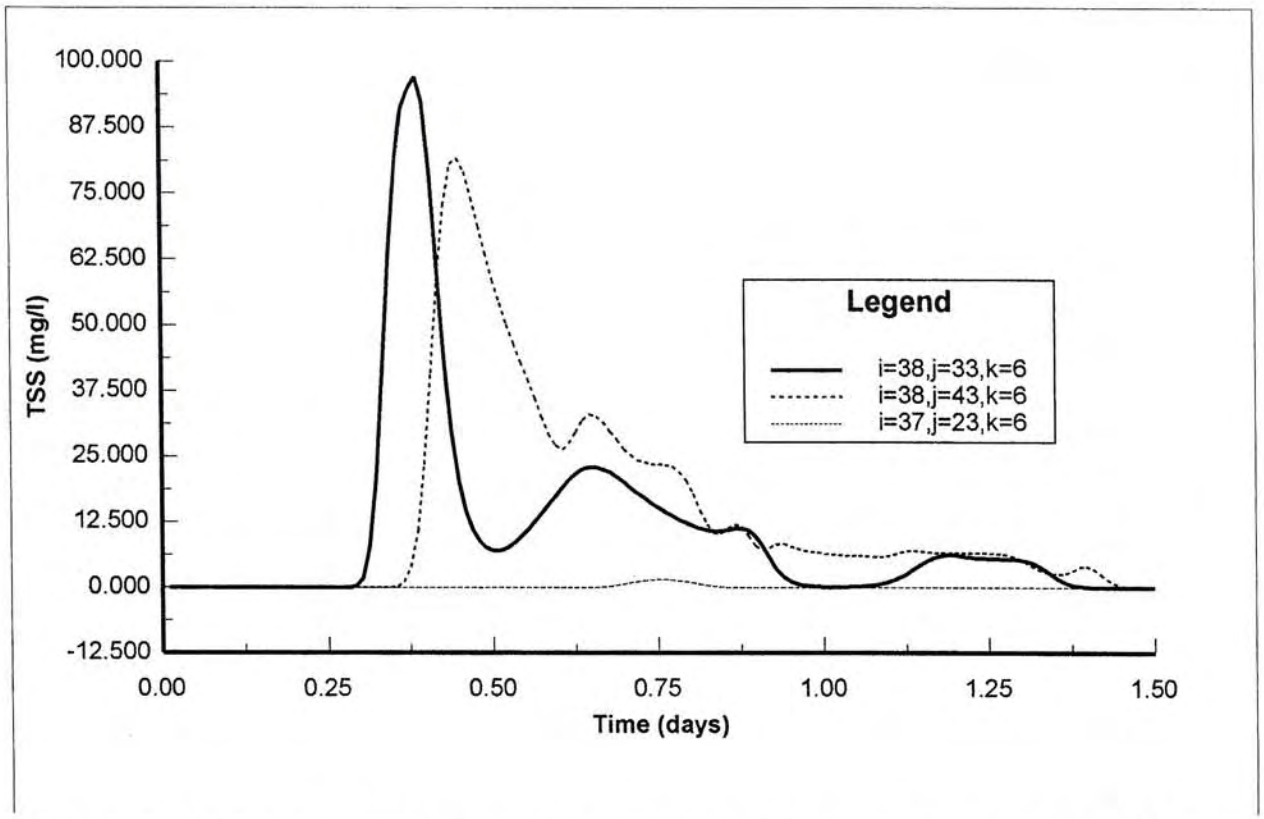


Figure 6-7H. Surface layer TSS time series offshore of the discharge site (i=38,j=33), 1000 meters west of the discharge site (i=38,j=43) and 1000 meters east of discharge site (i=37,j=23).

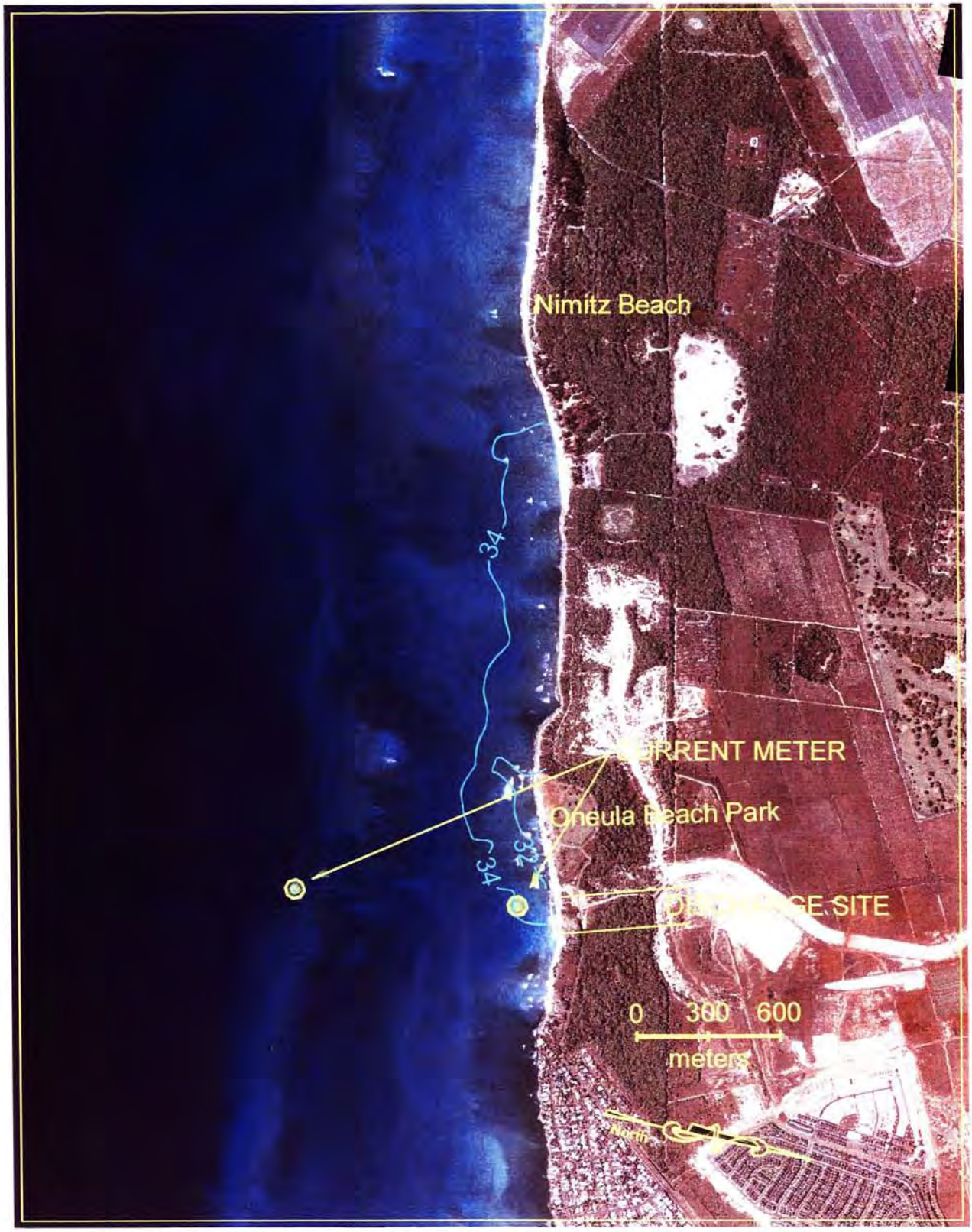


Figure 6-8A. Minimum Surface Layer Salinity for a 10-year Discharge, Moderate Tides, and Kona Winds and Waves. Contours in ppt.



Figure 6-8B. Peak Surface Layer (dye) Concentration for a 10-year Discharge, Moderate Tides, and Kona Winds and Waves. Contours show percentage of initial concentration.

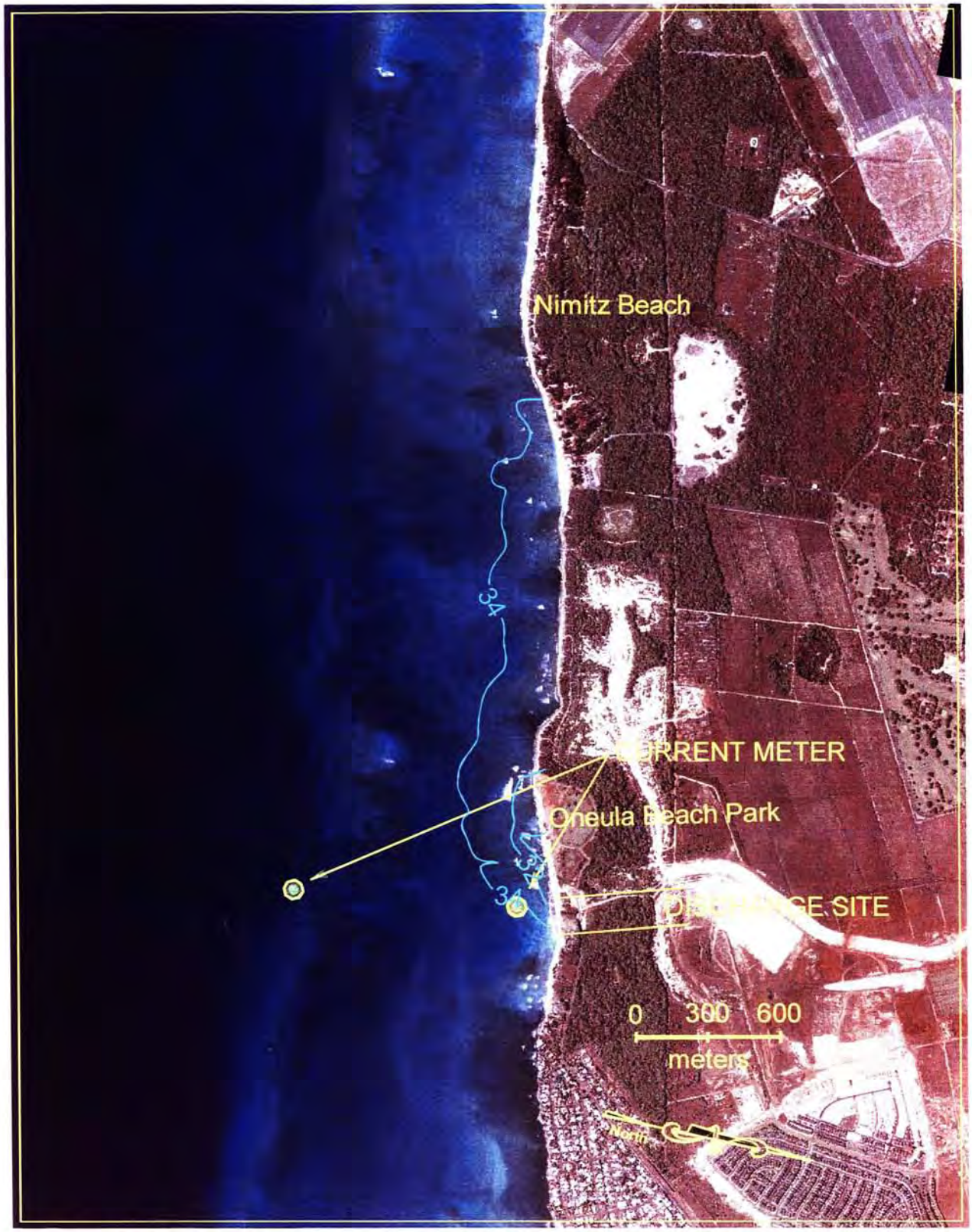


Figure 6-8C. Minimum Bottom Layer Salinity for a 10-year Discharge, Moderate Tides, and Kona Winds and Waves. Contours in ppt.

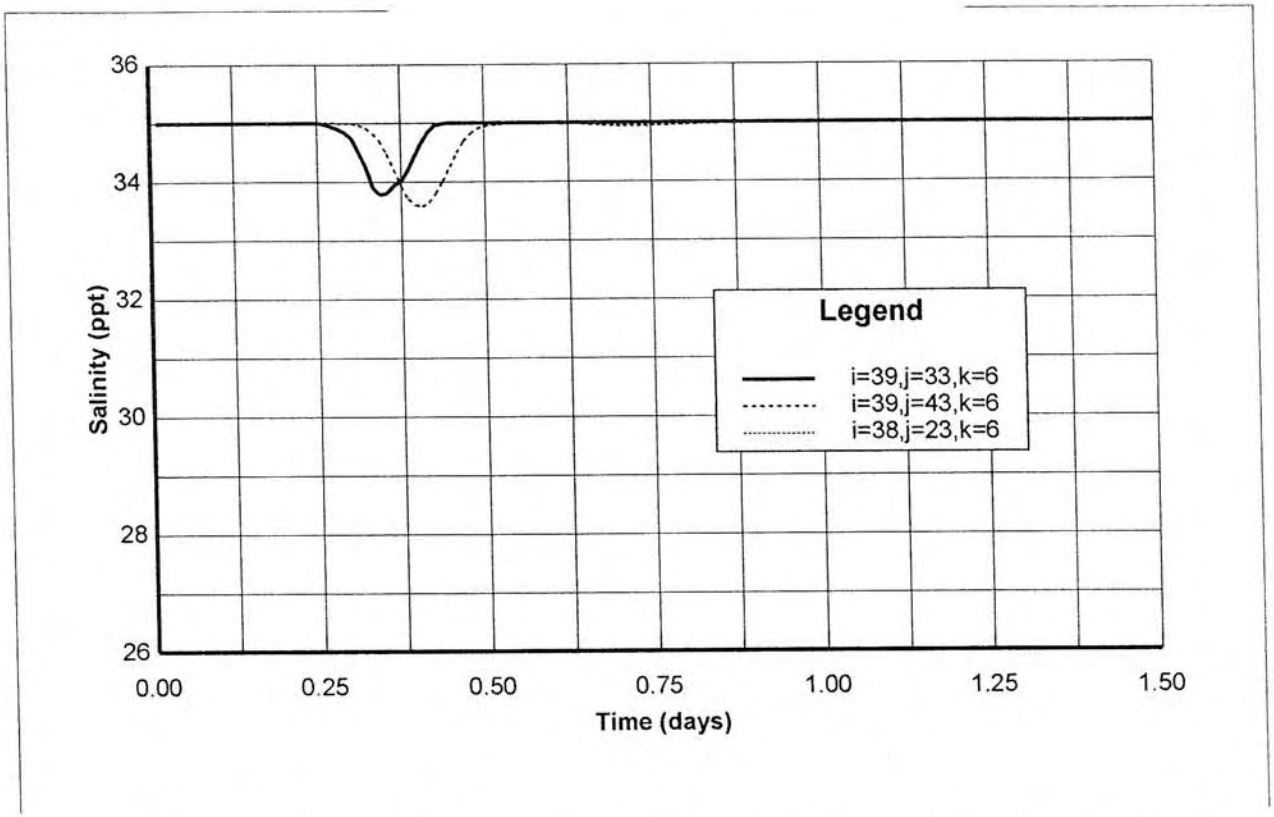


Figure 6-8D. Surface layer salinity time series offshore of discharge site (i=38,j=33), 1000 meters west of discharge site (i=38,j=43) and 1000 meter east of discharge site (i=37,j=23)

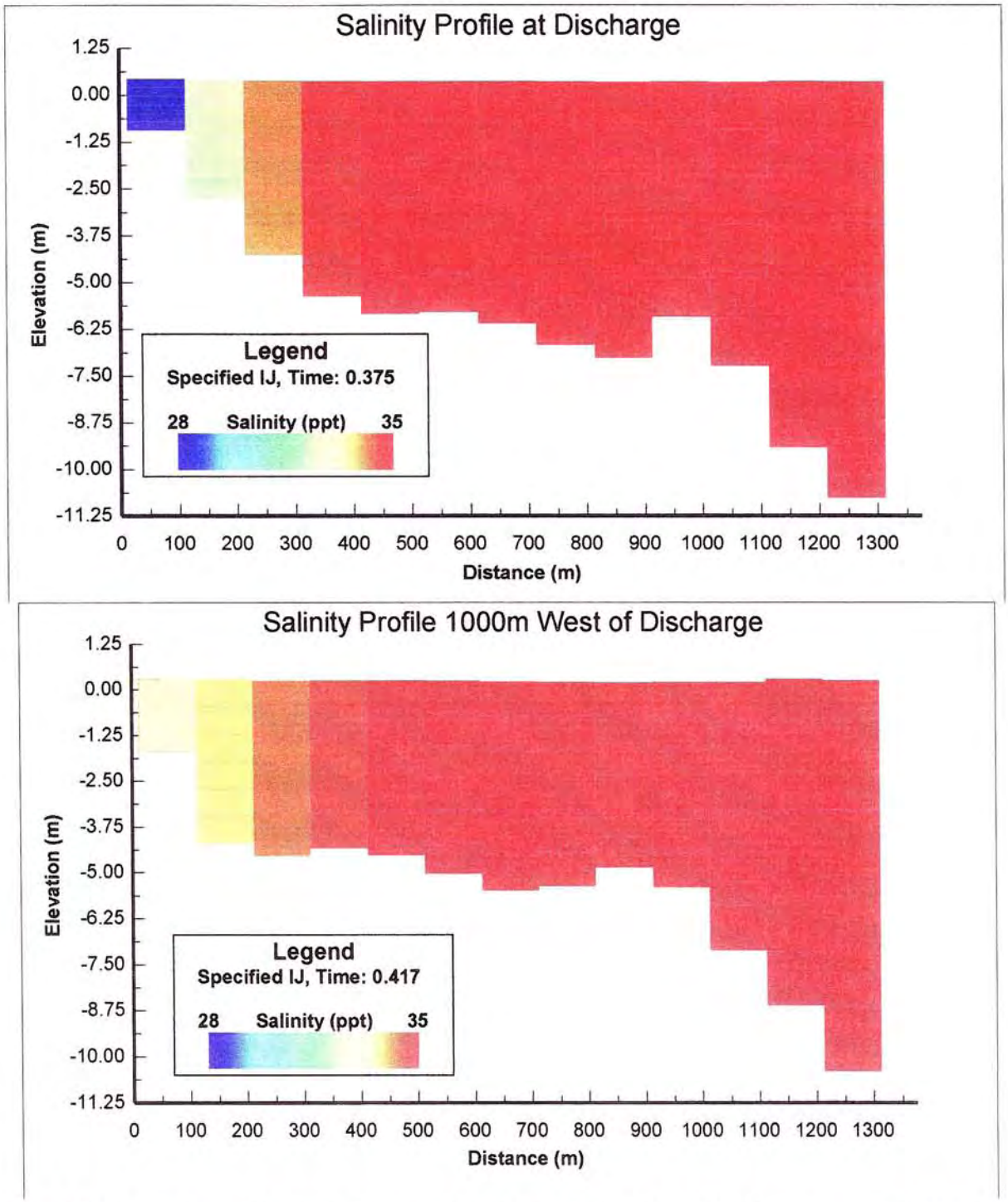


Figure 6-8E. Maximum plume thickness at discharge site (top) and 1000 meters west of discharge site (bottom).

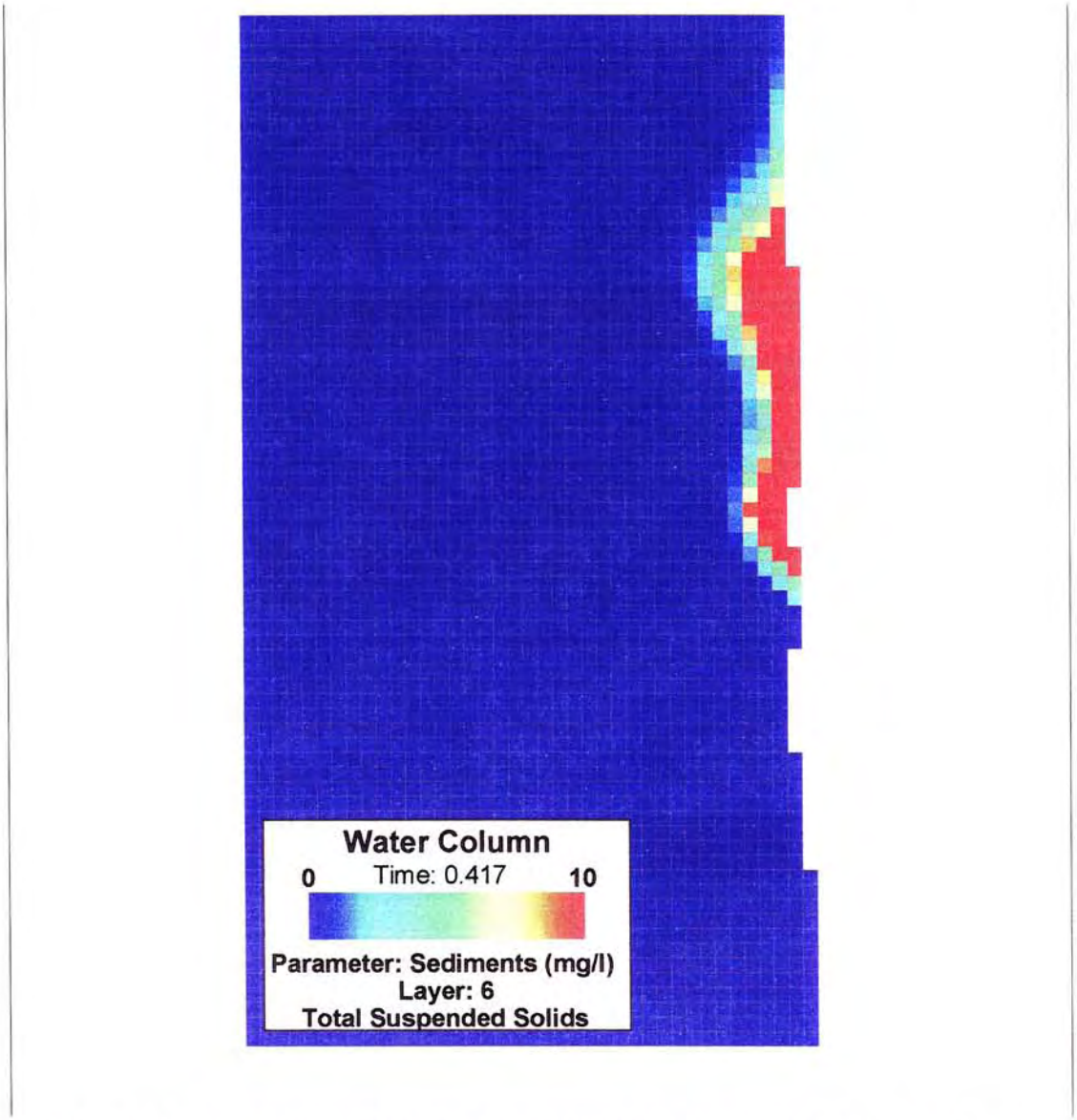


Figure 6-8F. Surface layer suspended sediment concentration at time 0.417 days. Each grid cell is 100x100 meters.

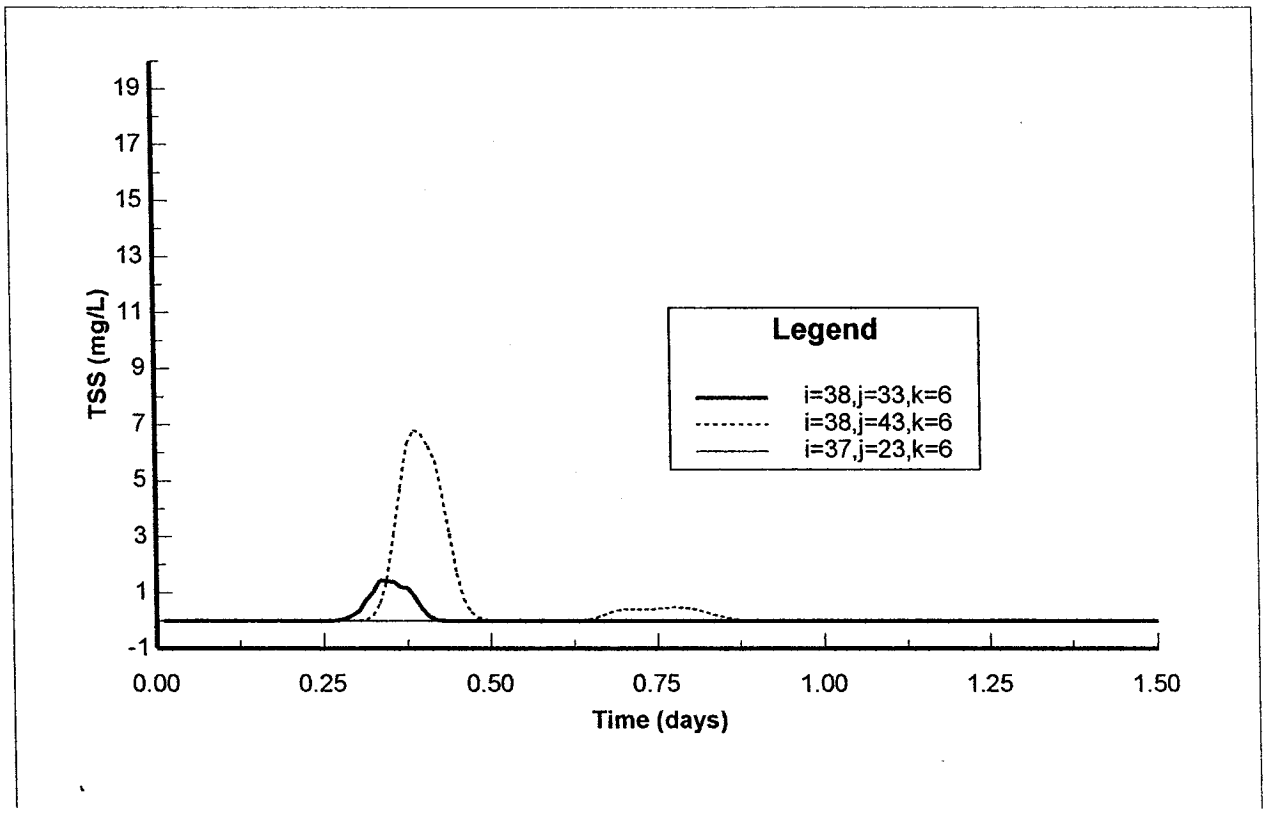


Figure 6-8G. Surface layer TSS time series offshore of the discharge site (i-38,j=33), 1,000 meters west of the discharge site (i=38,j=43) and 1,000 meters east of discharge site (i=37,j=23).

7.0 SUMMARY AND CONCLUSIONS

Eight model runs were completed, bracketing a range of discharge outflow, tides, wind and waves. The results of these model runs are summarized in Table 7.1. The modeling results show that the site is characterized by good transport and mixing. In general, the plume generated by storm runoff discharge at the discharge site hugs the shoreline, and is transported initially either to the east or west. The initial transport direction depends on the timing of the discharge outflow with respect to the tidal flow. During ebb tide, currents flow to the east, while during flood tide, currents flow to the west. The current meter data indicated that flow to the west and southwest is predominant; currents flowing to the west and southwest are stronger and last longer than the ebb flows to the east and northeast. Thus, the bulk of the discharge plume transport is to the west to southwest. However, episodes of predominantly flow to the east infrequently occur, and could result in net plume transport to the east.

The Ocean Point storm discharge system is designed to have an extremely large inland retention capacity. Thus, the 8-inch (10-year) rainfall event represents the threshold for discharge into the ocean; runoff from any lesser rainfall events are retained inland, and will not discharge into the ocean. Because of this large retention capacity, the 10-year event lasts only 3 hours and results in the discharge of 96,000 cubic meters of water and 56,000 kg of suspended sediment. During calm sea (no waves or wind) conditions and moderate tides, the discharge plume is calculated to extend a maximum 2,300 meters along the coast, and 500 meters offshore (Run 7, Figure 6-7A). The time required for the plume-affected waters to meet the State DOH salinity standard of 31.5 ppt is a maximum of 6 hours after the peak discharge outflow (Figure 6-7D). The suspended sediment load (TSS) in the discharge results in deposition of 0.12 mm of sediment at the point of greatest deposition immediately offshore of the outlet. Deposition rapidly diminishes with distance from the discharge. Suspended solids concentrations in the water in the project area are calculated to approach ambient levels of about 10 mg/l approximately 1 day after the end of the storm discharge (Figure 6-7H).

Perfectly calm conditions are rare at the project site. Incorporation of Kona waves and wind into the model results in a dramatic increase in mixing and a decrease in sediment deposition. Kona waves reduce the maximum plume dimensions to about 500 x 170 meters (Run 8, Figure 6-8A). Water salinity falls below State water quality standards only for a brief time immediately offshore of the discharge site. Similarly, suspended sediment concentrations in the water return to ambient levels within 6 hours of the peak discharge. This is because the breaking waves efficiently mix and diffuse the plume throughout the water column.

Worst-case conditions at the site are represented by the 20-year discharge event occurring when there are no waves or wind to promote mixing and dispersion (Model Runs 1 to 4). Under these conditions, the plume is calculated to hug the shoreline, and if the outflow coincides with ebb tide, extend 2,400 meters to the east in the vicinity of Ewa Beach. If discharge outflow coincides with flood tide, the plume is transported to the west a distance of 3,600 to 5,500 meters, depending on strength of the tide, and extends offshore 900 to 1,500 meters. A strong tide results in greater plume transport along the coast but less diffusion offshore. Under these worst case mixing conditions, the time required for the plume affected waters to meet the State DOH salinity standard of 31.5 ppt is a maximum of 12 hours after the peak discharge outflow. Further,

the plume is largely confined to the surface water layer; plume waters with salinity below 28 ppt come in contact with the seafloor only in the immediate vicinity of the discharge site.

The dramatic increase in mixing resulting from breaking waves at the project site is illustrated by model Runs 5 and 6. Kona waves or south swell reduce the time required for the plume to reach State standards of 31.5 ppt to less than 3 hours after the peak discharge outflow. Maximum plume dimensions are also diminished to 800 x 3,300 meters and 500 x 2,400 meters for Kona and south swell conditions respectively. This is because the breaking waves efficiently mix and diffuse the plume throughout the water column. This also means that plume waters mix to the bottom layers and contact the seafloor. Plume waters with salinity less than 28 ppt extend 300 meters offshore near the discharge site. This low salinity water remains in contact with the bottom for only a brief time – well below any reported thresholds of impacts to corals (Coles, 1992).

Suspended sediment transport and deposition were also computed for Runs 1 and 5. During the worst-case conditions represented by Run 1 (maximum discharge, and no winds or waves), the model calculates that 1.9 mm of sediment are deposited immediately offshore of the discharge site. Deposition rapidly diminishes with distance from the discharge; the model calculates sediment deposition of only 0.17 mm, 300 meters offshore of the discharge, and 0.26 mm, 1,000 meters west of the discharge. Suspended solids concentrations in the water in the project area are calculated to approach ambient levels of about 10 mg/l approximately 1 day after the end of the storm discharge. As shown in Run 5, waves significantly decrease sediment deposition, and increase suspended sediment mixing and dispersion. Maximum sediment deposition is 0.75 mm directly offshore of the discharge, and water column TSS levels are predicted to approach ambient levels within 12 hours of the end of the storm discharge.

Table 7.1. Model Run Results

Run No.	Run Description	Maximum Plume Size (meters)	Time Required to Meet State DOH Salinity Standard of 31.5 ppt (hours)	Maximum Sediment Deposition (mm)	Time Required to Approach Ambient TSS Level (hours)
1	20-year discharge, moderate tide	1,200 x 4,500	12	1.9	24
2	20-year discharge, moderate ebb tide	1,400 x 4,200	12		
3	20-year discharge, strong tide	900 x 5,500	8		
4	20-year discharge, weak tide	1,500 x 3,600	12		
5	20-year discharge, moderate tide, Kona wind and waves	800 x 3,300	<3	0.75	12
6	20-year discharge, moderate tide, south swell	500 x 2,400	<3		
7	10-year discharge, moderate tide	500 x 2,300	6	0.125	24
8	10-year discharge, moderate tide, Kona wind and waves	170 x 500	<3	0.04	6

Note: Plume is defined as water with salinity below the State water quality standard of 31.5 ppt

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APPENDIX B-2

Kaloi Watershed Data

Appendix B-2

KALOI WATERSHED DATA

WATERSHED MAPS

Prepared by R.M Towill Corporation

April 2005

SUMMARY REPORT

KALOI GULCH WATERSHED HYDROLOGIC AND SEDIMENT STUDY

August 2004

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1. Introduction

A permanent channel outlet for the Kaloi Gulch watershed is being proposed at the Oneula Beach Park in Ewa Beach, Oahu, Hawaii. This channel plan is a revision to a previous plan in which Kaloi Gulch would discharge into the proposed marina basin.

The purpose of this study was to estimate storm runoff and sediment quantities that would be produced from the watershed at the proposed channel outlet. Existing and developed conditions were being evaluated. The results of this study will be used to assess impacts of a permanent channel outlet at Oneula Beach Park to nearshore waters.

2. Methodology

2.1 General

The analytical software tool used to create the watershed model is referred to as *Hydrologic Simulation Program Fortran* (HSPF). This model was originally developed by the U. S. Geological Survey (USGS) and versions of it are widely used by the USGS and Environmental Protection Agency (EPA) and many other agencies for watershed modeling. The Hawaii State Department of Health will be using the HSPF routine to model Pearl Harbor watersheds in their Total Maximum Daily Load (TMDL) assessments of limited water quality segments.

The HSPF software enables continuous simulation of meteorological conditions. For this study, the calendar year 1996 was modeled due to the higher than normal rainfall experienced that year.

Storms that occurred in November of 1996 were severe and caused flooding in Ewa Villages and other parts of Oahu. The size of the November 5, 1996 event was estimated as a 70-year event (13-hour duration).

2.1 Data Acquisition

Primary data required to support the model include watershed physical characteristics (pervious and impervious lands and topography) and meteorological data (precipitation, air temperature, dew point, pan evaporation, wind speed, solar radiation, and cloud cover). Supporting data used by the model include sediment characteristics, retention and detention storages and runoff percolation losses.

2.1.1 Physical Watershed Data

Physical watershed characteristics include topography, land use and ground cover, and soil types. Data for existing and future watershed conditions were derived from the following sources:

a. 1997, R. M. Towill Corporation (RMTC), Ewa Villages Drainage Master Plan, prepared for the Department of Housing and Community Development, City and County of Honolulu, Revised March.

b. 1998, R. M. Towill Corporation (RMTC), East Kapolei Drainage Master Plan, prepared for the Housing Finance and Development Corporation, State of Hawaii, Draft Report July.

c. 1999, Sato and Associates, Kaloi Gulch Railroad Bridge Drainage Report, prepared for the City and County of Honolulu, Department of Design and Construction, September.

d. 1991, Belt Collins and Associates (BCA), Drainage Master Plan for the Gentry-Ewa Project, prepared for Gentry Development Company, revised February.

e. 1999, Tom Nance Water Resource Engineering (TNWRE), Drainage Study Revision for Coral Creek Golf Course, prepared for Coral Creek Golf, Inc., revised August.

f. Ewa Makai-West Drainage Master Plan

g. 1996, Engineering Concepts, Inc. (ECI), Drainage Master Plan for Ewa Makai-West, prepared for Gentry Homes, Ltd., October.

h. 2001, Gray, Hong, Bills and Associates, Inc. (GHB), Revised Drainage Master Plan for Ocean Pointe, prepared for Haseko (Ewa), Inc., February 1.

i. 2000, Department of Planning and Permitting (DPP), City and County of Honolulu, Hawaii, Rules Relating to Storm Drainage Standards, January.

j. 1994, United States Geological Survey (USGS), U. S. Department of the Interior, Estimation of Magnitude and Frequency of Floods for Streams on the Island of Oahu, Hawaii, Water Resources Investigation Report 94-4052.

k. 1984, Division of Land and Water Development (DOWALD), Department of Land and Natural Resources, State of Hawaii, Rainfall Frequency Study for Oahu, Report R-73.

l. 1981, Natural Resources Conservation Service (NRCS), U. S. Department of Agriculture and University of Hawaii, State of Hawaii, Sediment Control Guide for Hawaii, March.

m. 1972, Natural Resources Conservation Service (NRCS), U. S. Department of Agriculture and University of Hawaii, State of Hawaii, Soil Survey of Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii, August.

n. Topographic Mapping 1:24000, U. S. Geological Survey.

o. Ewa Villages Damage Survey Report, Federal Emergency Management Agency reconnaissance, Sediment Survey

2.1.2 Meteorological Data

Meteorological data for the HSPF model consisted of hourly measurements of precipitation, air temperature, dew point, pan evaporation, wind speed, solar radiation, and cloud cover. Solor radiation and cloud cover inputs pertain to snow conditions and results are not sensitive to these values.

Precipitation readings at the Kunia Substation gage for the year 1996 were obtained from the National Weather Service. Readings for the other meteorological parameters (air temperature, dew point, pan evaporation, wind speed, solar radiation, and cloud cover) were obtained from the NWS station at Honolulu International Airport (close available data site).

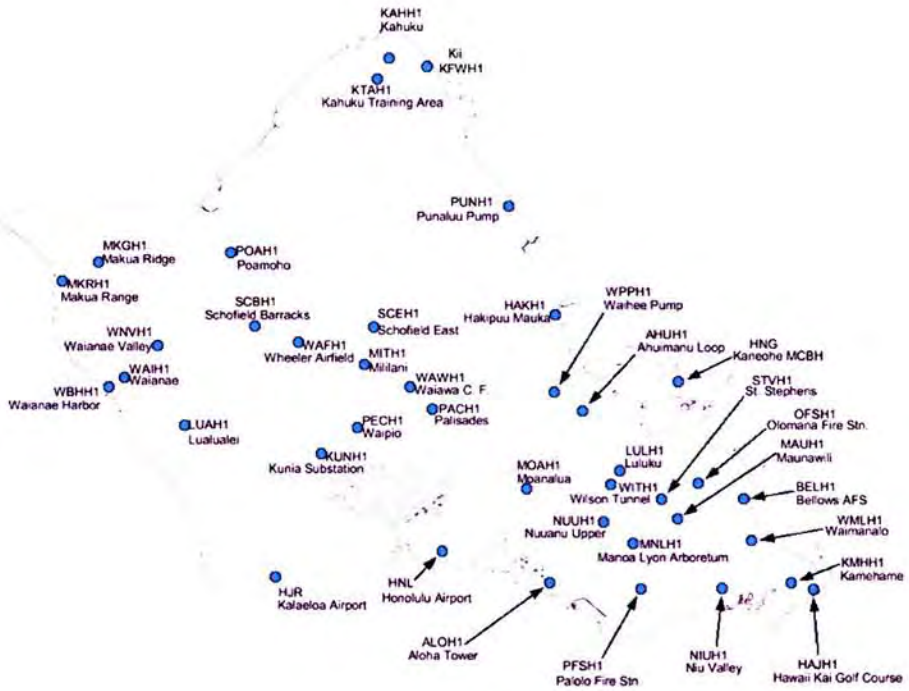

FIGURE 2-1
NATIONAL WEATHER SERVICE RAIN GAGE MAP

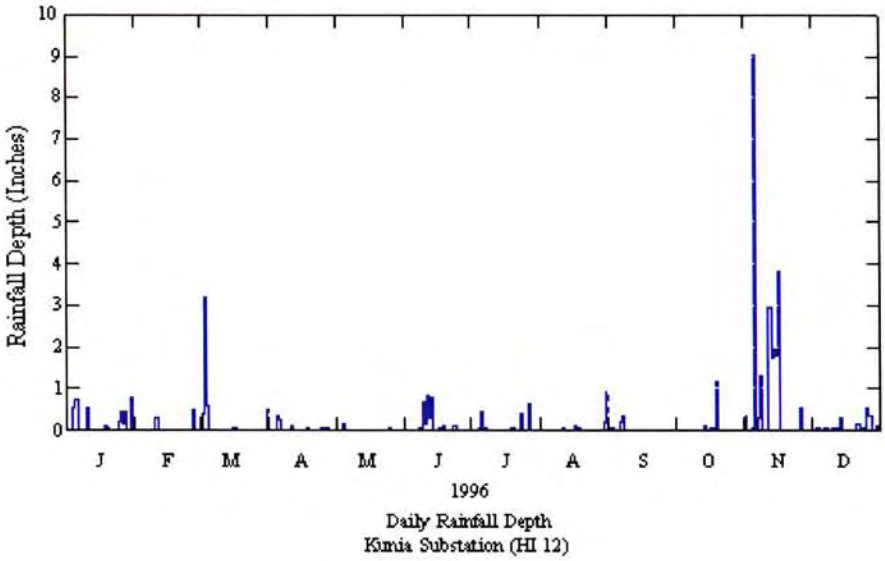

FIGURE 2-2
1996 DAILY RAINFALL DEPTHS AT KUNIA SUBSTATION

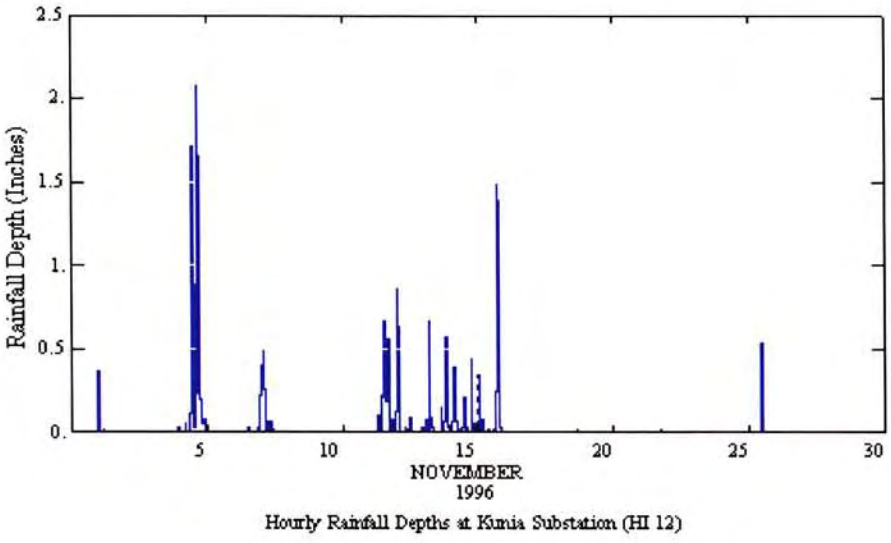

FIGURE 2-3
NOVEMBER 1996 HOURLY RAINFALL DEPTHS AT KUNIA SUBSTATION

2.1.3 Land Segment Descriptions

In setting up of the HSPF model, six (6) sets of subwatersheds were used to adequately represent the Kaloi watershed. These subwatersheds are comprised of pervious and impervious land segments to represent each of the following major land parcels within the watershed:

a. Area above the H-1 Freeway
b. Area between the H-1 Freeway and Ewa Villages (Referred to herein as the State Land Bank)
c. Ewa Villages and Golf Coruse
d. Ewa Gentry and Coral Creek Golf Course
e. Ewa Gentry Makai-West
f. Ocean Pointe and Golf Course

Pervious land segments (PERLND) were used to represent undeveloped and agricultural lands and impervious lands (IMPLND) were used to represent developed and urbanized lands. The various land segments for existing and future conditions are summarized in the following tables.

TABLE 2-1
LAND SEGMENTS FOR EXISTING CONDITIONS

Land ID	Location	Existing Pervious Land Segments	Existing Impervious Land Segments
		ac	ac
10	Land Above H-1 Freeway	2930.0	2.0
20	East Kapolei	1490.0	4.0
30	Ewa Villages	389.0	249.0
40	Gentry / Coral Creek	286.0	480.0
50	Gentry / Makai-West	190.0	1.0
60	Ocean Pointe	441.0	206.0

TABLE 2-2
LAND SEGMENTS FOR PROPOSED CONDITIONS

Land ID	Location	Proposed Pervious Land Area	Proposed Impervious Land Area
		ac	ac
10	Land Above H-1 Freeway	2930.0	2.0
20	East Kapolei	360.0	1135.0
30	Ewa Villages	286.0	370.0
40	Gentry / Coral Creek	226.0	540.0
50	Gentry / Makai-West	20.0	171.0
60	Ocean Pointe	165.0	481.0

Aerial maps (Figures 2-4 and 2-5) illustrate the existing and future Kaloi Gulch watershed land segments. Land segments are identified by the development names listed in the table above.

Kaloi Watershed Drainage Area Workmaps (Figures 2-6 and 2-7) for existing and future conditions are also attached which generally illustrate the watershed topographic conditions, drainageways and subwatershed divides.

The existing NRCS watershed soils map is shown in Figure 2-8.



FIGURE 2-4
KALOI GULCH WATERSHED MAP – EXISTING CONDITIONS

EXISTING KALOI WATERSHED MAP



FIGURE 2-5
KALOI GULCH WATERSHED MAP – FUTURE CONDITIONS

2025 KALOI WATERSHED MAP

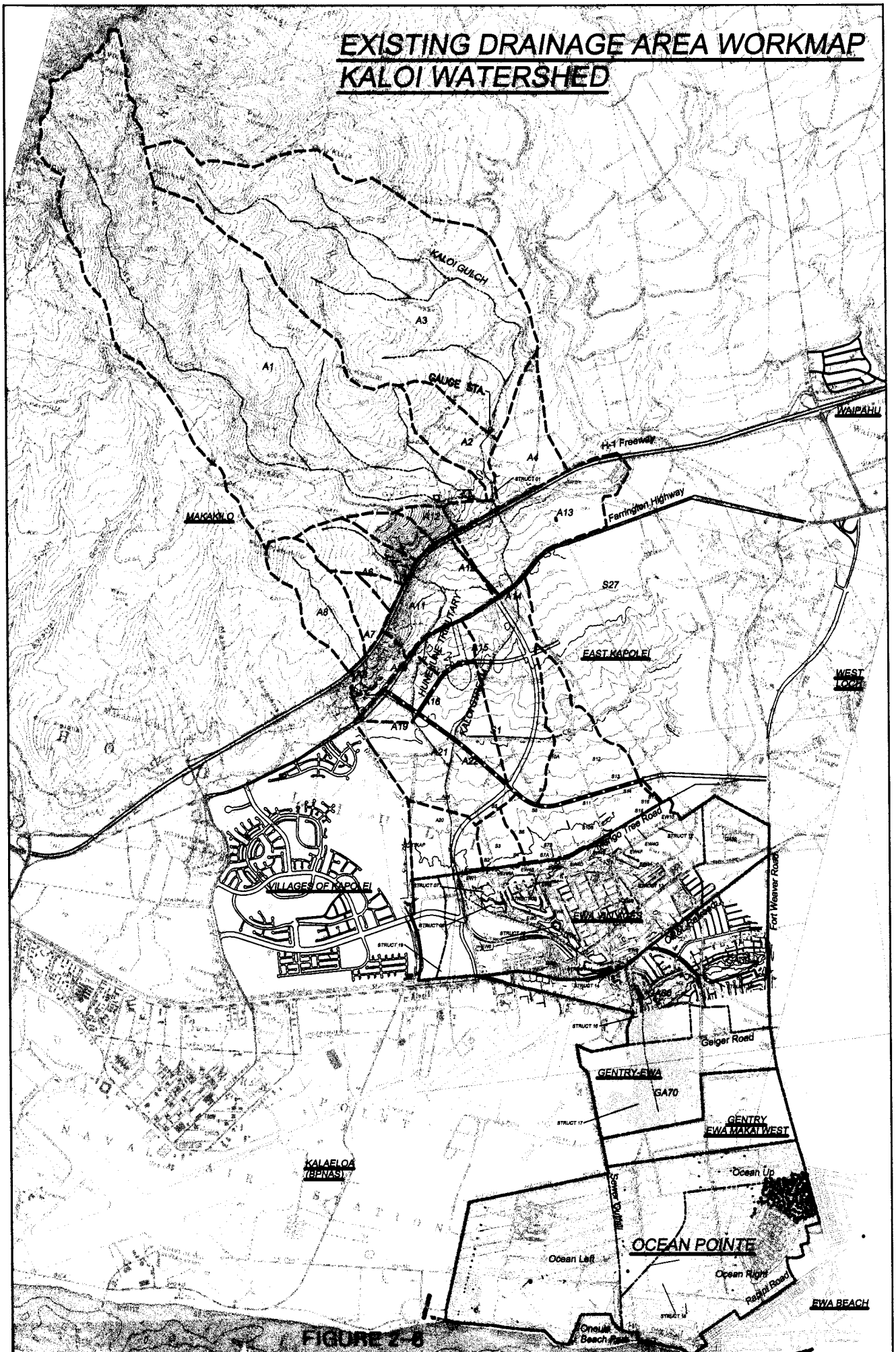

FIGURE 2-8
KALOI GULCH DRAINAGE AREA WORKMAP – EXISTING CONDITIONS

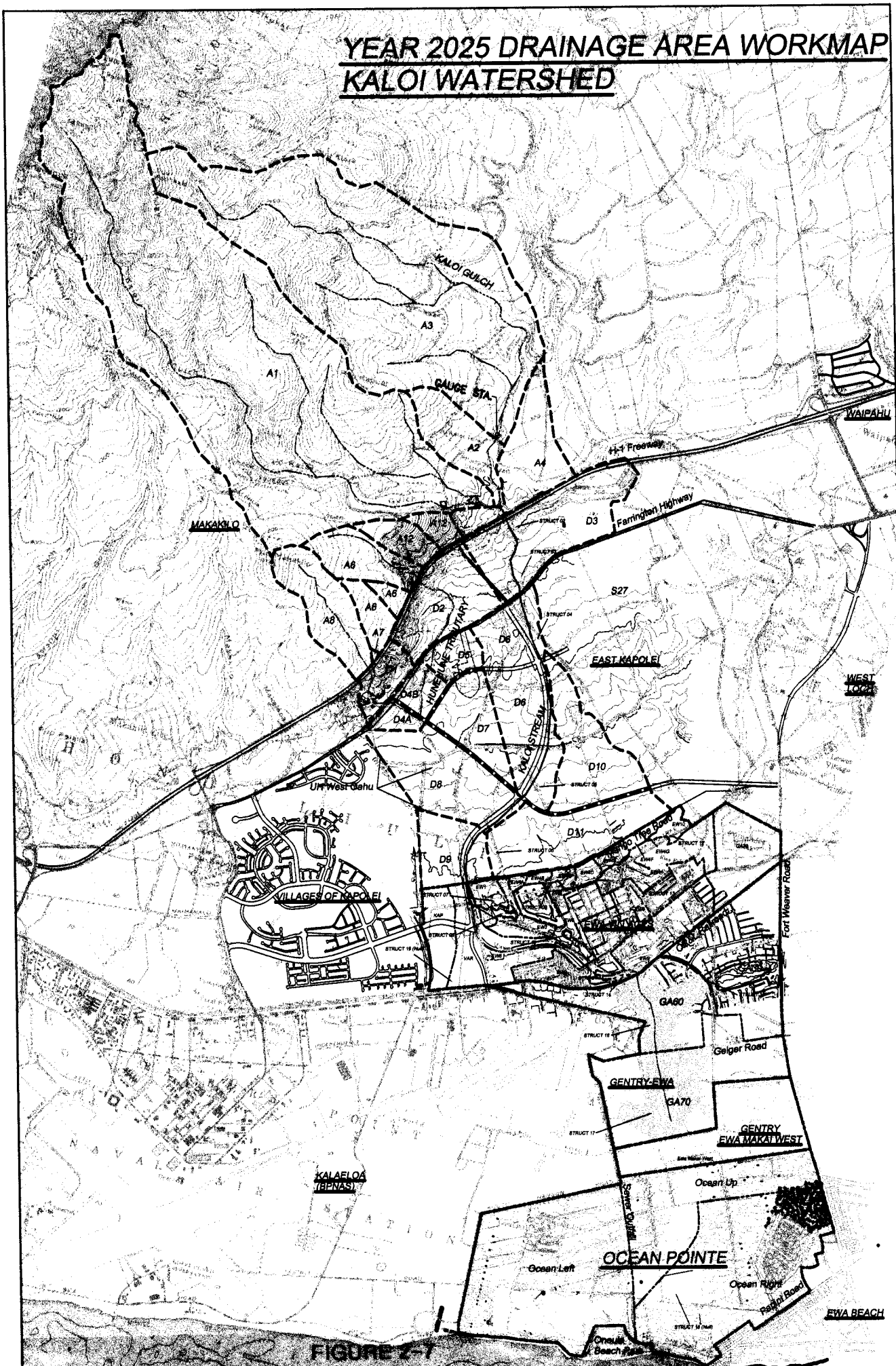

FIGURE 2-7
KALOI GULCH DRAINAGE AREA WORKMAP – FUTURE CONDITIONS

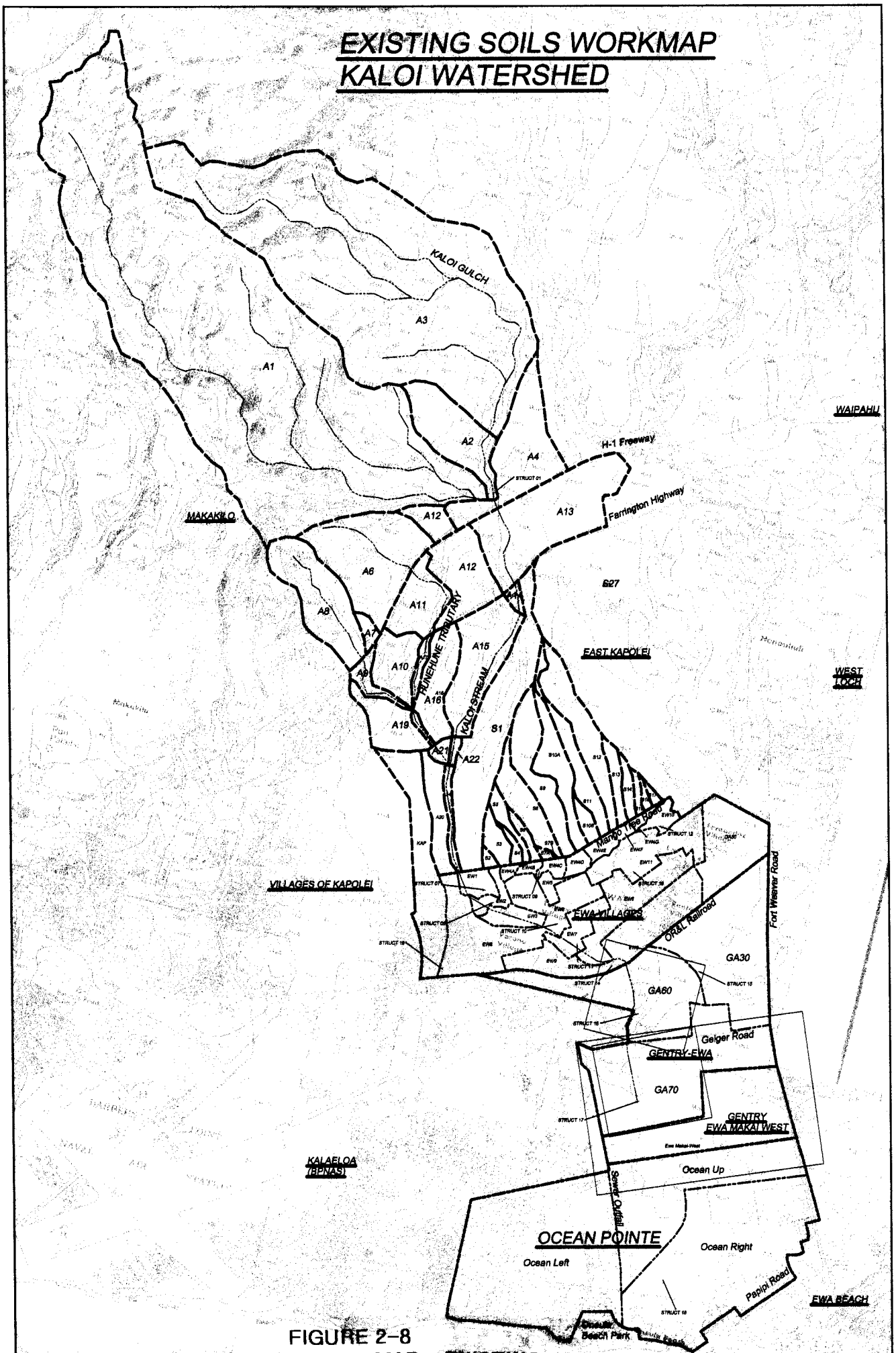

FIGURE 2-8
KALOI GULCH WATERSHED SOILS MAP – EXISTING CONDITIONS

2.1.4 Land Segment Parameters

Input parameters used for modeling of the pervious and impervious land segments are listed in the tables below. Input parameters are separated into the following categories:

Pervious Land Segments
- Hydrologic Parameters
- Sediment Parameters

Impervious Land Segments
- Hydrologic Parameters
- Sediment Parameters

Initial parameter values were obtained from measurements of watershed maps, soil surveys and through visual inspection of site conditions. Default values were used where parameter values were not readily available or were not considered consequential to the results (eg. snow computations, etc.). Parameters were then adjusted during calibration to obtain the final listing shown in the tables below.

TABLE 2-3
HYDROLOGIC PARAMETERS FOR PERVIOUS LAND SEGMENTS
(EXISTING AND PROPOSED CONDITIONS)

Parameter	Description	Units	Land ID	Existing Value	Future Value
FOREST	Fraction of PLS covered by forest (for snowfall conditions)		10 to 60		
LZSN	Lower Zone nominal storage	in	10 to 60	3.1	
INFILT	Index to Infiltration capacity of the soil	in/hr	10	1.5	
			20	1.5	
			30	2.3	
			40	8.0	
			50	8.0	
			60	8.0	
LSUR	Length of overland flow plane	ft	10	22,000	
			20	14,000	
			30	8,000	
			40	9,000	
			50	4,000	
			60	8,000	

Parameter	Description	Units	Land ID	Existing Value	Future Value
(Continued)					
SLSUR	Slope of overland flow plane	ft/ft	10	0.10	
			20	0.04	
			30	0.01	
			40	0.005	
			50	0.0001	
			60	0.0001	
KVARY	Parameter affecting groundwater flow	l/in	10 to 60	0.9	
AGWRC	Basic groundwater recession rate	l/day	10 to 60	0.9	
INEXP	Exponent in infiltration equation		10 to 60	2.0	2.0
INFILD	Ratio between max and mean infiltration capacities		10 to 60	2.0	2.0
DEEPFR	Fraction of groundwater inflow that will enter deep (inactive) groundwater		10 to 60	0.0	0.0
BASETP	Fraction of remaining potential E-T which can be satisfied from baseflow		10 to 60	0.0	0.0
AGWETP	Fraction of remaining potential E-T which can be satisfied from active groundwater storage		10 to 60	0.0	0.0
CEPSC	Interception storage	in	10 to 60	0.1	0.1
UZSN	Upper zone nominal storage	in	10 to 60	1.7	1.7
NSUR	Manning's n for overland flow plane		10 to 20	0.100	0.100
			30 to 60	0.150	0.150
Parameter	Description	Units	Land ID	Existing Value	Future Value
INTFW	Interflow inflow parameter		10 to 60	0.0	0.0
IRC	Interflow recession parameter		10 to 60	0.8	0.8
LZETP	Lower zone index parameter		10 to 60	0.0	0.0
CEPS	Initial interception storage		10 to 60	0.0	0.0
SURS	Initial surface overland flow storage		10 to 60	0.0	0.0
UZS	Initial upper zone storage	in	10 to 60	0.001	0.001
IFWS	Initial interflow storage	in	10 to 60	0.0	0.0
LZS	Initial lower zone storage	in	10 to 60	0.001	0.001
AGWS	Initial active groundwater storage	in	10 to 60	0.0	0.0
GWVS	Initial index to groundwater storage	in	10 to 60	0.0	0.0

TABLE 2-4
SEDIMENT PARAMETERS FOR PERVIOUS LAND SEGMENTS
(EXISTING AND PROPOSED CONDITIONS)

Parameter	Description	Units	Land ID	Existing Value	Future Value
SMPF	Erosion control mgmt practice factor		10 to 60	1.0	1.0
KRER	Coefficient in soil detachment equation		10 to 60	0.4	0.4
JRER	Exponent in soil detachment equation		10 to 60	2.0	2.0
AFFIX	Fraction by which detached sediment storage decreases each day due to soil compaction		10 to 60	0.010	0.010
COVER	Fraction of land surface shielded from rainfall erosion		10	0.20	0.20
			20	0.0	0.0
			30	0.4	0.4
			40	0.4	0.4
			50	0.2	0.2
			60	0.2	0.2
NVSI	Rate which sediment enters detached storage from atmosphere	lb/ac/day	10 to 60	0.0	0.0
KSER	Coefficient in the detached sediment washoff equation		10 to 20	200.0	200.0
			30	100.0	100.0
			40 to 60	50.0	50.0
JSER	Exponent in the detached sediment washoff equation		10 to 60	2.0	2.0
KGER	Coeff, in the matrix soil scour equation		10 to 60	1.0	1.0
JGER	Exp. in the matrix soil scour equation		10 to 60	2.0	2.0
DETS	Initial storage of detached sediment	tons/ac	10 to 60	0.0	0.0

TABLE 2-5
HYDROLOGIC PARAMETERS FOR IMPERVIOUS LAND SEGMENTS
(EXISTING AND PROPOSED CONDITIONS)

Parameter	Description	Units	Land ID	Existing Value	Future Value
LSUR	Length of overland flow plane	ft	10 to 60	300.0	300.0
SLSUR	Slope of overland flow plane	ft/ft	10	0.05	0.05
			20	0.03	0.03
			30	0.008	0.008
			40	0.005	0.005
			50	0.0001	0.0001
			60	0.0005	0.0005
NSUR	Manning's n for overland flow		10 to 60	0.060	0.060
RETSC	Retention (interception) storage capacity of the surface	in	10 to 60	0.1	0.1
RETS	Initial retention storage	in	10 to 60	0.001	0.001
SURS	Initial surface (overland flow) storage	in	10 to 60	0.001	0.001

TABLE 2-6
SEDIMENT PARAMETERS FOR IMPERVIOUS LAND SEGMENTS
(EXISTING AND PROPOSED CONDITIONS)

Parameter	Description	Units	Land ID	Existing Value	Future Value
KEIM	Coeff. in the solids washoff equation		10 to 60	1.0	1.0
JEIM	Exponent in the solids washoff equation		10 to 60	2.0	2.0
ACCSDP	Rate at which solids accumulate on the land surface	lb/ac/ day	10 to 60	0.01	0.01
REMSDP	Fraction of solids which is removed each day by sweeping		10 to 60	0.0	0.0
SLDS	Initial storage of solids on the land surface	tons/ac	10 to 60	0.2	0.2

2.1.5 Watershed Routing Parameters

Reach and reservoir routing was then performed on the runoff leaving each the pervious and impervious land segments. The hydrologic and sediment routing parameters used as input to the HSPF models for existing and future conditions are summarized below.

TABLE 2-7
REACH / RESERVOIR HYDROLOGIC ROUTING PARAMETERS

Parameter	Description	Units	Land ID	Existing Value	Future Value
LEN	Reach length	miles	10	1.0	1.0
			20	2.0	2.0
			30	1.5	1.5
			40	2.0	2.0
			50	1.0	1.0
			60	2.0	2.0
DELTH	Elevation difference along reach	ft	10	100	100
			20	200	200
			30	100	100
			40	60	60
			50	30	30
			60	50	50
STCOR	Stage correction	ft	10 to 60	0.0	0.0
KS	Weighting factor	none	10 to 60	0.5	0.5
DB50	Bed mean particle diameter	in	10 to 60	0.01	0.01
VOL	Initial volume of water in the reach / reservoir	ac-ft	10 to 60	0.0	0.0

TABLE 2-8
REACH / RESERVOIR SEDIMENT ROUTING PARAMETERS

Parameter	Description	Units	Land ID	Existing Value	Future Value
BEDWID	Bed width for sediment routing	ft	10 to 20	50.0	50.0
			30 to 60	100.0	100.0
BEDWRN	Warning depth	ft	10 to 60	15.0	15.0
POR	Bed porosity	none	10 to 60	0.3	0.3
SAND D	Effective diameter	in	10 to 60	0.010	0.010
SAND W	Fall velocity	in/sec	10 to 60	5.0	5.0
SAND RHO	Density	gm/cc	10 to 60	2.65	2.65
KSAND	Coeff.in sand load power function		10 to 60	0.0	0.0
EXPSAND	Exp. in sand load power function		10 to 60	0.0	0.0
SILT D	Effective diameter	in	10 to 60	0.0006	0.0006
SILT W	Fall velocity	in/sec	10 to 60	0.004	0.004
SILT RHO	Density	gm/cc	10 to 60	2.65	2.65
SILT TAUCD	Shear stress for deposition	psf	10 to 60	0.1	0.1
SILT TAUCS	Shear stress for scour	psf	10 to 60	0.8	0.8
CLAY D	Effective diameter	in	10 to 60	0.00006	0.00006
CLAY W	Fall velocity	in/sec	10 to 60	0.0004	0.0004
CLAY RHO	Density	gm/cc	10 to 60	2.65	2.65
CLAY TAUCD	Shear stress for deposition	psf	10 to 60	0.2	0.2
CLAY TAUCS	Shear stress for scour	psf	10 to 60	0.9	0.9
SAND INIT	Initial suspended sediment conc.	mg/l	10 to 60	0.0	0.0
SILT INIT	Initial suspended sediment conc.	mg/l	10 to 60	0.0	0.0
CLAY INIT	Initial suspended sediment conc.	mg/l	10 to 60	0.0	0.0
BEDDEP	Initial bed depth	ft	10 to 60	3.0	3.0
SAND BED	Initial bed sand proportion		10 to 30	0.5	0.5
			40 to 60	0.8	0.8
SILT BED	Initial bed silt proportion		10 to 30	0.3	0.3
			40 to 60	0.1	0.1
CLAY BED	Initial bed clay proportion		10 to 30	0.2	0.2
			40 to 60	0.1	0.1

2.1.6 Reach and Reservoir Stage-Storage-Discharge Relationships

The stage-storage-discharge relationships used for flow routing in HSPF are tabulated below for existing and future conditions. These data were derived from the topographic map sources and from the various development master plans.

Under existing conditions, large retention / detention runoff storage basins are included in Segments 30 (Ewa Villages) and 40 (Coral Creek). Under future conditions, large runoff storage basins are included in Segments 20 (Land Bank), 30 (Ewa Villages), 40 (Coral Creek) and 60 (Ocean Pointe). Another large basin is also being planned in the Gentry Ewa Makai-West parcel, however this study was prepared using the data available at that time and which did not include this basin. Inclusion of the basin will result in lower runoff and sediment entering Ocean Pointe.

Basins were modeled with two outflow discharges: One to account for surface overflows and the other for downward percolation losses. The downward percolation losses were estimated based on data from seepage tests in Ocean Pointe, NRCS soil surveys, and site observations within Ewa Villages and Coral Creek after flooding events. As a conservative estimate, the area over which percolation was assumed to occur was limited to the area of the retention basins. Percolation in occurring pervious lands outside the basins were not included. In addition, only 50% of the basin areas were assumed to be effective.

The reservoir flow depth-storage-discharge relationships for existing and proposed conditions are listed in Tables 2-9 and 2-10.

TABLE 2-9

REACH / RESERVOIR ROUTING RELATIONSHIPS FOR EXISTING CONDITIONS

Segment ID	Flow Depth	Flow Surface Area	Storage Volume	Outflow (surface discharge)	Outflow (percolation loss)
	ft	ac	ac-ft	cfs	cfs
10 (above H-1)	0.0	0.0	0.0	0.0	0.0
	4.0	2.3	4.8	920.0	15.0
	8.0	4.0	12.9	3900.0	15.0
	10.0	4.8	18.3	6400.0	15.0
20 (Land Bank)	0.0	0.0	0.0	0.0	0.0
	2.0	7.4	10.7	400.0	150.0
	4.0	10.7	24.8	1530.0	150.0
	8.0	17.4	62.8	6490.0	150.0
30 (Ewa Villages)	0.0	0.0	0.0	0.0	0.0
	4.0	18.9	63.0	0.0	700.0
	5.0	20.0	80.0	850.0	700.0
	6.0	21.2	98.0	2450.0	700.0
	7.0	22.4	116.0	4580.0	700.0
	8.0	23.5	135.0	7170.0	700.0
40 (Coral Creek)	0.0	0.0	0.0	0.0	0.0
	4.0	24.7	86.0	0.0	2000.0
	5.0	25.8	109.0	850.0	2000.0
	6.0	27.0	133.0	2450.0	2000.0
	7.0	28.1	156.0	4580.0	2000.0
	8.0	29.3	181.0	7170.0	2000.0
50 (Makai West)	0.0	0.0	0.0	0.0	0.0
	2.0	1.1	2.0	690.0	150.0
	4.0	1.4	5.4	3430.0	150.0
	6.0	1.6	6.7	4770.0	150.0
	8.0	1.8	9.3	8110.0	150.0
60 (Ocean Pointe)	0.0	0.0	0.0	0.0	0.0
	3.0	7.8	19.3	0.0	500.0
	4.0	8.5	26.4	210.0	500.0
	6.0	9.9	41.7	1390.0	500.0
	8.0	11.2	58.3	3430.0	500.0
	10.0	12.6	76.3	6330.0	500.0

TABLE 2-10
REACH / RESERVOIR ROUTING RELATIONSHIPS FOR PROPOSED CONDITIONS

Segment ID	Flow Depth	Flow Surface Area	Storage Volume	Outflow (surface discharge)	Outflow (percolation loss)
	ft	ac	ac-ft	cfs	cfs
10 (above H-1)	0.0	0.0	0.0	0.0	0.0
	4.0	2.3	4.8	920.0	15.0
	8.0	4.0	12.9	3900.0	15.0
	10.0	4.8	18.3	6400.0	15.0
20 (Land Bank)	0.0	0.0	0.0	0.0	0.0
	4.0	22.7	76.0	0.0	220.0
	5.0	24.1	96.0	850.0	220.0
	6.0	25.5	118.0	2450.0	220.0
	7.0	26.9	140.0	4580.0	220.0
	8.0	28.3	162.0	7170.0	220.0
30 (Ewa Villages)	0.0	0.0	0.0	0.0	0.0
	4.0	18.9	63.0	0.0	180.0
	5.0	20.0	80.0	850.0	180.0
	6.0	21.2	98.0	2450.0	180.0
	7.0	22.4	116.0	4580.0	180.0
	8.0	23.5	135.0	7170.0	180.0
40 (Coral Creek)	0.0	0.0	0.0	0.0	0.0
	4.0	24.7	86.0	0.0	720.0
	5.0	25.8	109.0	850.0	720.0
	6.0	27.0	133.0	2450.0	720.0
	7.0	28.1	156.0	4580.0	720.0
	8.0	29.3	181.0	7170.0	720.0
50 (Makai West)	0.0	0.0	0.0	0.0	0.0
	1.0	5.7	5.6	900.0	170.0
	2.0	5.9	11.3	2890.0	170.0
	3.0	6.1	17.1	5710.0	170.0
	4.0	6.3	23.0	9290.0	170.0
	5.0	6.4	28.9	13550.0	170.0
	6.0	6.6	35.0	18480.0	170.0
60 (Ocean Pointe)	0.0	0.0	0.0	0.0	0.0
	4.0	21.8	75.0	0.0	630.0
	5.0	23.0	95.0	850.0	630.0
	6.0	24.1	115.0	2450.0	630.0
	7.0	25.3	136.0	4580.0	630.0
	8.0	26.4	158.0	7170.0	630.0

2.2 Model Calibration

Hydrologic calibration of the HSPF model was performed by adjusting runoff discharges to approximate discharge measurements taken at the US Geological Survey gaging station 2124.5 situated along Kaloi Gulch just above the H-1 Freeway. The drainage area of this gage is 1.7 square miles and the elevation datum is 260 feet above mean sea level. Gage 2124.5 is a crest stage gage and therefore only annual peak discharge information was available.



FIGURE 2-9
LOCATION MAP - USGS GAGE 2124.5

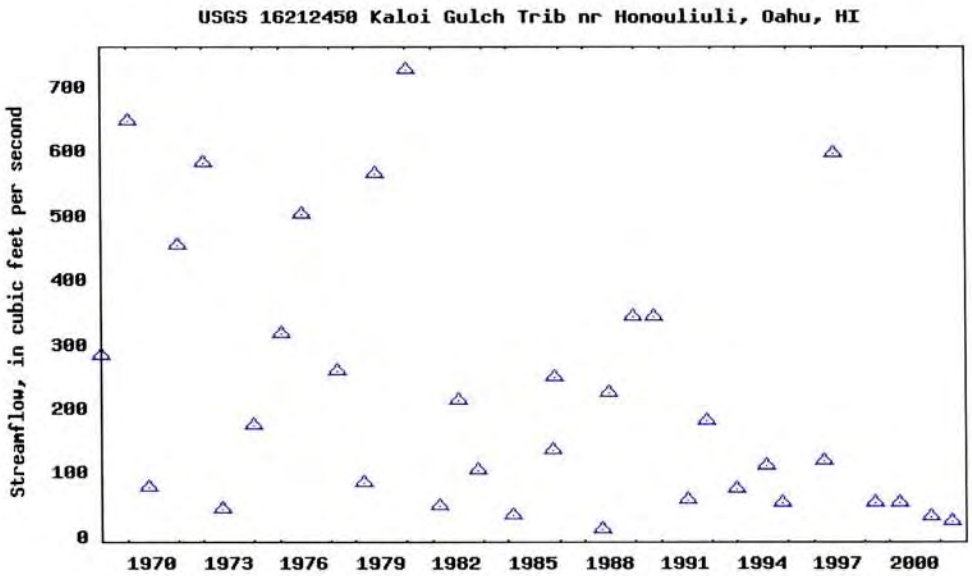

FIGURE 2-10
ANNUAL PEAK DISCHARGES – USGS GAGE 2124.5

Peak discharges measured during 1996 that were used for calibration of the model include:

115 cfs recorded on June 13, 1996

540 cfs recorded on November 5, 1996

594 cfs recorded on November 16, 1996

These values were used as targets for Land Segment 10 of the HSPF model. Pervious and impervious hydrologic parameters were adjusted in the model to produce peak discharge rates that approximated the peak discharge rates recorded in 1996.

Calibration of sediment quantities was performed by adjusting results to closely match sediment quantities deposited in Ewa Villages during the 1996 storm. The total amount of sediment deposited in the Ewa Villages Golf Course and surrounding areas as a result of runoff from the Kaloi Gulch watershed was estimated to be 24,660 cubic yards (approximately 36,600 tons).

Sediment data was obtained from the Ewa Villages Golf Course Flood Damage Repair work. Damage Survey Reports (DSRs) were prepared by the Federal Emergency Management Agency (FEMA) in December of 1996 following the aftermath of the November floods in Ewa. Construction plans that were prepared for the ensuing repair work were used in this study as the basis for the amount of sediment deposited in Ewa Villages. The construction plans were based on reconnaissance work and surveys that were performed in December 1996 for the DSRs. The subsequent construction plans for the repair work were approved by the City in September 1998.

3. Existing Conditions

Under 1996 simulated existing conditions, it was determined discharge from the Kaloi Gulch watershed would not reach the ocean under the November 1996 storm conditions. This outcome matches observations made during that period of no discharges to the ocean at Oneula Beach Park. Factors that contributed to these findings include the mostly undeveloped (pervious) state of the watershed, presence of existing storage (approximately 200 acre-feet retention and 600 acre-feet detention) and high rate of downward percolation losses (especially in the lower watershed area).

Results for the 1996 simulation of peak flows, sediment loads and total suspended sediment concentrations along Kaloi Gulch for existing conditions are summarized in the following graphs.

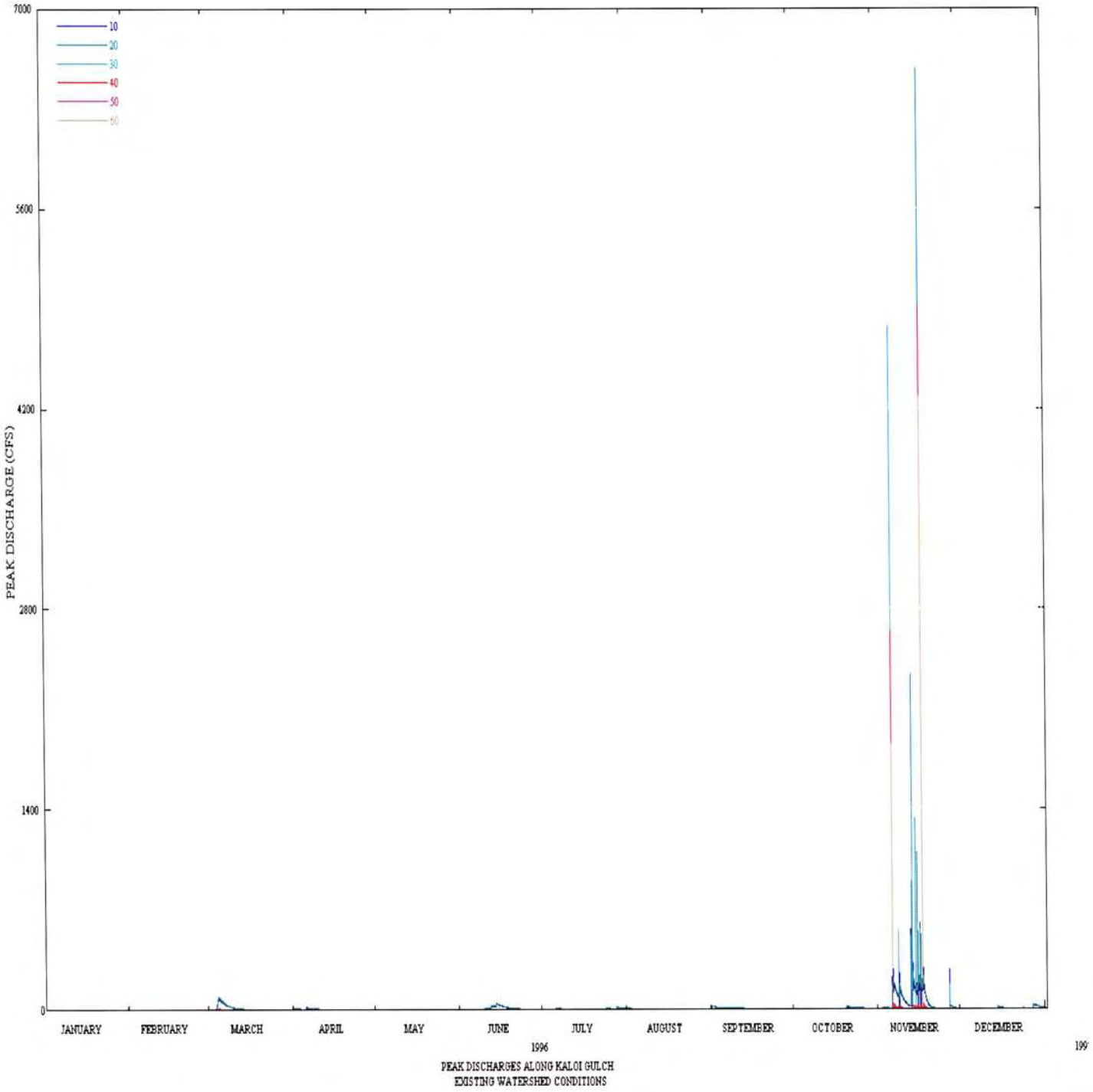

FIGURE 3-1
PEAK DISCHARGES ALONG KALOI GULCH
EXISTING WATERSHED CONDITIONS - 1996 RAINFALL SIMULATION

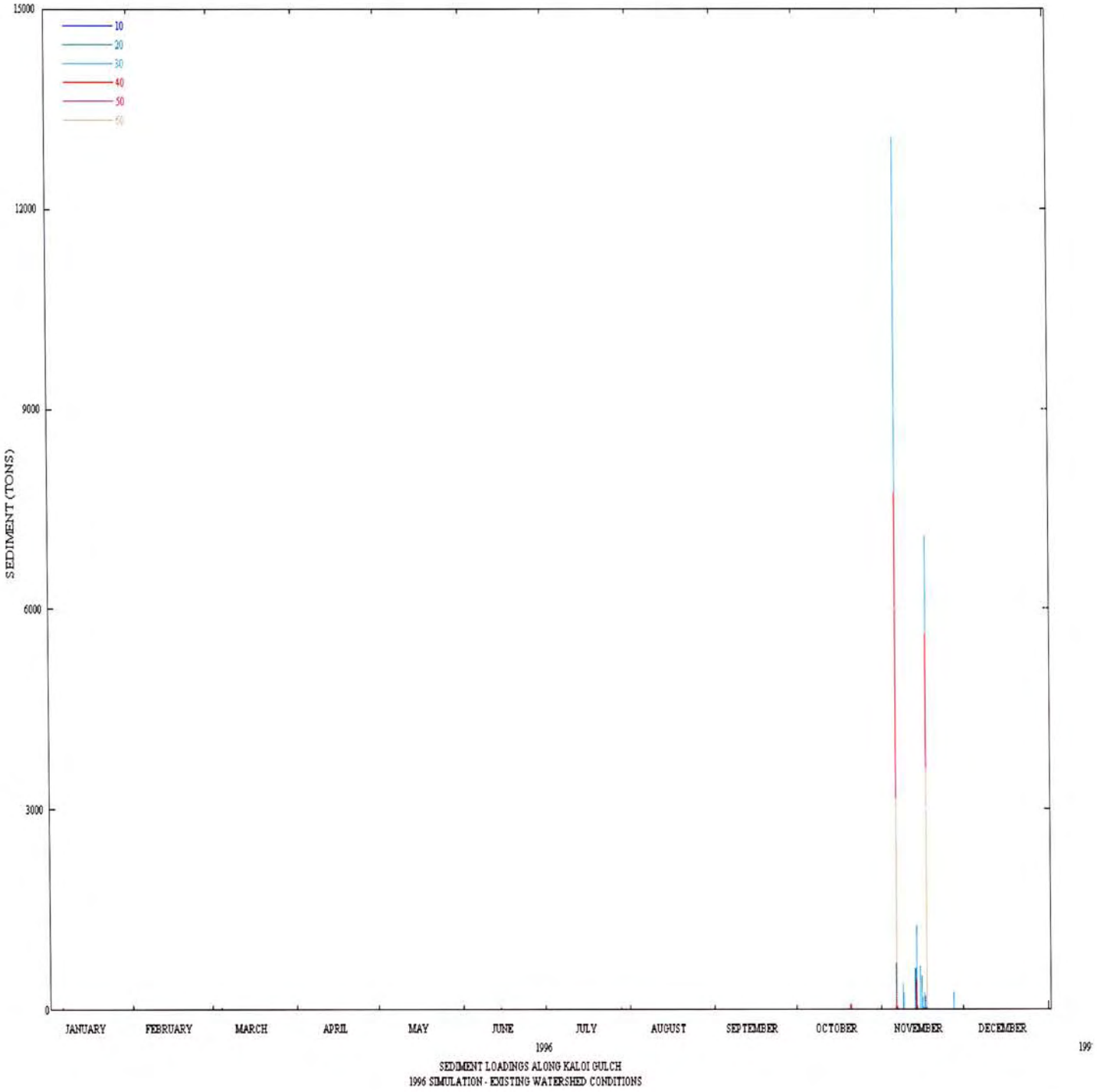

FIGURE 3-2
SEDIMENT LOADINGS ALONG KALOI GULCH
EXISTING WATERSHED CONDITIONS - 1996 RAINFALL SIMULATION

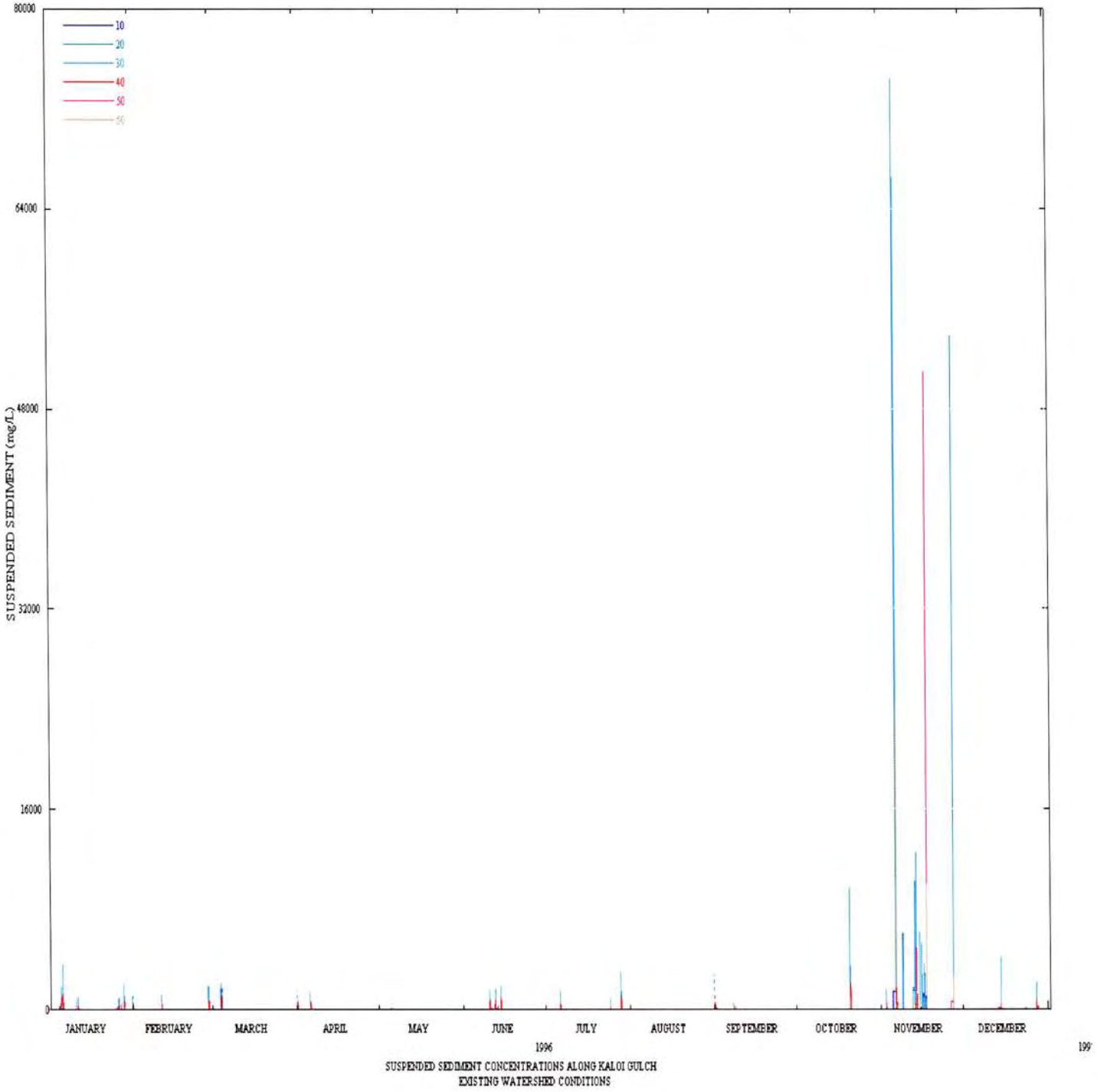

FIGURE 3-3
TOTAL SUSPENDED SEDIMENT CONCENTRATIONS ALONG KALOI GULCH
EXISTING WATERSHED CONDITIONS – 1996 RAINFALL SIMULATION

4. Proposed Conditions

Under developed conditions, it was determined that there were two discharge occurrences at Oneula Beach Park under simulated 1996 rainfall conditions (3,400 cfs on Nov. 5 and 2,300 cfs Nov. 16). The total sediment loading for the year into the ocean was estimated at approximately 2,700 tons.

Under developed conditions, total watershed storage was estimated at 300 acre-feet for retention and 800 acre-feet for detention. The Ocean Pointe golf course included 75 acre-feet of retention to serve as the final settling basin.

Results for developed watershed conditions are summarized in the following plots. These results reflect the simulation of 1996 hydrological conditions under proposed 2025 year watershed build-out conditions. It was anticipated that storages within the watershed will be developed in accordance with the various master plans listed in Section 2.1.1.

The 10-year, 24-hour storm was also modeled with HSPF by using the Natural Resources Conservation Service (NRCS) Type I rainfall temporal pattern with the 8-inch rainfall depth that corresponds to the 10-year, 24-hour event. It was found that the events smaller than approximately the 10-year, 24-hour did not produce discharge to the ocean from the Kaloi watershed.

The results of this study will be used by others for determination of coastal and nearshore impacts due to storm runoff and sediment from the Kaloi Gulch drainageway at Oneula Beach Park.

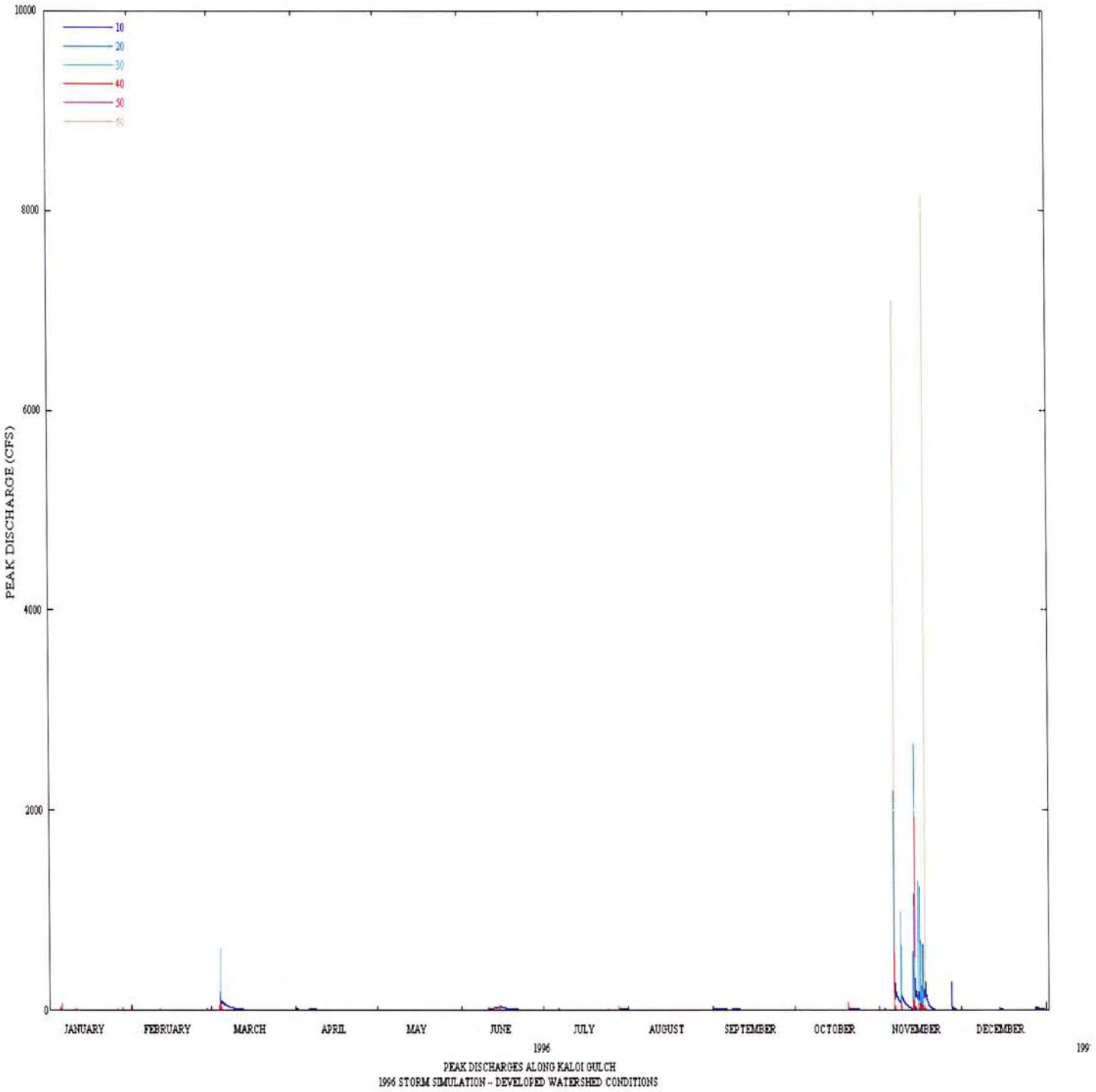

FIGURE 4-1
PEAK DISCHARGES ALONG KALOI GULCH
DEVELOPED WATERSHED CONDITIONS - 1996 RAINFALL SIMULATION

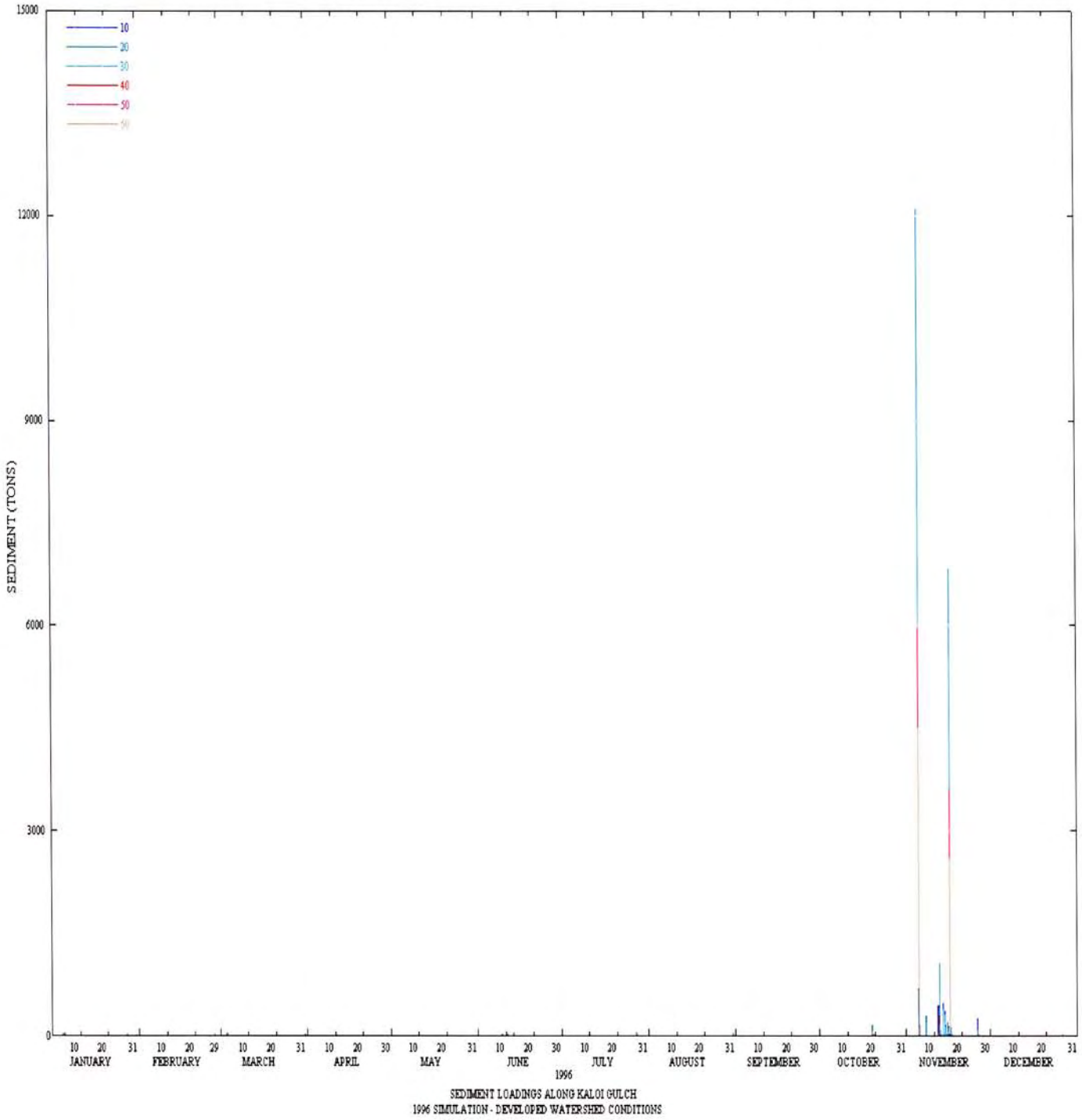

FIGURE 4-2
SEDIMENT LOADINGS ALONG KALOI GULCH
DEVELOPED WATERSHED CONDITIONS - 1996 RAINFALL SIMULATION

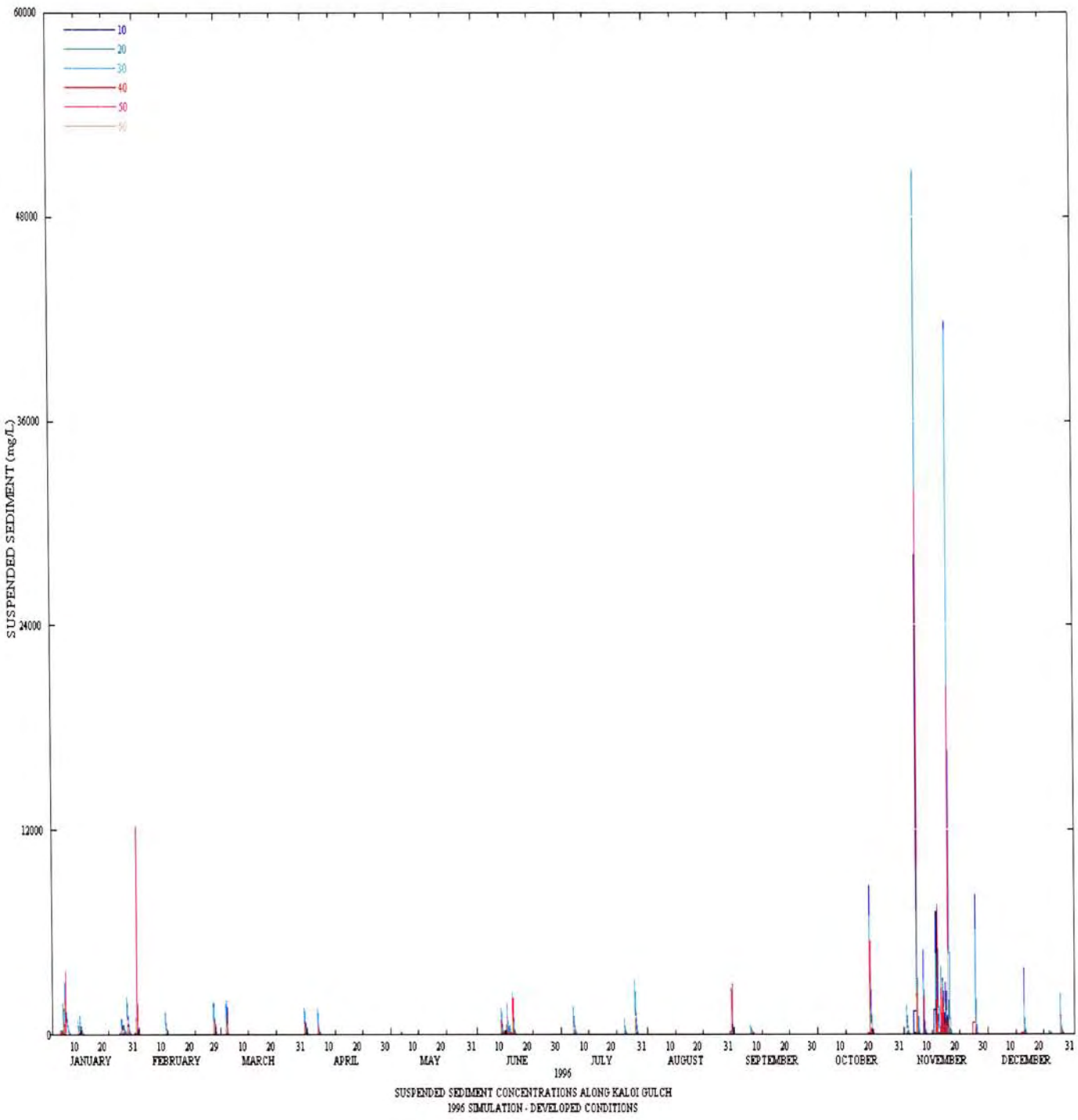

FIGURE 4-3
TOTAL SUSPENDED SEDIMENT CONCENTRATIONS ALONG KALOI GULCH
DEVELOPED WATERSHED CONDITIONS - 1996 RAINFALL SIMULATION

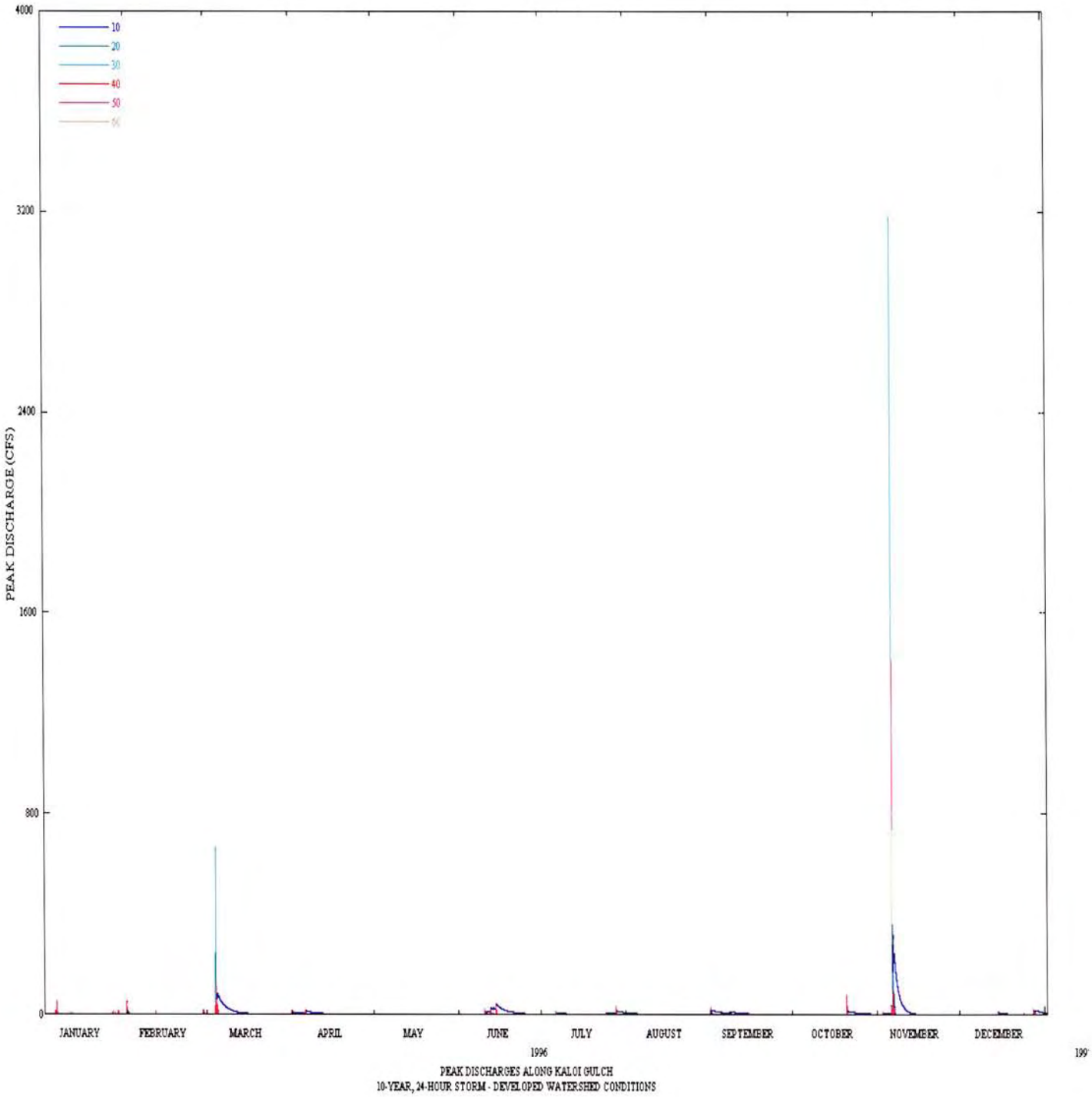

FIGURE 4-4
PEAK DISCHARGES ALONG KALOI GULCH
DEVELOPED WATERSHED CONDITIONS
1996 RAINFALL SIMULATION WITH 10-YEAR, 24-HOUR EVENT ON NOV. 5, 1996

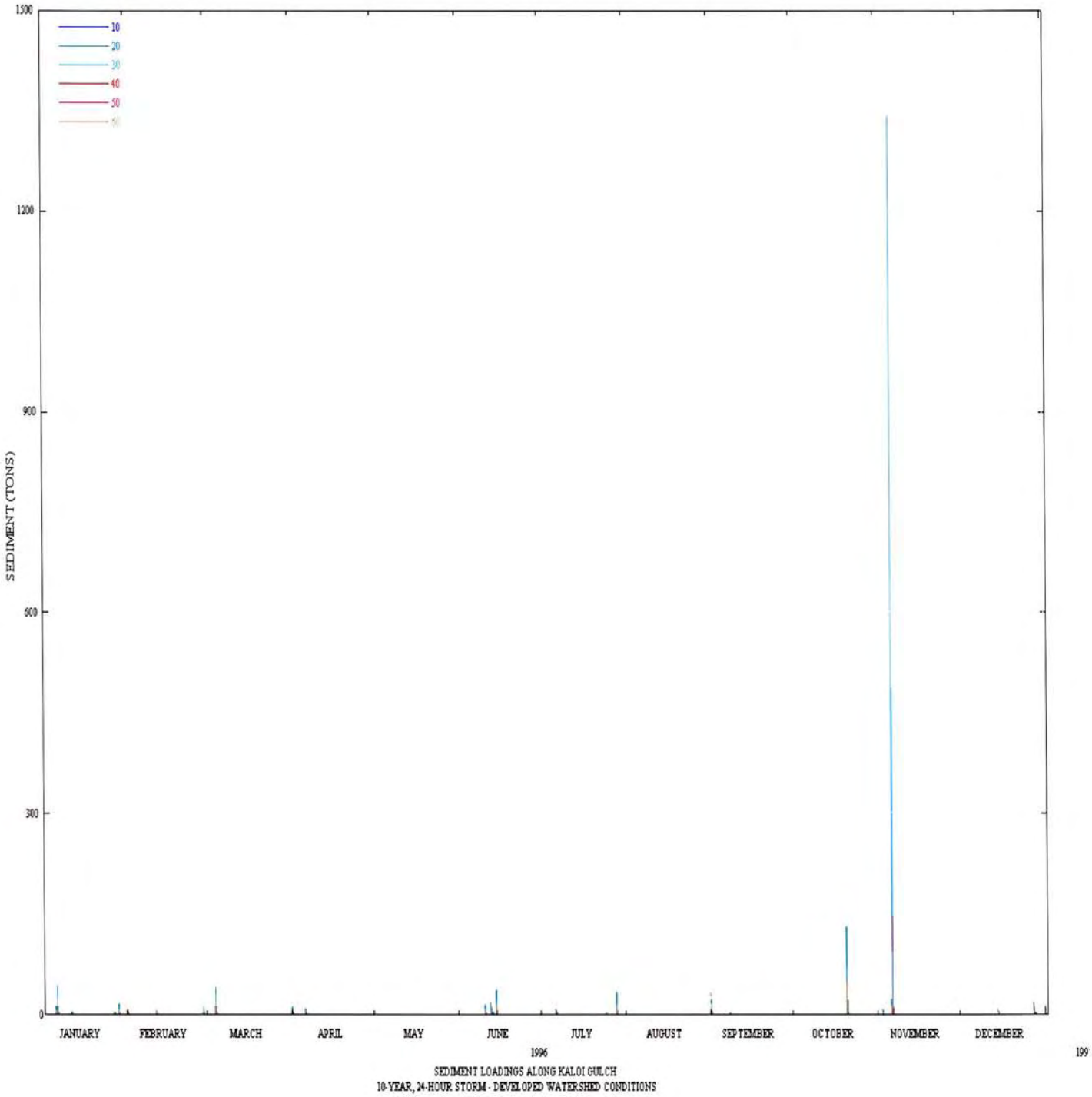

FIGURE 4-5
SEDIMENT LOADINGS ALONG KALOI GULCH
DEVELOPED WATERSHED CONDITIONS
1996 RAINFALL SIMULATION WITH 10-YEAR, 24-HOUR EVENT ON NOV. 5, 1996

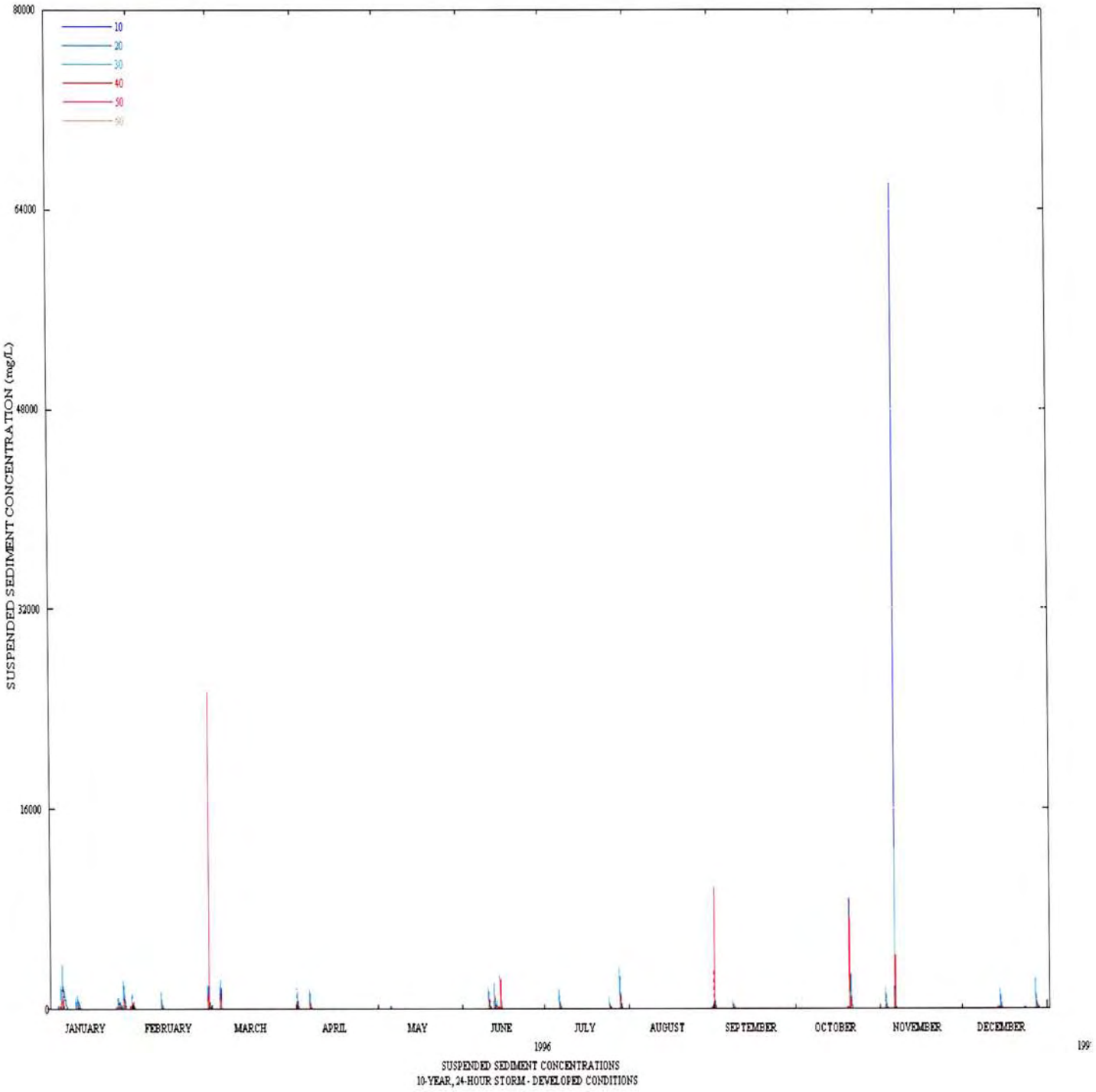

FIGURE 4-6
TOTAL SUSPENDED SEDIMENT CONCENTRATIONS
DEVELOPED WATERSHED CONDITIONS
1996 RAINFALL SIMULATION WITH 10-YEAR, 24-HOUR EVENT ON NOV. 5, 1996

APPENDIX C

Botanical Resources Assessment Study

CHAR & ASSOCIATES
Botanical / Environmental Consultants
4471 Puu Panini Ave.
Honolulu, Hawaii 96816
(808) 734-7828

19 June 2004

Planning Solutions, Inc.
Ward Plaza, Suite 330
210 Ward Avenue
Honolulu, Hawaii 96814-4012

Attention: Charles L. Morgan

SUBJECT Kalo'i Gulch Drainageway
'Ewa District, O'ahu

Dear Mr. Morgan:

A botanical resources assessment study was made for the proposed Kalo'i Gulch drainageway improvements. HASEKO, Inc. in coordination with the City and County of Honolulu plans to make changes to the One'ula Beach Park section. Improvements proposed for the 3.7-acre portion of the Kalo'i Gulch drainageway that lies within One'ula Beach Park include a 500-foot wide drainage channel to the ocean; berms to contain the storm water; reconstruction of the park access road; and accessory improvements including grassing and landscaping.

Field studies to assess the botanical resources on the project site were conducted on 16 June 2004. The primary objectives of the field studies were to:

1) provide a general description of the vegetation on the project site;
2) search for threatened and endangered species as well as species of concern; and
3) identify areas of potential environmental problems or concerns and propose appropriate mitigation measures.

Description of the Vegetation

The plant names used in this report follow Wagner et al. (1990) and Wagner and Herbst (1999). The few recent name changes are those reported in the Hawaii Biological Survey series (Evenhuis and Eldredge, eds., 1999-2002).

The vegetation within the existing drainageway is patchy with large, open, barren areas. On the mauka half closer to the park access road, the substrate is thin, brownish-red soil. On the makai half, it is sandy. Pickleweed (Batis maritima) forms scattered patches, one to two feet tall, especially along the margins of the drainageway where there is soil. Smaller patches of swollen fingergrass (Chloris barbata), saltbush (Atriplex suberecta), Bermuda grass or manienie (Cynodon dactylon), kipukai (Heliotropium curassavicum), golden crown-beard (Verbesina encelioides), and Sporobolus pyramidatus are found here and there.

Woody components form low thickets, three to eight feet tall. Indian pluchea shrubs (Pluchea indica) are abundant along the edge of the drainageway on the berms. A row of tall tamarisk trees (Tamarix aphylla) is found along the east berm. A low thicket of sourbush (Pluchea carolinensis), Indian pluchea shrubs, and windswept kiawe trees (Prosopis pallida) is found just back of the sandy beach. A few trees of the long-spined kiawe (Prosopis juliflora) also occur within the drainageway, but these have been cut down and/or treated with herbicide.

On the seaward side of the low thicket above the sandy beach, there are mats of the native 'aki'aki or beach dropseed grass (Sporobolus virginicus) and pohuehue or beach morning glory (Ipomoea pes-caprae). No vegetation is found on the gently sloping beach front where it is subject to wave wash during storms and shifting sands.

A portion of the beach park parking lot and grassy lawn will be affected by the

proposed drainage improvements. The parking lot is crushed coral-lined with a few Indian pluchea shrubs along its east end. Where it adjoins the lawn area, there is a row of coralline boulders and also a water line with faucets. Clumps of 'ape or elephant's ear plant (Alocasia macrorrhiza) have been planted in the runoff area by the faucets. These runoff areas support lush, green mats of buffelgrass (Cenchrus ciliaris), two to three feet tall, and other weedy plants such as wiregrass (Eleusine indica), khaki weed (Alternanthera pungens), Calyptocarpus vialis, and heliotrope (Heliotropium procumbens). Plumeria (Plumeria rubra) has also been planted here.

A row of coconut trees (Cocos nucifera) lines the makai side of the lawn. On the mauka side of the lawn area next to the access road, there is a narrow band of kiawe trees, Indian pluchea shrubs, and smaller weedy species such as swollen fingergrass, pickleweed, saltbush, and buffelgrass. The park lawn is composed primarily of Bermuda grass, but barren dirt patches and scattered low mats of weeds such as Sida ciliaris and creeping indigo (Indigofera hendecaphylla) are common to abundant.

Discussion and Recommendations

The area for the proposed drainage improvements already supports an existing drainageway and a beach park. Large, barren, open areas of brownish-red soil or sand characterize the drainageway. The vegetation within the drainageway consists of scattered patches of weedy plants such as pickleweed, swollen fingergrass, saltbush, etc. Low thickets of kiawe and Indian pluchea are scattered here and there.

The park area is primarily open, grassy lawn which is periodically mowed. A row of coconut trees lines the makai side of the park, while a narrow band of kiawe trees and scrub is found on the mauka side next to the access road.

Almost all of the vegetation on the project site is composed of introduced or alien species. Introduced species are all those plants which were brought to the Hawaiian Islands by humans, intentionally or accidentally, after Western contact, that is, Cook's arrival in the islands in 1778. Three plants are originally of Polynesian introduction; these are the coconut, milo (Thespesia populnea), and 'ape. Three species are native; these are the kipukai, pohuehue, and 'aki'aki. These plants are all indigenous, that is, they are native to the Hawaiian Islands and elsewhere.

None of the plants observed on the project site is a threatened and endangered species or a species of concern (U.S. Fish and Wildlife Service 1999a, 1999b; Wagner et al. 1999). This is not surprising given the present uses of the project site.

The proposed drainage improvements at the One'ula Beach Park site are not expected to have a significant negative impact on the botanical resources. Accessory improvements including grassing and landscaping are planned. There are no botanical reasons to impose any restrictions, conditions, or impediments to the proposed drainage improvements.

Please do not hesitate to contact me should you have any questions regarding this study.

Sincerely,

Winona P. Char

Winona P. Char
CHAR & ASSOCIATES

References

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APPENDIX D

Avian Assessment of the Proposed Kaloi Drainageway Improvements at Oneula Beach Project

RANA
PRODUCTIONS LTD.

June 29, 2004

Charles L. Morgan
Planning Solutions, Inc.
Suite 330 Ward Plaza
210 Ward Street
Honolulu, Hawaii 96814-4012

Re: An Avian Assessment of the Proposed Kalo'i Gulch Drainageway Improvements at One'ula Beach Park Project.

Dear Mr. Morgan:

I visited the project site located within and *mauka* of One'ula Beach Park with Perry White of your office on the morning of June 18th 2004. He had asked me to characterize the avifauna likely to use resources within the project site, and to render an opinion on the likely changes in faunal use patterns following completion of the proposed drainage improvements, especially within the 3.7 acre portion of the drainageway located within One'ula Beach Park.

The habitat within the existing drainageway and along the sides of Kalo'i Gulch is dominated by alien species including *kiawe* (*Prosopis pallida*), *koa haole* (*Leucaena leucocephala*), garden spurge (*Chamaesyce hirta*), *Pluchea* spp., tree tobacco (*Nicotiana glauca*) and numerous other weedy species. Two indigenous species, *'uhaloa* (*Waltheria indica*), and *'ilima* (*Sida fallax*) were encountered. The *'uhaloa* was abundant, *'ilima* less so. There is also a large amount of bare ground, and several unpaved trails and roadways within and immediately adjacent to the gulch. Within One'ula Beach Park the majority of the 3.7 acres fronting Papipi Road is bare ground, fringed to the east and west with alien grass species, and to the south by pickle weed (*Batis maritima*) and then sand dunes extending to a karst outcrop and then the ocean.

I recorded 11 species of birds within Kalo'i Gulch, and the 3.7 acre portion of the drainageway located within One'ula Beach Park (Table 1). All of the species detected are considered to be alien to the Hawaiian Islands. In addition two other species; Wandering Tattler (*Heteroscelus incanus*) and Ruddy Turnstone (*Arenaria interpres*) were seen foraging on the karst outcrop immediately inland of the shoreline. These later two species are migratory shorebirds that are commonly seen in Hawai'i between July and May each year. No species listed as threatened, endangered or proposed for listing under either the federal or State of Hawai'i endangered species programs were detected.

PHONE: (808)329-9141 FAX: (808)329-1245
P.O.BOX 1371 KAILUA-KONA, HAWAII 96745

Table 1

Avian Species Detected: Kalo'i Drainageway Project

Common Name	*Scientific Name*
PIGEONS & DOVES - Columbidae	
Spotted Dove	*Streptopelia chinensis*
Zebra Dove	*Geopelia striata*
BULBULS – Pycnonotidae	
Red-vented Bulbul	*Pycnonotus cafer*
SILVEREYES - Zosteropidae	
Japanese White-Eye	*Zosterops japonicus*
MOCKINGBIRDS & ALLIES – Mimidae	
Northern Mockingbird	*Mimus polyglottos*
STARLINGS - Sturnidae	
Common Myna	*Acridotheres tristis*
EMBERIZIDS - Emberizidae	
Red-crested Cardinal	*Paroaria coronata*
SALTATORS, CARDINALS & ALLIES – Cardinalidae	
Northern Cardinal	*Cardinalis cardinalis*
CARDULINE FINCHES & ALLIES - Fringillidae	
House Finch	*Carpodacus mexicanus frontalis*
WAXBILLS & ALLIES – Estrildidae	
Common Waxbill	*Estrilda a. astrild*
Chestnut Munia	*Lonchura atricapilla*

Although, not encountered it is possible that endangered Black-necked Stilts (*Himantopus mexicanus knudseni*), may use resources within a small portion of the 3.7 acre portion of the drainageway located within One'ula Beach Park when it retains water immediately following heavy rains. I am unaware of any reports of this species ever having been recorded within the park. However, the species is found in many locations within the 'Ewa plains, and the birds tend to be very opportunistic, rapidly prospecting any standing water.

If stilts occasionally use the park it would be for loafing and incidental foraging. There is nothing unique about the habitat present within the proposed drainageway. Given that there is adequate stilt foraging and loafing habitat close to the park, the modification of this small portion of the drainageway so as to preclude it from holding standing water will not have a negative impact on Black-necked Stilts currently found in the 'Ewa plains area.

Construction of the proposed improvements will likely temporarily disturb individual alien species. However, following build-out and landscaping it is likely that avian densities will increase. The areas within the gulch that will be grassed will likely attract

numerous individuals of any number of the 40 odd species of migratory and extralimital shorebird species that have been recorded in Hawai'i.

Sincerely

Reginald E. David

APPENDIX E

Supplemental Archaeological Survey:

Subsurface Testing of Beach Areas at Marina Channel and

Kaloi Drainage Channel

Report 2379-050104

Supplemental Archaeological Survey: Subsurface Testing of Beach Areas at Marina Channel and Kalo'i Drainage Channel, Ocean Pointe Project

Land of Honouliuli, 'Ewa District, Island of O'ahu
(TMK:9-1-012-8,9,11-13,16,17)

BY

Alan B. Corbin • M.A., Supervisory Archaeologist

PREPARED FOR

HASEKO (Ewa), Inc.
c/o Perry White
Planning Solutions, Inc.
Ward Plaza, Suite 330
210 Ward Street
Honolulu, Hawai'i 96814

JULY 2004

PHRI **Paul H. Rosendahl, Ph.D., Inc.**
Archaeological · Historical · Cultural Resource Management Studies & Services

HAWAII: 224 Waianuenue Avenue • Hilo, Hawaii 96720 • (808) 969-1763 • GUAM: P.O. Box 23305 • G.M.F., Guam 96921 • (671) 472-3117

SUMMARY

At the request of Perry White of Planning Solutions, Inc., representing the current landowners of the subject property, Ocean Pointe/HASEKO (Ewa), Inc., Paul H. Rosendahl, Ph.D., Inc. (PHRI) recently conducted a supplemental archaeological survey within two coastal areas of the Ocean Pointe Project (proposed Marina Channel [3,885 sq m] and the Kalo'i Drainage Channel [4,350 sq m]), in the Land of Honouli'uli, 'Ewa District, Island of O'ahu (TMK:9-1-012-8,9,11-13,16,17). The overall purpose of the survey was to satisfy the historic preservation requirements of the Hawai'i State Historic Preservation Division (SHPD), as contained in the Hawai'i Administrative Rules, Title 13, Subtitle 13 (Sections 6E-7 and 6E-8), and the requirements of the Department of Planning and Permitting of the City and County of Honolulu (DPP-CCHONO) in connection with land use approval petitions and subsequent development planning and permit applications. Specifically, the supplemental survey involved additional subsurface testing of shoreline sand deposits for the possible presence of potentially significant buried historic properties (e.g., cultural deposits or human burials) prior to excavation of the proposed marina and drainage channels. Human burial remains had been found previously, in two locations in the vicinity, within One'ula Beach Park. One of the burials was initially identified in 2001 within the current Marina Channel area. The location of the other burial, initially identified in 1992, is unknown, as its location apparently was not recorded adequately at the time.

During the current project, 27 backhoe trenches were placed in the Kalo'i Drainage Channel area, and 26 backhoe trenches were placed in the proposed Marina Channel area. In addition, three hand excavation units were placed within the immediate vicinity of the location of the burial initially identified in the Marina Channel area in 2001. No human skeletal remains or prehistoric cultural materials of any kind were identified during the trenching and excavations. The trenches and units yielded primarily recent historic trash, such as fragments of plastic, glass, paper, metal, and ceramics.

It therefore appears that the two early burial discoveries are likely isolated instances, and that the Marina Channel and Kaloi Drainage Channel areas do not constitute areas commonly used for burial, i.e., cemeteries. Based on the negative findings of the current and past archaeological work in the project area, no further archaeological work is recommended.

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By Historical Researcher Helen W. Smith, M.A.

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INTRODUCTION

BACKGROUND

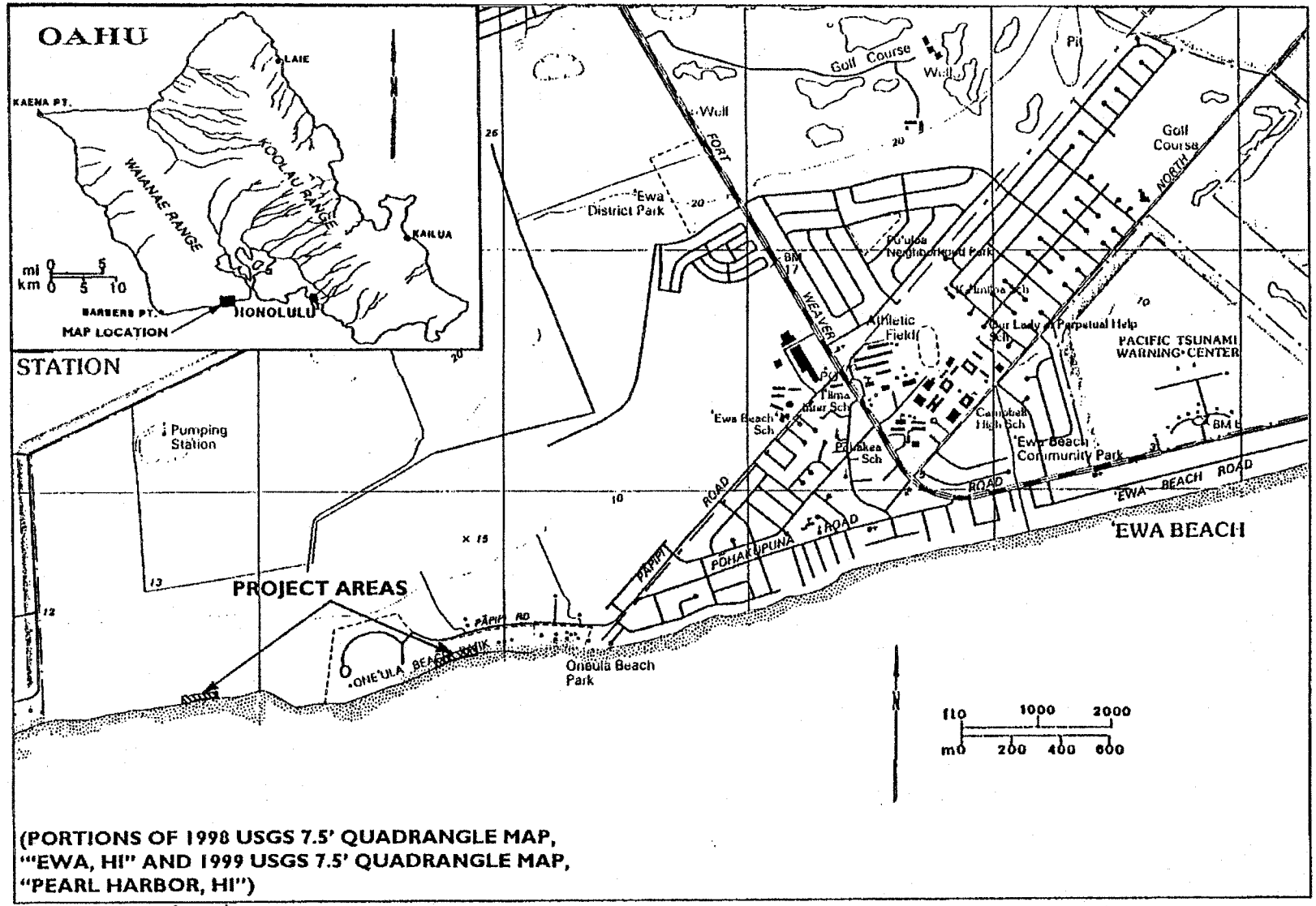
At the request of Perry White of Planning Solutions, Inc., representing the current landowners of the subject property, Ocean Pointe/HASEKO (Ewa), Inc., Paul H. Rosendahl, Ph.D., Inc. (PHRI) recently conducted a supplemental archaeological survey at the Ocean Pointe Project, Land of Honouliuli, 'Ewa District, on the southwestern coast of the Island of O'ahu (TMK:9-1-012-8,9,11-13,16,17). More specifically, the project area consists of two defined beach areas: the proposed Marina Channel and the Kalo'i Drainage Channel (*Figures 1 and 2*). The maximum area of the former is estimated to be c. 0.96 acre (3,885 sq m), and the latter is estimated to be c. 1.10 acre (4,350 sq m), for a total beach dune area of c. 2.06 acres (8,235 sq m). The proposed Kalo'i Drainage Channel cuts through the eastern extension of the City and County of Honolulu's (CCHONO) existing 'One'ula Beach Park. The overall purpose of the survey was to satisfy the historic preservation requirements of the Hawai'i State Historic Preservation Division (SHPD), as contained in the recently approved SHPD Administrative Rules, Title 13, Subtitle 13, Chapter 275, Rules Governing Procedures for Historic Preservation Review for Governmental Projects, Sections 6E-7 and 6E-8, Hawai'i Revised Statutes (2003); and to comply with all current historic preservation requirements of the SHPD and the Department of Planning and Permitting of the City and County of Honolulu (DPP-CCHONO) in connection with land use approval petitions and subsequent development planning and permit applications. More specifically, the purpose of the supplemental inventory survey was to satisfy the recommendation of the SHPD for additional subsurface testing of shoreline sand deposits for the possible presence of potentially significant buried historic properties (e.g., cultural deposits or human burials) prior to excavation of the proposed marina and drainage channels (SHPD letter to DPP-CCHONO dated April 26, 2001; Log No:27363, Doc No:0104SC21).

The decision to conduct the current supplemental survey was preceded by the following events, discussed chronologically:

- In September 1992, human skeletal remains were inadvertently discovered in the general area of the Proposed Marina Channel, in an area locally referred to as "Hau Bush Beach." The remains were removed to the CCHONO morgue by the Honolulu Police Department, and subsequently reinterred by Ko Olina Resort staff at a SHPD-approved location on Campbell Estate lands (at Pu'u Pālailai Ridge).

- In January 2001, a second inadvertent discovery of human skeletal remains was made in the same general area as the September 1992 discovery. Partial remains were removed to SHPD office at Kapolei by SHPD staff, who returned several days later and disinterred the rest of the remains, as they had been deemed to be in imminent danger of further exposure and damage. All remains are apparently still being curated at the SHPD office in Honolulu, and final disposition has not been determined.

- Based on a visit to the January 2001 inadvertent discovery location, made in February 2001 by members of the O'ahu Island Burial Council (OIBC), the OIBC approved a motion made at its May 2001 meeting recommending that SHPD ask the property owner to conduct additional subsurface testing of shoreline sand dunes to be impacted by proposed construction (e.g., the marina entrance channel).



(PORTIONS OF 1998 USGS 7.5' QUADRANGLE MAP, ""EWA, HI" AND 1999 USGS 7.5' QUADRANGLE MAP, "PEARL HARBOR, HI")

Figure 1. Project Location

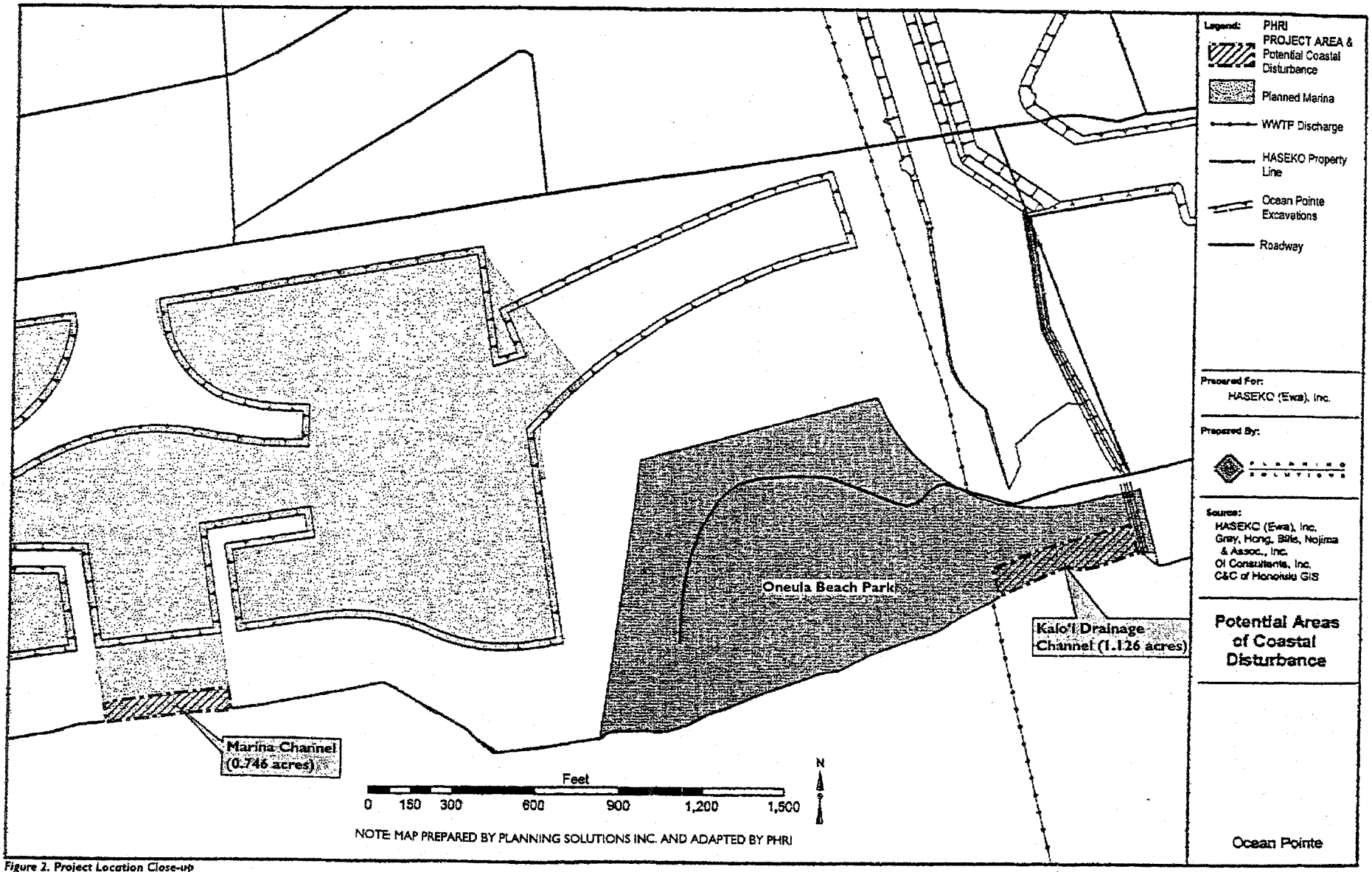


Figure 2. Project Location Close-up

- In its April 2001 letter reviewing a Draft Supplemental Environmental Assessment (DSEA) that HASEKO (Ewa), Inc. had prepared in support of requested zoning changes and minor changes to an existing Special Management Area (SMA) Use Permit, SHPD recommended to DPP-CCHONO that additional archaeological survey (i.e., subsurface testing) of the shoreline sand deposits be carried out prior to any ground disturbance.

- On January 16, 2004, Dr. Paul Rosendahl, PHRI Principal Archaeologist, SHPD staff (Dr. Collins, Assistant O'ahu Island Archaeologist Muffet Jourdane, Burials Program Manager Kai Markell, Burials Program Cultural Specialist Kanai Kapeliela, and client representative Perry J. White of Planning Solutions, Inc.) visited and discussed the site. The scope of work below is based on the agreements reached during that site visit and consultation.

SCOPE OF WORK

The specific objectives of the survey were fourfold: (a) to identify any potentially significant archaeological remains present within the defined beach areas; (b) to collect information sufficient to evaluate and document the potential significance of any identified remains; (c) to evaluate the potential impacts of any proposed development upon any identified significant remains; and (d) to recommend appropriate measures that would mitigate any adverse impacts upon identified significant remains.

Based on (a) preliminary review of available reports of prior archaeological work done in the general area, (b) consultation with Dr. Sara L. Collins, SHPD Archaeology Branch Chief and O'ahu Island Archaeologist, (c) a subsequent site visit/consultation (referred to above), and (d) familiarity with both the general project area and the current regulatory review requirements of the SHPD and the DPP-CCHONO, the following tasks were determined to constitute an adequate scope of work for the current survey:

1. Conduct appropriate background research and review, and prepare and obtain SHPD approval of detailed inventory survey work plan to guide fieldwork;

2. Mobilization – including fieldwork preparations, field crew travel, and demobilization;

3. Conduct fieldwork – Kalo'i Drainage Channel Area - transect excavations (backhoe);

4. Conduct fieldwork – Kalo'i Drainage Channel Area - sample units excavations (backhoe);

5. Conduct fieldwork – Marina Channel Area - sample units excavations in immediate vicinity of previous two inadvertent discoveries (hand excavation);

6. Conduct fieldwork – Marina Channel Area - sample units excavations in sand pocket deposits (backhoe);

7. Conduct post-field analyses of field and other data;

8. Prepare appropriate draft and final reports – including general significance assessments and recommended general mitigation treatments, as appropriate, for all potentially significant sites and features; and

9. Coordinate and consult with client, client representatives, regulatory agency staff, etc. (as appropriate and/or required).

PROJECT AREA DESCRIPTION

General

This section is taken and adapted largely from Franklin et al. (1995), who in turn created it based on several earlier PHRI reports concerning the general vicinity.

The project area is located along the coastal portion of the east-central segment of the Ewa Coral Plain. The Ewa Plain is a Pleistocene elevated coralline reef that forms the leeward coastal lowlands of southwestern Oahu, and extends five km south from the Waianae mountains and 8 km south from the adjacent Central Plateau. Pearl Harbor lies at the east end of the plain, while West Beach marks the approximate western end of the feature. The project area extends inland only a short distance, and the Marina project area consists almost exclusively of coralline lowlands. However, to the north are basaltic uplands also associated with the Ewa Plain geomorphic feature. The marine-terrestrial interface is evident at numerous locations along the Ewa Plain, where the structure of the Pleistocene reef, consisting of coral conglomerate standing 5.0-6.0 m above mean sea level (AMSL), overlies the volcanic strata of the Waianae mountains (Pollock 1928: Plate IV,c). Alluvial encroachment from the volcanic uplands has covered much of the interior of the plain with a mantle of sediment. The coral substrate, however, remains largely exposed at the surface in the coastal zone. Subaerial weathering of this calcareous surface has produced a shallow karstic topography of ridges, hollows, and pinnacles; characteristic components include widespread sinkholes of varying size and depth. Both alluviated and exposed coral areas are present within the Marina project area.

The topography of the Ewa coral plain is quite regular, rising to a maximum elevation of about 30.0 m on an average gradient of less than 1/2 percent from the shore to the uplands. Few features interrupt the monotony of this landscape. Only the low eroded bluffs above West Loch, in Pearl Harbor, and the two volcanic cones of Pu'ukapolei and Pu'upalailai stand out in relief. The ash-cinder cone of Pu'upalailai is of particular interest to any archaeological study of the Ewa coral plain, because this is one of only three known sources of volcanic glass on the Island of O'ahu (Manhoff and Uyehara 1976:46). Pu'upalailai lies to the northwest of the Marina project area, at the base of the Waianae range.

The shoreline of the Ewa coral plain is also unremarkable in terms of geomorphological features. It is composed almost entirely of weathered limestone benches that are punctuated periodically with poorly developed calcareous sand beaches. The only significant variations occur at the estuarine outflow of Pearl Harbor, and at the basalt/limestone interface near Kahe Point (west of the Marina project area). In the latter, former seasonal outflows of fresh water once created backwaters that provided estuarine-like conditions both behind the coastal dune and at its breech to the sea. Relics of this can still be found in the area. Extensive coastal sand dunes are not typical of the Ewa coastline, although there are several minimally developed examples along the west shore of the region, south of Kahe Point. The dunes fronting the deep-draft harbor rise 4.0-5.0 m AMSL, and are composed of coarse-grained, light-tan to buff-colored carbonate beach sands overlain by finer cream colored carbonate aeolian sands. There is no barrier reef off of either the south or west coasts of the Ewa plain, but there is a well-developed fringing reef along the south coast within the vicinity of the Marina project area. This reef supports an extensive inshore fauna

dominated by reef and silt-sand bottom species of fish and shellfish. This fringing reef continues intermittently along the west side of the Ewa plain where there is a concomitant shift in the relative distribution between inshore and offshore species.

Due to the porous structure of the coral plain, overland runoff is highly attenuated at the coast. There are few developed surface drainages in the region, with Honouliuli Stream representing the most significant exception. Intermittent streams include Makaiwa and Waimanalo gulches at the western end of the Plain. Additional examples within the central portion of the Ewa Plain (e.g., Makakilo) have been diverted around U.S. Navy and other installations via aquaducts and other modern structures.

The restricted sedimentation and soil development along the coastal margins of the Plain is due in part to the attenuated surface flow. The soils that do exist beyond the alluvial mantle are encountered in sinkholes and depressions among the rock outcrops closest to the coastline, and consist of friable azonal clays and silts weathered from transported alluvial material and from the local substrate. They are loose and well-aerated soils, with poor moisture retention qualities unless frequently replenished with humus.

Ewa in general is a semiarid region of intense sunshine, warm dry tradewinds, and little rainfall. At the western end of the plain these conditions are most accentuated. Except for some coastal marshlands, the vegetation is typically xeric, and, where undisturbed by modern developments, it has become dominated by hardy exotics. There is increasing evidence, however, that prehistoric vegetation in the region was more savannah-like, and consisted of a grassland studded with thickets and small groves of trees.

The relatively harsh conditions characterizing the region today, as they did in former times, are primarily determined by geology and the location of the coral plain in the leeward shadow of the Waianae and Ko'olau mountains, which form the volcanic core of Oahu. Seasonally shifting wind patterns account for the low annual rainfall, which typically ranges from 300-500 mm. Easterly to northeasterly tradewinds of 10-15 knots prevail c. 75-85 percent of the time during an average year. But due to the rain-shadow effect, the retained moisture less frequently reaches the Ewa Plain in the form of significant quantities of rainfall than is true for many other areas of the island. From October through April, the tradewinds decrease in frequency and intensity and are replaced by more variable kona, or leeward, winds. These kona conditions, especially when they originate from the southeast and southwest, bring in the few winter storms, which deposit most of the annual precipitation for this area.

The mean annual temperature in the region is 74-75 degrees F, with a seasonal variation of c. 6-8 degrees F. The winter months are noticeably cooler than the summer months, although the variation is not significant. Diurnal variation is considerably greater than annual temperature variation, ranging from 64 degrees to 84 degrees F in the winter, and from 72 degrees to 93 degrees F in summer. The ocean may have an ameliorating effect on ambient temperatures over the adjacent landmass, but ground temperatures are little affected in this way. Although little information is available on this phenomenon, surface temperatures measured during previous work in the harbor project area revealed a daily variation in ground temperature exceeding 65 degrees F. Nighttime ground temperatures in areas cleared of vegetation averaged 67 degrees F; by mid-afternoon, however, the dark humus surfaces which had been exposed directly to the heat of the sun registered temperatures of nearly 135 degrees F.

Despite the relatively low precipitation and the normally restricted surface runoff, coastal Ewa is not without accessible fresh water. Prolonged rains during the winter storm season can exceed the capacity of the coral substrate to accommodate the increased volume, thus producing extensive sheet-wash flooding at the coast. This was especially evident during the winter of 1981-1982. Groundwater is another important factor in flooding at lower elevations. The water table usually stands 0.3-0.6 m AMSL. This is only 1.0-3.0 m below ground level through most of the coastal zone; in some areas it appears at the surface as

coastal marshlands. Depending upon the combined affect of runoff from the inland zone and the long-term stability of the water table, some of these marshlands may appear only seasonally while others persist year round.

Groundwater in southwestern O'ahu occurs in two reservoirs, or aquifers. Basal fresh water is contained in the Waianae Volcanic Series. This is partly overlain by the adjacent coral rock cap containing largely brackish water. Ordinarily, the basal water would flow into the adjacent coral aquifer due to the pressure created by the higher elevation and greater capacity of the catchment that recharges the basal reservoir. However, the two are separated by an aquaclude, a dense descending stratum of low permeability formed by terrigenous and marine sediments that acts as a barrier, retarding the normal flow of fresh water from the basal aquifer. This restricted movement of groundwater between the two reservoirs means that the recharge of the lowland water table must rely primarily on the direct infiltration of the scant rains over the plain, plus the intermittent stream flow and runoff from the adjacent uplands. Once in the cap rock, the groundwater moves seaward in the southwesterly direction. Because of the porosity of the coral and the many natural conduits within the reef structure, the subterranean flow becomes more rapid as the water approaches the coast. Measurements of the water table through several deeper sinkholes in the previous harbor study area revealed a nearly synchronous response between the water level in widely separated features, and that of the oceanic tides along the shore some 1,000 m distant.

The quality of this groundwater is variable and depends on conditions affecting recharge of the coral aquifer. The bulk of the water is brackish, but fresh water does lens over the saline basement. During the prehistoric period of settlement, the availability and quality of this fresh water was apparently sufficient to have warranted the structural modification of sinkholes for use as "native" wells. During periods of prolonged drought, however, the usual recharge of the lowland water table can be greatly reduced. Under these circumstances the aboriginal modification of sinkholes providing access to ground water sources can be viewed as a Hawaiian response to conditions of environmental stress.

So far this description of the region has emphasized the general aridity of its leeward situation in the island-wide setting, and such factors as geology, soil development, surface runoff, and the relative proximity of groundwater to the surface near the coast. All of these variables contribute to ecological variability within what might otherwise be characterized as a rather monolithic environment. There are several additional factors contributing to the ecological variability of the region, however, and all can be related in potentially important ways to the prehistoric patterns of land use and resource exploitation of the region.

Seasonality - Seasonality is an important heuristic device in attempting to evaluate prehistoric patterns of land use and resource exploitation. The archaeological evidence assembled to date documents use of both the marine and terrestrial zones by the Hawaiian settlers of the Ewa Plain. This included fishing, shellfish gathering, the hunting of birds, and gardening. The recent archaeological research in the deep-draft harbor area (Davis 1979a) suggests that the following elements are important to an understanding of seasonal use of the general region:

a. Seasonal Fishery: In the marine zone, the productivity of the Waianae fishery is legendary. It is also generally acknowledged that winter and spring (January to May) are routinely the most productive seasons. The higher productivity of this fishery during this time of the year is apparently correlated with a number of seasonal variations, both oceanographic and biologic. Contributing factors include (a) the prevailing southeasterly surface and near-surface currents and their associated gyrals; (b) the synchrony of peak reproductive activity among Hawaiian reef fish with the occurrence of the southeasterly current; (c) the North Pacific Swell and its effect of upwelling cooler nutrient-rich waters from deeper levels into the upper water column; and (d) the greater aggregation of fish attracted to the increased food levels over the submarine outcrops and escarpments where this upwelling occurs;

b. Seasonal Terrestrial Resources: Seasonal changes in the weather have already been noted. As for effects on terrestrial resources, there is apparently little in the way of conspicuous seasonal variation in the vegetation, other than perhaps flowering and seed-bearing among several species like the wiliwili tree *(Erythrina sandwicensis).* The major floral variation seems largely to be in the output of new greens in response to the increased precipitation from November through April. For the avifauna, some seasonal cycles are indicated below. Note that the potential overlap of stages from one period to another is not indicated. Note also that this is only a partial listing, since no data are available for many of the species identified to date.

(1) For the Hawaiian Goose, breeding adults arrive at nesting sites in lower elevations from October to November and egg laying begins shortly thereafter. Hatching is underway by December and January. The chicks remain in the nest until February or March, by which time the young have fledged and are beginning to fly. Adult birds are also going through their postnuptial molt and are flightless at this time. Finally, from April through September, most, if not all of the geese return to their upland feeding in the interior. A few birds may remain at lower elevations.

(2) For Upland Forest Birds, May to October finds them resident in the uplands, with only occasional excursions to lower areas. These birds frequent lower elevations from November to April, possibly including the coastal plain, avoiding the severe upland winter storms.

(3) For the Petrel (excepting two species), Shearwaters, and Tropic Birds, breeding adults begin arriving at nesting sites in April, and egg laying continues until August. Hatching begins about June, and there may be chicks in the nest through mid-October. Finally, from November to March all the pelagic birds are at sea. The nesting sites are generally abandoned at this time, with the exception of the White-tailed Tropic Bird, which appears to remain in the general vicinity. Markham's Storm Petrel and the Bonin Island Petrel lay eggs in January and February, and chicks begin hatching in March. The young remain in the nest until June. These are also pelagic species and are at sea from July to December.

Marina Channel and Kalo'i Drainage Channel Areas

The terrain fronting the ocean in the Marina Channel area consists primarily of discrete areas of relatively shallow sand deposits within broad and shallow natural depressions of the underlying limestone reef substrate. This area is on a shelf or bench overlooking the ocean, which is approximately three meters below. The sand dune deposits cover approximately 95% of the area, with the limestone formations appearing on the surface in only a few small areas. The vegetation in the Marina Channel area is composed primarily of *kiawe (Prosopis pallida*), various grasses, and strand shrubs. A dirt road, beginning at the One'ula Beach Park, runs parallel to the coast through the Marina Channel Area project area. The entire area has been much disturbed, as evidenced by modern trash and campfires, and several abandoned cars.

The terrain fronting the ocean in the Kalo'i Drainage Channel Area consists primarily of sand accumulations overlying limestone formations. The sand deposits are considerably deeper and more extensive than the Marina Channel Area, with no exposed coral bedrock except at the ocean's edge. The terrain is generally flat, and the vegetation consists of *kiawe (Prosopis pallida),* various grasses, and strand shrubs. There is a great deal of subsurface disturbance in the area, as evidenced by modern trash in the initial layer of sand, although little of the trash is visible on the surface.

PREVIOUS ARCHAEOLOGICAL RESEARCH

McAllister (1933:107-110) lists many sites for Honouliuli; however, most of these are located at Pearl Harbor or high on the ridges of the Waianae Range. His Site 134, the Pu'u Kuina Heiau, is noted as situated in a gulch at the toe of Mauna Kapu. However, at the time of his visit, only a "suggestion" of a terrace remained. His Site 137, the Pu'ukuua Heiau, was located on a ridge overlooking Nanakuli and Honouliuli. By the time of his visit, this *heiau* had been largely dismantled for stones for a cattle pen *makai* of the site. McAllister's Site 138 was originally noted by Thrum (1907:46), who mentions that a *heiau* was once situated on Kapolei Hill. This site was apparently destroyed for its stones, which were crushed for building material (McAllister 1933:108), and nothing is known concerning the original size or type of this feature. McAllister also includes a nearby rock shelter as the place where the pig-god, Kamapua'a, is said to have resided with his grandmother.

Local informants also showed McAllister a small, sacred fishing shrine *(ko'a).* The Kalanamaihiki shrine (his Site 139) was located on a small tongue of land opposite Laulaunui Island in West Loch. At the time of his visit, it was covered with *akulikuli,* and was not a conspicuous feature of the land. Another fishing shrine and associated walled fish traps in this area (Site 144) was originally recorded by Stokes (1909).

McAllister reports several fishponds in the West Loch and Pu'uloa areas, including Site 140, adjoining Laulaunui Island (possibly Laulaunui fishpond); Site 142, at the tip of the Waipio peninsula (Kapamuku fishpond, also called Pamoku); and Site 143, in Pu'uloa across from Waipio Peninsula (Okiokilepe fishpond). The entire West Loch (Kaihuopalaai) area was subsumed under McAllister's Site 141. This area was famous for its seasonal mullet fishing. The area of Pu'uloa comprises his Site 145. Traditionally, this is where the first breadfruit in Hawaii was planted. The Barbers Point area and much of the 'Ewa Plain are subsumed under his Site 146. Concerning this area he states:

> 'Ewa Plains, throughout which are the remains of many sites. The great extent of old stone walls, particularly near the Puuloa Salt Works, belongs to the ranching period of about 75 years ago. It is probable that the holes and pits in the coral were formerly used by the Hawaiians. Frequently the soil on the floor of the larger pits was used for cultivation and even today one comes upon bananas and Hawaiian sugarcane still growing in them (McAllister 1933:109).

Emory examined a well-preserved house site and possible *heiau* located on the western part of the 'Ewa Plain, adjacent to Kalaeloa Boulevard (Bishop Museum Site Files [1933]). Both structures had been constructed of stacked limestone slabs and uprights, but were destroyed by sugar cane planting.

Lewis (1970) summarized the available historical data for the 'Ewa Plain. These data indicated a sparse population at European contact, one that was further reduced shortly thereafter. Early travelers made few comments about the region, and many native Hawaiians avoided the area, apparently preferring to follow trails further inland. In 1969 and 1970, Lewis conducted the first extensive archaeological survey and excavations in an area inland from Malakole Road. Lewis summarized his archaeological research, as follows:

> For our area we find many kinds of sites—houses and house compounds—cairn mounds, ahus of myriad size and shape; pits that may have had cultural uses; walls of several types. It is obvious that the people at some time adapted themselves to life on this near-barren coral expanse. Though much of the land has been put under cane or concrete, there is yet a large area in which we may expect to find many additional sites to the few we have. Thus there is hope that we can define something of the past life of the Hawaiians who lived in such a seemingly un-Hawaiian place (Lewis 1970:42).

Lewis considered the area to be so marginal that it would only have been settled after more desirable locations had been occupied, and that one should not ascribe to western 'Ewa patterns of adaptation, known from other parts of the islands. The primary food source was thought to be the sea and reef. The possibility of

raising fish (mullet) in brackish-water ponds, and limited agriculture associated with pits and mounds is also noted, as is trade as a potential means for obtaining non-marine foods and other resources.

The Department of Anthropology of the Bishop Museum conducted a reconnaissance of c. 900 acres at Barbers Point in 1975 (Barrera 1975). Inland areas were examined to relocate sites recorded by Lewis in 1969 and 1970, and to locate additional sites. Seaward areas were examined to determine the extent and density of surface remains. Twenty-four sites were identified. Nine of Lewis's sites were relocated within the survey area; three were probably relocated; and one could not be found. At least five of Lewis's sites had been destroyed. Twelve new sites were recorded. Site types included limestone sinks, house sites, walls, cairns, enclosures, shelters, a terrace, a midden deposit, a paved area, a burial cave, and many mounds constructed of coralline limestone boulders and cobbles. A triangular basalt adze was found on the surface within an enclosure.

Barrera (1975) concluded that prehistoric occupation of the Barbers Point area was demonstrated by the presence of midden and artifacts. Fishing was considered to be the primary prehistoric use of the area, as evidenced by fish bones and scales, fishhooks, and sinkers. No indications of agricultural activities were present, but Barrera suggests that some of the mounds may have been used for cultivation of ti (*Cordyline term malls* [L.] Kunth) and sweet potato (*Ipomoea batatas* [L.] Lam.), and recommended further survey and excavations to document this possibility. The settlement pattern was described as "dispersed clusters of residences, surrounded by a relatively open and little-inhabited area" (Barrera 1975:1 8). The Barbers Point locality was considered a potentially important locale for archaeological research because it represents "...the prehistoric Hawaiian adaptation to a unique set of ecological circumstances (raised reef, low rainfall, and immediate proximity to deep ocean)" (Barrera 1975:18).

Sinoto (1976) conducted a survey of four areas in Barbers Point (designated A through D). Ninety-seven sites were identified, including 17 sites previously recorded by Lewis (1970) and 36 reported by Barrera (1975). All sites were assigned Bishop Museum site numbers (50-Oa-B6-22 through 137; B6-58 through 137 added by A. Sinoto). The most common features recorded were unmodified limestone sinks (80), walled sinks (17), rectangular enclosures (18), C-shapes (12), wall segments (14), and *ahu* (15+). Other infrequent sites and features included cairns, complexes of walls and enclosures, an L-shape, a ramp associated with a sink, a filled sink, railroad tracks, a trail, platforms (2), and culturally modified caves (3). Sinoto (1976) undertook excavation at 27 sites. An important result of the excavations was the discovery of at least seven species of extinct birds in the limestone sinks.

In 1977, an archaeological and paleontological salvage project was initiated by the Department of Anthropology, Bishop Museum, to mitigate the impacts of construction of the deep-draft harbor at Barbers Point (Sinoto 1978). Five archaeological and 13 paleontological sites were excavated. The excavations at the five archaeological sites produced portable artifacts, and midden, soil, and land snail samples (Sinoto 1978). In general, the excavations provided evidence of a high degree of disturbance at project area sites. Sinoto noted only a single-component, or cultural stratum, among all of the excavated sites. Volcanic glass from one site (Site B6-70) was hydration rind dated to the 17th century (AD 1612-1650). Artifacts consisted of single specimens of the following artifact categories: adze, adze chip, basalt flake, basalt hammerstone, coral abrader, coral file, fishhook fragment (Type S-IAIB-HT 4 after Emory, Bonk, and Sinoto 1959), modified bird bone, and polished hematite. Ten pieces of volcanic glass and three unmodified basalt flakes were also recovered from the excavations. Midden materials consisted primarily of Mollusca, Echinodermata, and Crustacea—all of which commonly occur in nearby shallow water, reef, and surge zone habitats. Fish and bird bones were scarce and unidentified, except for tuna (*Scombridae* sp.). Mammal bones were primarily those of rodent, with minor amounts of human bone.

Several trends in prehistoric utilization of the area were discussed by Sinoto (1978). Construction of surface architectural features incorporated natural features, such as outcrops surrounding low-lying areas. Habitation-related structures were oriented in a manner that offered protection from the prevailing winds (i.e., highest walls along the northeast side of habitation areas). Sinkholes, when sufficiently large, showed evidence of habitation, and were often modified and incorporated into clusters of surface structures. The prehistoric utilization of the area was interpreted as short-term, seasonal, or specialized, or a combination of these. This interpretation was based on consistently thin cultural stratigraphic units, the absence of internal features, such as fireplaces, and low artifact and midden densities. The stratigraphic consistency and range of dates from Sites B6-58 and B6-70 suggested that regional sites represent a "coeval occupation." The artifacts, midden, and the

presence of *ahu* considered to be fishing shrines were interpreted as evidence for an emphasis on fishing-oriented activities.

Davis and Griffin (1978) discussed the previous research undertaken in the Barbers Point area up to that date noting the tentative nature of some of the earlier hypotheses advanced by Lewis (1970) and Sinoto (1976). In particular, the hypotheses suggesting permanent occupation of the area and the comments on plant cultivation were questioned. Davis and Griffin (1978) suggest another plausible interpretation of the existing data: that these sites represented use and revisitation of the area over an extended period of time. Furthermore, contrary to Lewis' earlier assertion, Davis and Griffin suggest that techniques for cultivating atoll environments could have been readily applied to the more or less equivalent environmental context at Barbers Point. Intensive labor practices, involving mulching and tapping the subterranean brackish water lens, for example, would have permitted small-scale food production within this area.

Sinoto (1979) conducted survey and test excavations in an 80-acre parcel adjacent to the area that he surveyed in 1976. No new architectural types were found, but Sinoto (1979:32) did note variation in the "intensity in the exploitation of the two areas." Sinoto's research also focused on evaluating paleontological significance. In addition to locating over 500 testable limestone sinks using a systematic quadrant sampling design, 24 sinks were evaluated. Sixteen percent of the excavated sinks were found to contain extinct avifaunal remains. Sinoto (1979:34) outlined four categories of significance, or potential significance, for the avifaunal species inventoried: (a) species that are totally extinct in the Hawaiian Islands, with no historic record of extinction; (b) species that are totally extinct in the Hawaiian Islands today, with a historic record of extinction; (c) species that still exist today in the Hawaiian Islands but occupy a totally different type of habitat from that of Barbers Point; and (d) species that have been extirpated from O'ahu.

Cultural Surveys Hawaii (CSH) conducted salvage excavations and paleontological studies at 26 sites in the Deep Draft Harbor project area in 1981 (Hammatt and Folk 1981). Studies of the extinct bird bones from this project by Olson and James (Olson and James 1982, 1991, 1994; James and Olson 1991,1994) are the most important resources for all subsequent paleoecological studies of the area.

A three-year archaeological and paleontological study of 89 acres of the proposed Deep Draft harbor area was undertaken by the Bishop Museum between 1981 and 1983. The survey resulted in the identification of 75 sites, including habitation sites and sinkholes with cultural modification or use (Davis 1990c in Cleghorn and Davis 1990).

Several studies have also been conducted in the Deep Draft Harbor area in the past few years. In 1988, the Bishop Museum conducted data recovery excavations in 20 features at two sites in a 31-acre parcel southeast of the Deep Draft Harbor (Miller 1993). Although the bones of extinct birds were found in cultural features, the features were all sinkholes and the remains cannot be definitively interpreted as cultural refuse. Miller noted that the data "...suggest a sporadic but more intense use of the project area than previously expected" (1993:1). In 1992, Hammatt and Folk (1992) tested a beach berm within the proposed drainage channel. Later, Hammatt and Shideler (1994) and Hammatt et al. (1994) conducted an assessment and inventory for the proposed harbor expansion, which resulted in negative findings.

In the mid-1980s, resort, commercial, residential community, and public recreation developments were proposed for a 640-acre parcel situated at the far west end of the 'Ewa Plain. Known as West Beach, the area was subjected to intensive inventory survey and test excavation work that resulted in the identification of 181 component features at 48 sites (Davis and Haun 1987). Sites included habitation complexes, both with and without architectural features, gardening areas, and primary and secondary human burials. Typical features included trash dumps, large cairns, and numerous modified sinkholes, some containing cultural refuse. Dating results suggested that occupation was concentrated in the latter centuries of the prehistoric sequence. However, samples from some rockshelter sites and cultural deposits identified near an old buried marshland suggested use as early as the period of initial Polynesian settlement of O'ahu and, possibly, during the period of initial Polynesian settlement of the Hawaiian Islands overall. The West Beach project thus yielded the first clear evidence of early occupation within the leeward zone of O'ahu.

Recommendations for additional data collection work and data recovery excavations for the West Beach project area were formalized in the fall of 1986 in a Data Recovery Plan (Davis, Haun, and Rosendahl 1986b).

The fieldwork was completed before the end of 1987, and laboratory and other analyses were undertaken during the subsequent three years. The results provide a picture of the overall spatial patterning of settlement on the west end of the 'Ewa coastal plain. It appears that there was a long initial settlement period, based on a high degree of marine-oriented task specialization. Marine task specialization continued into later settlements, but terrestrially oriented activities increased. This shift in activities suggests a concomitant shift from a very dispersed temporary occupation to a loosely nucleated one involving extended periods of residence. This nucleation apparently depended upon a functionally (task) integrated household where membership was both kin- and task-based.

Concurrently with implementation of the West Beach project, PHRI undertook additional inventory survey work above Pearl Harbor's West Loch (Dicks, Haun, and Rosendahl 1987). The City and County of Honolulu proposed residential community and golf course developments on 216 acres located within the lower and upper valley segments of Honouliuli Gulch. Although agricultural and other disturbances to the project area were extensive, seven sites were identified—including both historic and prehistoric habitation and burial sites situated on Hoaeae Point and on the slopes and uplands surrounding the Honouliuli Stream flood plain. Among the recorded features were the remnants of a once extensive agricultural system that combined aquaculture in fishponds situated on the shores of West Loch, irrigated pond field cropping of the flood plain, and dryland cultivation of the surrounding slopes and uplands. Laboratory analysis findings and radiocarbon dates from these features suggested that the cultural sequence in the West Loch area spanned the past 1,000 years.

Additional data collection was recommended for six of the seven West Loch Estates and Golf Course project area sites. This work was undertaken in 1988 and 1989. Generally, the findings supported initial testing results, and indicated that agricultural use of the Honouliuli Stream flood plain for pond field cultivation of taro may have begun in the lower valley as early as AD 1000 (Charvet-Pond, A., and B.D. Davis 1992). Initial dates on the lower valley pond field systems range from c. AD 1100-1600, with dates from the upper valley pond fields suggesting cultivation of that portion of the project area beginning c. AD 1400-1500. Intensification of agriculture thus appears to coincide temporally with similar events documented at numerous other sites on O'ahu and elsewhere in the Hawaiian Island chain. Pond field cultivation in some areas may have continued into the early twentieth century, with rice crops replacing the earlier taro cultivation in historic times. Sugar cane cultivation has largely obliterated pond field systems in much of the 'Ewa plain.

The Bishop Museum conducted a reconnaissance level survey to identify and evaluate cultural resources at Barbers Point Naval Air Station (Haun 1991). One goal of the study was to predict the effectiveness of low-, medium-, and high-intensity surveys in identifying all cultural resources in a given area. Haun predicted that the areas covered by low-intensity surveys (60 m transect intervals) would identify 57% of the sites; medium-intensity surveys (30 m intervals) would identify 71% of the sites; and high-intensity surveys (10 m intervals) would identify 88% of the sites. Most of the 42 sites found in Haun's survey comprised native Hawaiian features

Several Cultural Resources Management (CRM) projects have taken place on the Barbers Point Naval Air Station since 1990. At the time of PHRI's inventory survey of the Ewa Marina Community project area, P. Miller (1990) recorded a burial found during construction at Nimitz Beach, west of Site 3201. The burial was an adult male found in a flexed position. Two years later, PHRI (Burgett and Rosendahl 1992) conducted a small inventory survey and testing project at the proposed contaminated soil stockpile/remediation facility on the NAS, locating several sinkholes and native Hawaiian sites. That same year, Ogden conducted a reconnaissance and limited testing project in the Family Housing Construction Area of BPNAS (Landrum, Williams, and Schilz 1993). This was on land that had been previously surveyed at a low-intensity by the Bishop Museum (Haun 1991). Ogden found considerably more features in this area than the 57% predicted in Haun's model, concluding that the earlier low-intensity survey found only 15% of the sites and 8% of the features within their survey area. In 1993, IARII (Jones 1993, Tuggle 1994) conducted Phase I reconnaissance and Phase II inventory and testing at several proposed construction projects in the northwestern portion of the BPNAS. These projects resulted in the identification of native Hawaiian sites comprising habitation structures, agricultural mounds, and modified sinkholes. Most features appeared to date to late in the pre-contact period.

In the early 1990s, IARII submitted two documents in conjunction with the proposed closure of Barbers Point Naval Air Station (BPNAS). The first is a synthesis of the cultural resource studies of the 'Ewa Plain (Tuggle and Tomonari-Tuggle 1994a); the second is an assessment of the cultural resources of the BPNAS,

with a proposed inventory research design (Tuggle and Tomonari-Tuggle I 994b). The former document synthesizes data on feature identification and function, chronology, and settlement patterns for the 'Ewa Plain, presenting this information in terms of regional research issues. Proposed models for Hawaiian settlement are presented, and paleoenvironmental changes, as represented by the stratigraphic record, are discussed. The latter document focuses on previous research on the BPNAS, and makes recommendations for additional work.

In 1988, in the eastern portion of Honouliuli, the Bishop Museum conducted a subsurface survey of 1,016 acres for the proposed Ewa Gentry development (Davis 1988a). Of this area, c. 86% had been cultivated in sugar cane for many years. All but one backhoe trench in Davis' extensive testing program resulted in negative cultural findings. Davis found dispersed charcoal deposits in his Trench 3. The charcoal returned a radiocarbon date of 1580+/-70 years BP. Davis suggested that the carbon sample was of natural origin. IARII (Davis and Burtchard 1991) conducted an archaeological inventory survey of 36 acres at the proposed PPV Housing Area in the West Loch Unit of the Lualualei Naval Ammunition Depot, in Puuloa. No cultural resources were found; this was probably due to past land alterations. Ogden performed a cultural resources overview survey of several U.S. Naval facilities on O'ahu (Landrum, Drolet, and Bouthillier 1993). The survey compiled information on 197 previously identified sites, comprising 1,020 recorded features and 400 reported, but not recorded, features. The West Loch Branch of the NAVMAG was one of the facilities assessed in this study.

ACH conducted archaeological inventory and data recovery programs at the site of the proposed Puuloa golf course (Kennedy, Berlin, and Denham 1992; Kennedy and Denham 1992). Their project area was located immediately to the southwest of the NAVMAG-West Loch facility. Seventy-two sites were identified. Most of these were single, isolated features, comprising primarily low-stacked clearing and agricultural mounds, habitation enclosures and C-shapes, and modified and unmodified sinkholes. Radiocarbon assays indicated occupation dating to as early as AD 1020. Kennedy and Denham suggest a subsistence shift from avian to marine resources sometime after AD 1280, and posit that this resulted from decreased bird populations.

Ewa Marina Community Project Area

Prior to the present project, several projects have been conducted in the project area. The initial archaeological research was undertaken by the Bishop Museum (Jourdane 1979), who conducted a reconnaissance survey of the portion of the project area east of the old poultry farm (Area A) and a portion within the project area land to the west of the poultry farm (Area B). At the time, the land surveyed by the Bishop Museum was slated for agricultural use. Over 60% of Jourdane's survey area lay in cane lands to the north of the present data recovery project boundary, but within the present Ewa Marina Community project lands. Jourdane found eight sites within this parcel, none of which were located in the cane fields. In her brief examination of the Area B lands, Jourdane noted that Area B appeared to have a higher density of sites than the mostly disturbed Area A.

Shortly after Jourdane's survey, Hawaii Marine Research, Inc. was contracted to perform a survey of all of the proposed Ewa Marina Community lands (Davis I 979c). The level of this work may be described as "intensive reconnaissance." While most archaeological sites were identified, Davis admitted that due to vegetation cover and budgetary constraints, features were probably missed and the level of recording of the identified features varied considerably. Davis broke the project up into four survey zones. Zone I included the wetlands and cluster of sites immediately east of the BPNAS boundary (64 features); Zone II extended east from Zone Ito the now-defunct chicken farm north of One'ula Park (34 features); Jourdane's reconnaissance lands were designated Zone 111(9 features); and the disturbed sugar cane lands to the north were designated Zone IV. Altogether, Davis identified 107 features in the portions of the project area not in sugar cane cultivation. Consistent with Jourdane's observations, Davis found that Zone II was extremely disturbed, containing old roads, an active pig farm, and modern gardens.

Hommon and Ahlo (1983) conducted a subsurface reconnaissance of the portions of the Ewa Marina Community project area that had been planted in sugar cane, with negative findings. In 1984, because five years had elapsed and the integrity of the features may have been altered, Cultural Surveys of Hawaii (CSH) was contracted to perform a reconnaissance and updated assessment of the lands surveyed by Davis (Hammatt 1984). The purpose of the survey was to relocate a sample of Davis' features and evaluate their significance in order to make mitigation recommendations for the project area. Hammatt evaluated the research potential of the area in light of the archaeological research that had taken place in the previous years at the Deep Draft harbor.

CSH relocated 33 of Davis' features (eight sites), finding these features in relatively unaltered condition. Hammatt recommended further study for those features that would be impacted by the development.

Five years later, CSH returned to the Ewa Marina Community locale to prepare an assessment of the Phase II development lands (Hammatt and Shideler 1989), in the north and northwest portions of the proposed development. These lands include portions of the present project area. Hammatt and Shideler reexamined the features identified by Davis (1979b) in the Phase II lands, recommending intensive survey and testing of the area.

The current project area is encompassed by a larger project area which was the focus of intensive archaeological survey and test excavations in 1990, within the One'ula Archaeological District (SHIP Site 50-OA-2873) (Dunn and Haun 1991). During the fieldwork, 53 sites consisting of 312 features were identified. The sites ranged in physical condition from poor to good and consisted of both single and multiple features. The features consisted of the following formal types: adjoining C-shape structures, adjoining enclosures, alignment (C-shape, linear, L-shape, rubble, and U-shape), cairn, concrete slab, concrete structure, C-shape structure, cupboard, enclosure (w/adjoining C-shape, w/adjoining platform, U-shape), incomplete structure, midden scatter, modified bedrock, modified sinkhole, mound, platform, rubble concentration, terrace, wall. Functional types present included agriculture, animal husbandry, bunker, ceremonial, footing, foundation, garden plot, habitation, incinerator, indeterminate, marker, temporary habitation, and well.

Sixty one test units, 122 informal shovel tests, and 24 backhoe trenches were excavated during the course of this fieldwork in the *kiawe* forest and cane fields *mauka* of the current project area, and 86 auger holes were also placed along the coastal area (the area of the current project). No substantial cultural deposits were identified during the auger hole testing. A total of 176 out of 247 sinkholes were tested, and they yielded bird bone, and occasionally, midden and charcoal. No cultural deposits were uncovered in any of the trenches. The combined units contained cultural materials-portable artifacts, midden and dating samples. The dating samples ranged from 1290 to recent times. The portable artifacts consisted of indigenous artifact types such as fishhooks, octopus lures, a hammerstone, an adze fragment, and flaked stone. Non-indigenous artifacts were of recent age and included glassware, metal items, plastic items and ceramics (Dunn and Haun 1991).

During the Phase II(a) data recovery program (Franklin et al. 1995), within the same project area, an additional 92 units were excavated, primarily on sites previously tested during the intensive archaeological survey and test excavations in 1990. During these excavations, ecofactual remains recovered consisted of marine shell, fish bone, bird bone, mammal bone, and botanical remains. Marine shell remains represent a wide variety of species, comparable to those found in the testing phase. Artifacts included stone debitage (exotic basalt and volcanic glass, and locally available limestone), bone and shell fishhooks and gorgets, bone awls, coral abraders modified shell fishhook tabs, and shaped basalt. Historic artifacts include bottles, pottery (earthenware, stoneware, and porcelain-some hand-painted), spent military ammunition, glass, can fragments, nails, barbed wire, and gate parts (Franklin et al. 1995).

SETTLEMENT PATTERNS

The earliest archaeological evidence for settlement of O'ahu and the Hawaiian Islands dates to about AD 300-500 (Kirch and Kelly 1975; Pearson et al 1971; Schilt 1980). The settlers who came at that time originated from an unspecified island in Eastern Polynesia. Initial settlement is believed to have occurred along the wetter and more fertile windward coasts where "conditions were optimal for marine and terrestrial exploitation along lines followed previously in Eastern Polynesia" (Green 1980:1). This exploitation involved a variety of techniques for obtaining fish and shellfish from the sea, gardening, animal husbandry, and utilization of the natural terrestrial flora and fauna (Kirch and Kelly 1975; Pearson, et al.: 1971).

The settlement pattern consisted of a series of widely spaced, permanent home settlements that are thought to have gradually given way to a nearly continuous series of settlements located along the windward coasts as the population grew. Leeward settlement is believed to have begun only after windward areas were settled. It is currently unclear whether the earliest leeward coastal settlements were permanent or seasonal/temporary. Settlement of inland leeward areas, at least on a permanent basis, is thought to have occurred

only after the development of inland dryland agricultural techniques. Evidence currently available indicates that inland leeward settlement did not occur until 600 to 900 years after initial settlement, or between about AD 1100 and 1400 (Green 1980; Hommon 1976).

Hypothetical reconstructions based on data from archaeology, linguistics, and ethnology suggest that early Hawaiians were organized in a typical Polynesian conical clan pattern, in which individual status was based on genealogical ranking (Green 1980:72). Kinship formed a basis for regional and island-wide societal integration; however, the most important social subsistence unit was the localized territorial community-based corporate kin group. Leadership within this group fell to the "highest ranking individual of the locally dominant, socially ranked lineage" (Green 1980:73). This individual acted as the local chief, overseeing the social, political, and economic functioning of the community.

The subsequent development of a uniquely Hawaiian innovation, the *ahupua'a*, resulted in a more complex level of social and political integration (Hommon 1976; Green 1980). The *ahupua'a* is a traditional Hawaiian land division ideally extending from the coast to the mountains, often corresponding with a valley drainage. The chief or manager (*konohiki)* of an *ahupua'a* extracted rents or tribute from the people (commoners or *maka'ainana*) who worked the land. The chief was a member of a non-localized ruling elite (*ali'i*). Thus, the earlier kinship-based relationship between a chief and his local community no longer existed, and this new Hawaiian socio-political organization has thus been classified as a complex chiefdom or primitive state.

Green's (1980) summary of the prehistory of Makaha Valley and the probable pattern of adaptation by Polynesians to the Hawaiian high-island ecosystem is of direct relevance for understanding the prehistory of the Ewa coral plain area in general. Makaha prehistory begins with a hypothesized coastal settlement in the late first millennium AD. Although the nature of coastal settlement is unknown, because of land modifications and the lack of archaeological investigations on the coast, it is believed to have consisted of habitation structures associated with nearby garden areas (Green 1980:74). Marine exploitation is thought to have played a prominent role in the subsistence economy, and the presence of a small *heiau* in the area has been interpreted as reflecting a lineage-based system of local chiefly leadership.

Some time between the 12th and 14th centuries, if not before, cultivation of inland areas began. Dryland field systems, marked by stone walls, appear to be associated with small field shelters (C-shapes and other enclosure types) that were used on a temporary basis by people tending the fields, who lived permanently in the coastal settlement (Green 1980). Irrigated terrace systems were in use by the 15th century in the uppermost part of Makaha Valley. Permanent inland settlement is thought to have begun by this time (Green 1980:76). There is abundant evidence for permanent inland habitation during the 17th century, including rectangular dwellings, religious structures (stepped-stone platforms, shrines, and other specialized architecture). Large-scale construction of irrigation works and the rebuilding and expansion of an inland *heiau* at Makaha indicate that, by the mid-1600s, this area had become an *ahupua'a* unit in the "larger scale, complex rank social systems typical of Hawai'i at the time of contact" (Green 1980:76).

While the conditions on the western Ewa coral plain are considerably drier than those at Makaha, many of the archaeological remains reported from the lower valley have also been found in the coastal zone of the Ewa region, and may represent associations generally similar to those suggested above for coastal Makaha. At the west end of the Ewa coral plain, Honouliuli gulch and stream is much closer to Makaha, and it is likely that the Makaha pattern was generally duplicated within this area. Recent research provides some evidence in support of this contention (Jensen et al. 1988), although the extensive agricultural-related and other disturbances to the area have undoubtedly destroyed numerous features dating to the 14-17th centuries, while others have probably been deeply buried by extensive sediments washed down from the Waianae Range to the north.

The Ewa coral plain comprises the seaward portion of Honouliuli, the largest *ahupua'a* on the island of O'ahu. At the time of European contact, the *ahupua'a* was the basic aboriginal land division, extending from the central uplands of the island down to the sea, and crosscut the various concentric island ecozones exploited by the Hawaiian people. Each *ahupua'a* thus theoretically incorporated sufficient resources to provide its inhabitants economic self-sufficiency.

The manner in which the *ahupua'a* economic unit was operationalized has long been a topic for discussion, and has led to the formulation of two alternative models for Hawaiian patterns of residence. One position argues for the redistribution of terrestrial and marine resources between permanently resident inland coastal components of the *'ohana,* or the Hawaiian extended family (Handy and Pukui 1972). The other model suggests that the re-distributative network may not have involved goods, but rather people, with all or a majority of the productive population moving back and forth between the uplands and the coast (Rosendahl 1972). Population movements and settlement patterns could have followed a predictive seasonal round, or occurred on a more frequent and opportunistic basis, depending upon the degree of seasonal variation expressed in the environment and the logistical problems involved. Alternatively, it should also be considered that these are not necessarily mutually exclusive strategies. Both may have functioned in the same territory, given local or regional conditions, at any point in time.

HISTORICAL DOCUMENTARY RESEARCH

Helen Wong Smith, Cultural Historian, provides the historic documentary research for the current project (see *Appendix A*; taken and adapted from Dunn et al. 1991). Smith' appendix provides information concerning legends and pre-contact history, post-Contact history, land tenure, the plantation and the railroad, social change at Ewa Plantation, crops, and coastal marine resources in the vicinity. She also provides information on the Honouliuli Forest Reserve and Government occupation of the area.

IMPLICATIONS/EXPECTATIONS FOR THE CURRENT PROJECT

There had been one previous discovery of human skeletal remains in the project area, in January 2001, and another prior to that, in September 1992. The former remains were certainly within the project area. The latter may have been, but this is uncertain because the location of the remains was not recorded. During the previous archaeological survey within the current project area, 86 auger holes were placed (Dunn and Haun 1991). No human skeletal remains or prehistoric cultural deposits were recovered in the sand dune deposits or elsewhere within the current project area. Coupled with other considerations, such as topography and subsurface composition, it was therefore thought likely that the two prior discoveries were isolated instances, and that the discovered burials were not part of a larger group burial or *ilina* (cemetery), and that no further human skeletal remains or cultural deposits would be revealed during the course of the current excavations.

FIELD METHODS AND PROCEDURES

The fieldwork for the current project was conducted on March 30 and 31, and April 1-3, 2004 under the supervision of PHRI Supervisory Archaeologist Alan B. Corbin, M.A., and under the overall direction of PHRI Principal Archaeologist Dr. Paul H. Rosendahl. Dr. Rosendahl was on site to supervise the initiation of the fieldwork on March 30, 2004. Assisting on the project was PHRI Assistant Field Archaeologist/Senior Editor Leonard Kubo.

Prior to fieldwork the bounds of the Marina and Kalo'i Drainage channels were flagged by surveyors, and the locations of the burial identified in January 2001 was located (GPS) and staked in the field. Also staked was the estimated location of the burial identified in September 1992. The following methodology was employed to test the Kalo'i Drainage Channel Area:

1. A backhoe with a 2'4" bucket was employed to excavate trenches;

2. PHRI employed a rectangular grid system that permitted controlled and systematic testing of the entire area (excluding a small area in the southeast corner of the parcel; sand deposits in this area were shallow, and there were two camper's tents erected in the area.) Backhoe trenches were spaced approximately 10.0 m apart (*Figure 2*);

3. All backhoe trenches were excavated to coral bedrock;

4. All backhoe trenches were individually profiled;

5. Two transect profiles were made (one north-south, and one east-west);

6. Selected backhoe trenches were photographed in color and black-and-white; and

7. All backhoe trenches were backfilled.

The following methodology was employed to test the Marina Channel area:

1. A backhoe with a 2'4" bucket was employed to place trenches;

2. Backhoe trenches were placed in areas of sand dune deposits and in the area of the inadvertent discovery of human skeletal remains on January 2001;

3. In order to sample all likely areas for human remains and cultural deposits, backhoe trenches were also placed in areas near the shore, and on both sides of the dirt coastal road;

4. Photographs of selected backhoe trenches were taken;

5. All backhoe trenches were excavated to coral bedrock;

6. All backhoe trenches were backfilled;

7. Three 1.0 m by 1.0 m hand excavation units were placed within a meter of the location of the inadvertent discovery of human skeletal remains on January 2001 (Test Units 1, 2, and 3). The units were hand dug, with trowel and dustpan, in conformance with the natural strata, with ten-centimeter arbitrary levels dug within identifiable natural or cultural layers. All excavated material was passed through ¼-inch hardware mesh. Test units were terminated on bedrock. Pre-excavation and post-excavation photographs were taken of each unit. Upon completion of the excavations, profile drawings of the units were prepared, and stratigraphic information was recorded following U.S. Soil Conservation Service guidelines and Munsell color notations. The test units were then backfilled.

FINDINGS

During excavation within the project area, no human skeletal remains or prehistoric cultural materials were identified. Twenty-seven backhoe trenches were placed in the Kalo'i Drainage Channel area, and 26 trenches were placed in the Marina Channel area (*Figures 3 and 4*). The subsurface of both project areas were greatly disturbed, as evidenced by the presence of large amounts of modern trash in the excavations. Modern trash from both the Kalo'i Drainage Channel area and Marina Channel area were similar and included paper, glass, metal and plastic fragments, bottle glass, rubber tubing, fragments of rope and cloth, aluminum cans, and fragments of wood, recent charcoal, and burnt wood.

Test Units 1, 2, and 3 placed in the Marina Channel area (*Figure 4*) also yielded abundant modern trash, including unidentified metal and plastic fragments, wood fragments, bottle and glass fragments, paper scraps, ceramic fragments, fishing line, a fishing weight, household keys, automobile lug nuts and parts, automobile rubber parts, metal nails, metal screws, metal washers, a Lincoln head penny (1974), a Roosevelt dime (1966), and recent charcoal. Small amounts of marine shell were also present in Test Units 1, 2, and 3. The shell constituted natural rather than cultural depositions, and therefore was not collected.

Thirteen recent pieces of faunal bone were recovered in the various trenches placed in both project areas. Much of the bone was machine cut and is probably from recent barbeques. *Table 1* summarizes the bone identified in the backhoe trenches.

Table1. Summary of Bone Identified in Backhoe Trenches

B.T. Number	Specimen	Number	Approximate Depth (cmbs)
2	Mammal (machine cut)	1	30-40
2	Bird (probably chicken)	4	30-40
16	Chicken	1	50
33	Dog	1	50
34	Mammal (machine cut)	1	40
34	Bird (probably chicken)	1	40
47	Dog	4	10-20
		Total 13	

BACKHOE TRENCHES

As mentioned, backhoe trench stratigraphies in both the Kalo'i Drainage Channel and Marina Channel areas were heavily disturbed with recent trash. No human skeletal remains or prehistoric cultural materials were identified in any of the trenches. *Figures 5-10* are photographs of the walls of selected backhoe trenches. *Figures 11-18* are representative profiles of selected backhoe trenches. Mixing of sand due to past storm and wave action was evidenced in all trenches, manifesting as gradients of shade and color. Three primary layers of sand were observed (a Laver IV, although rare, was revealed in three examples from the Kalo'i Drainage Channel area). All three were structureless; fine; granular; loose, non-coherent; non-sticky, and non-plastic:

Type I: yellowish brown (10YR 5/4)
Type II: light grey (10YR 7/2)
Type III: light brownish grey (10YR 6/2)

In addition, an additional greenish grey layer was identified in a few trenches:

Type IV: Greenish grey (6/1; chart 1 for gley)

Appendix B describes the stratigraphies of all trenches and correlates layers with the various soil types.

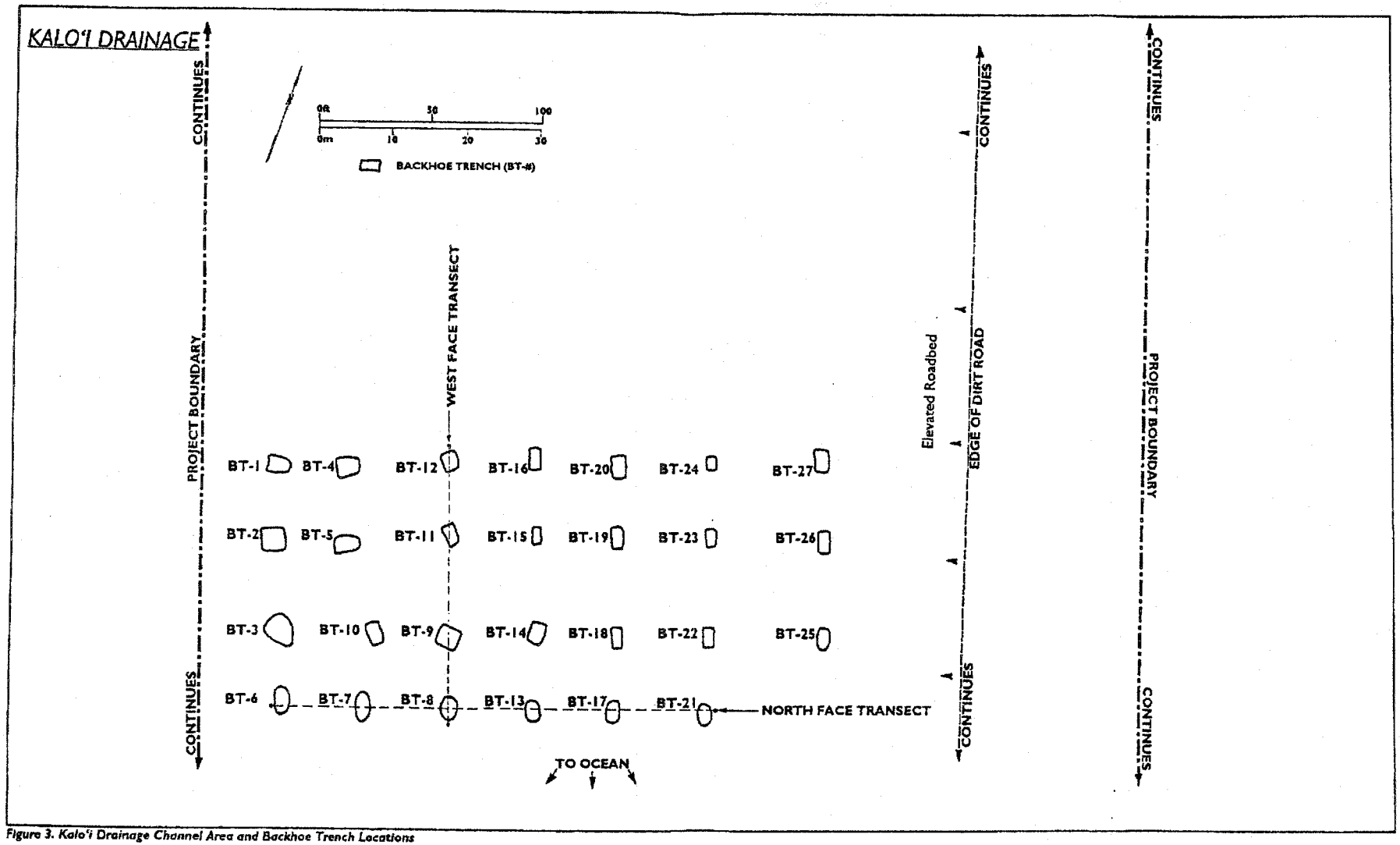


Figure 3. Kalo'i Drainage Channel Area and Backhoe Trench Locations

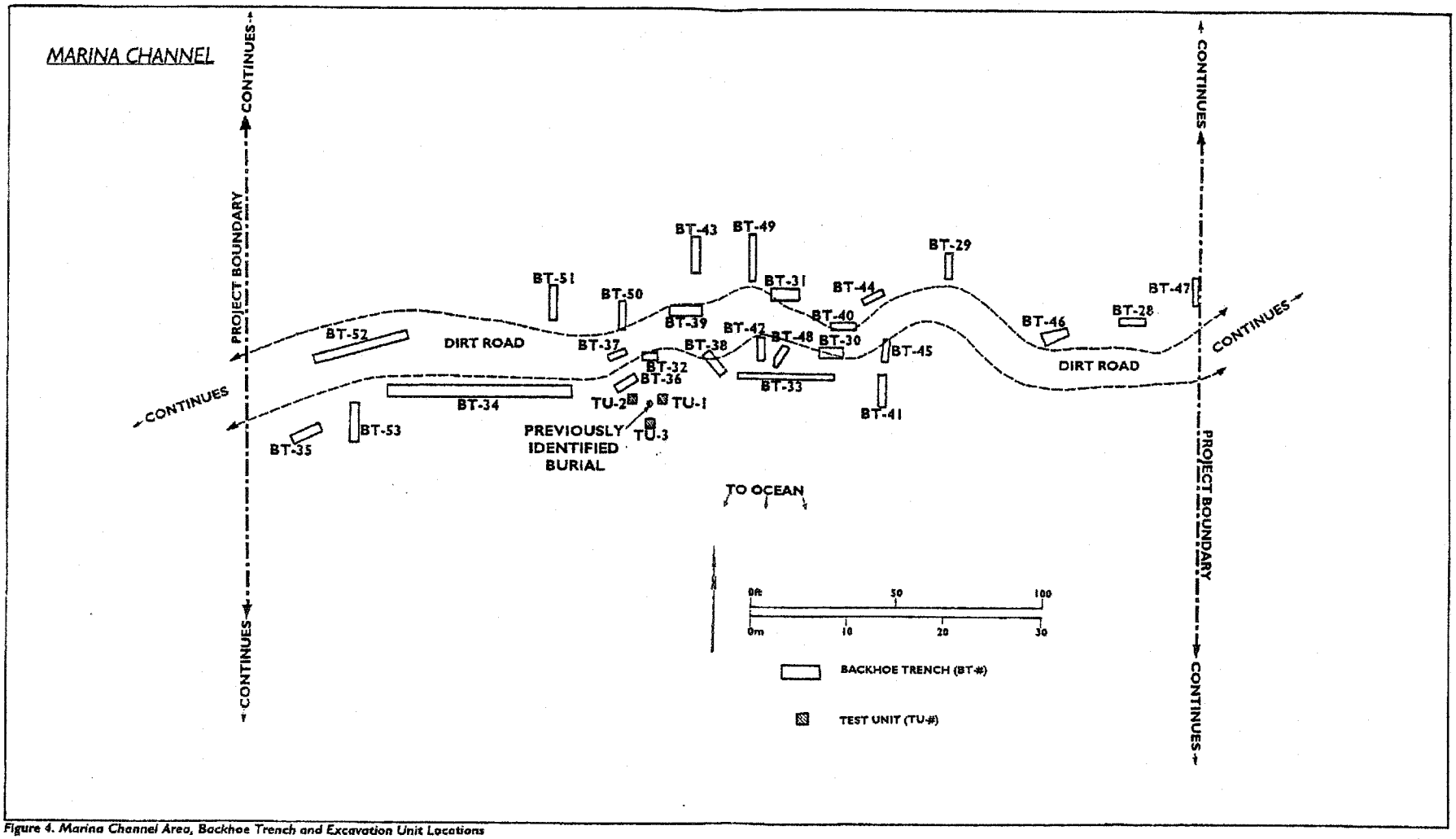


Figure 4. Marina Channel Area, Backhoe Trench and Excavation Unit Locations

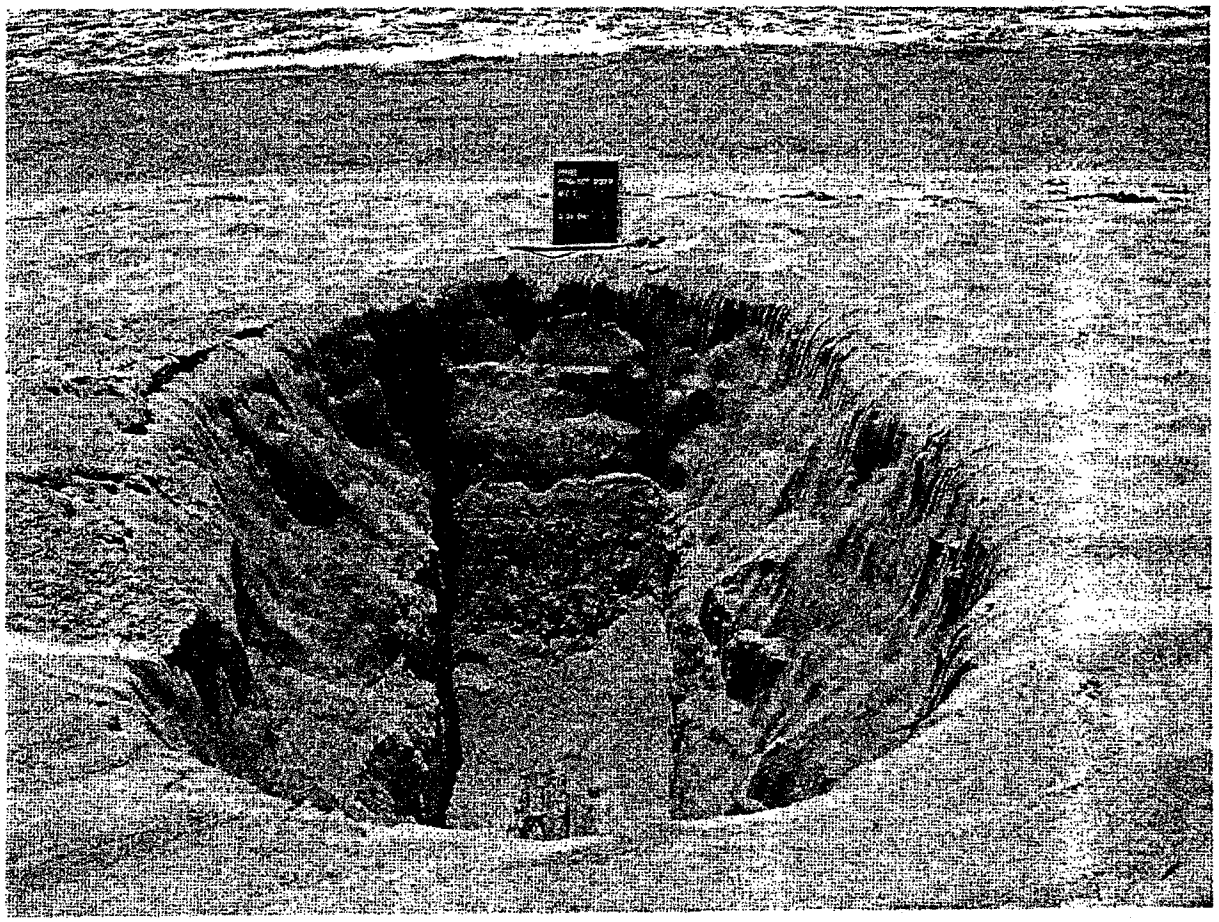


Figure 5. Backhoe Trench 7, View to Southeast

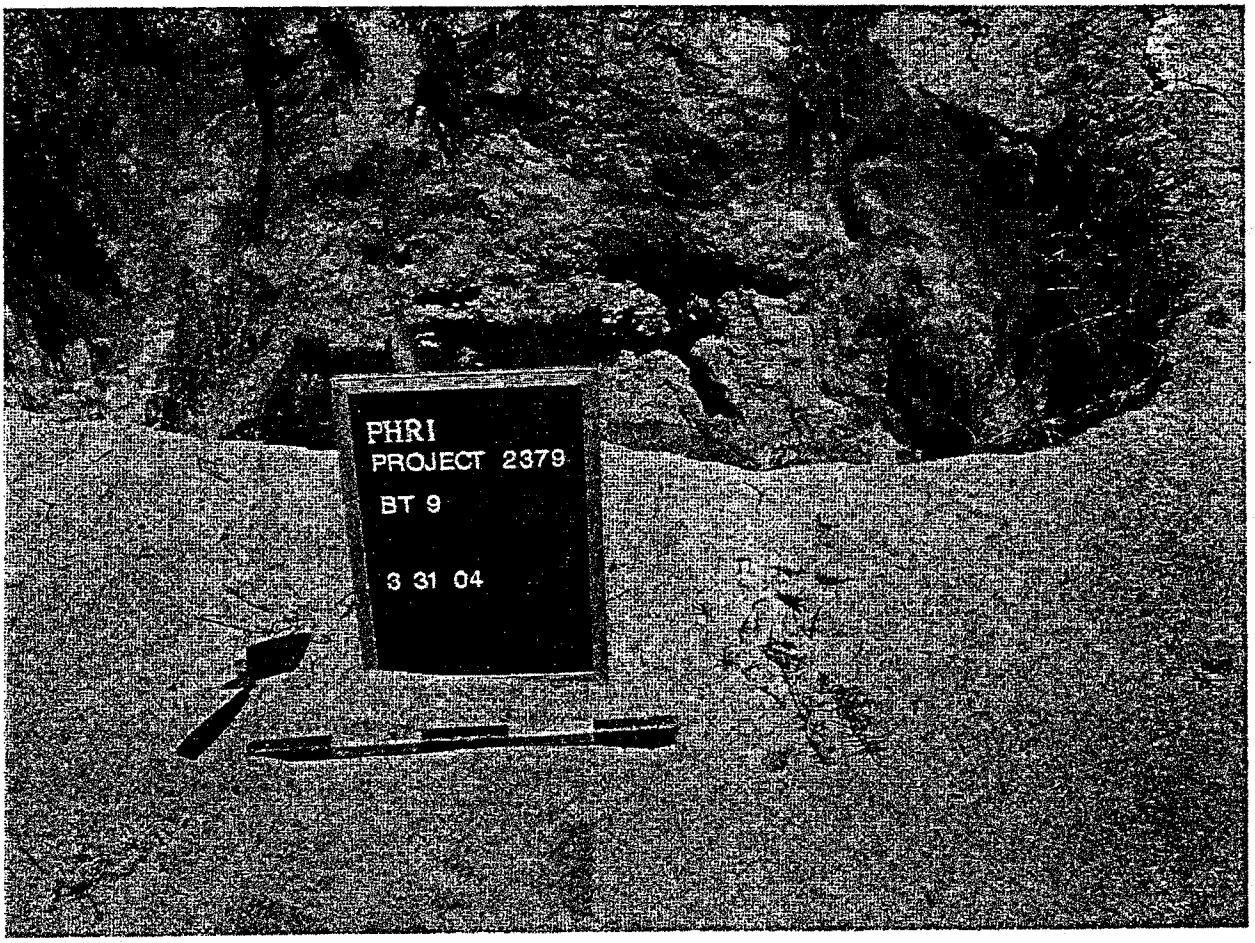


Figure 6. Backhoe Trench 9, View to North

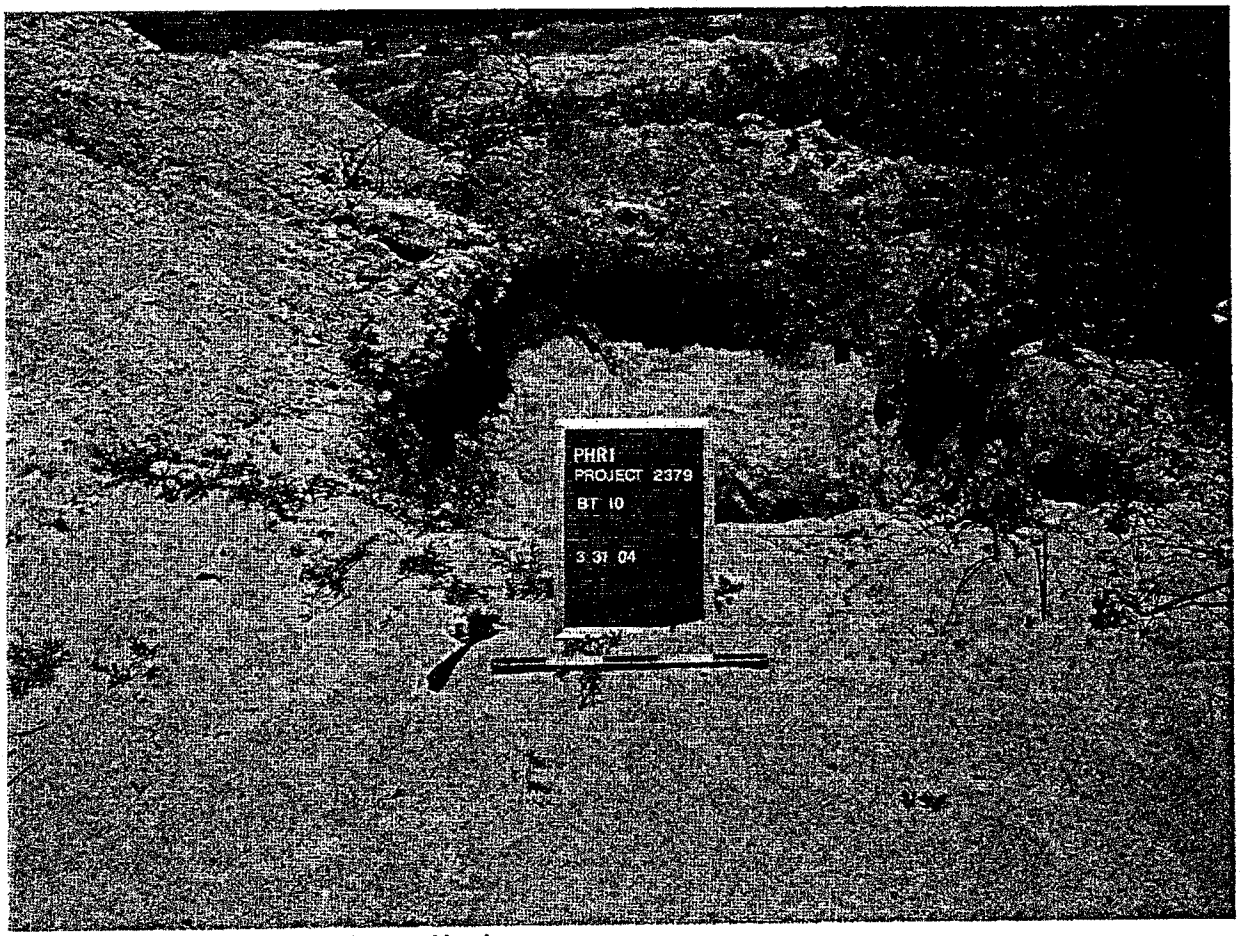


Figure 7. Backhoe Trench 10, View to North



Figure 8. Backhoe Trench 33, View to Southwest

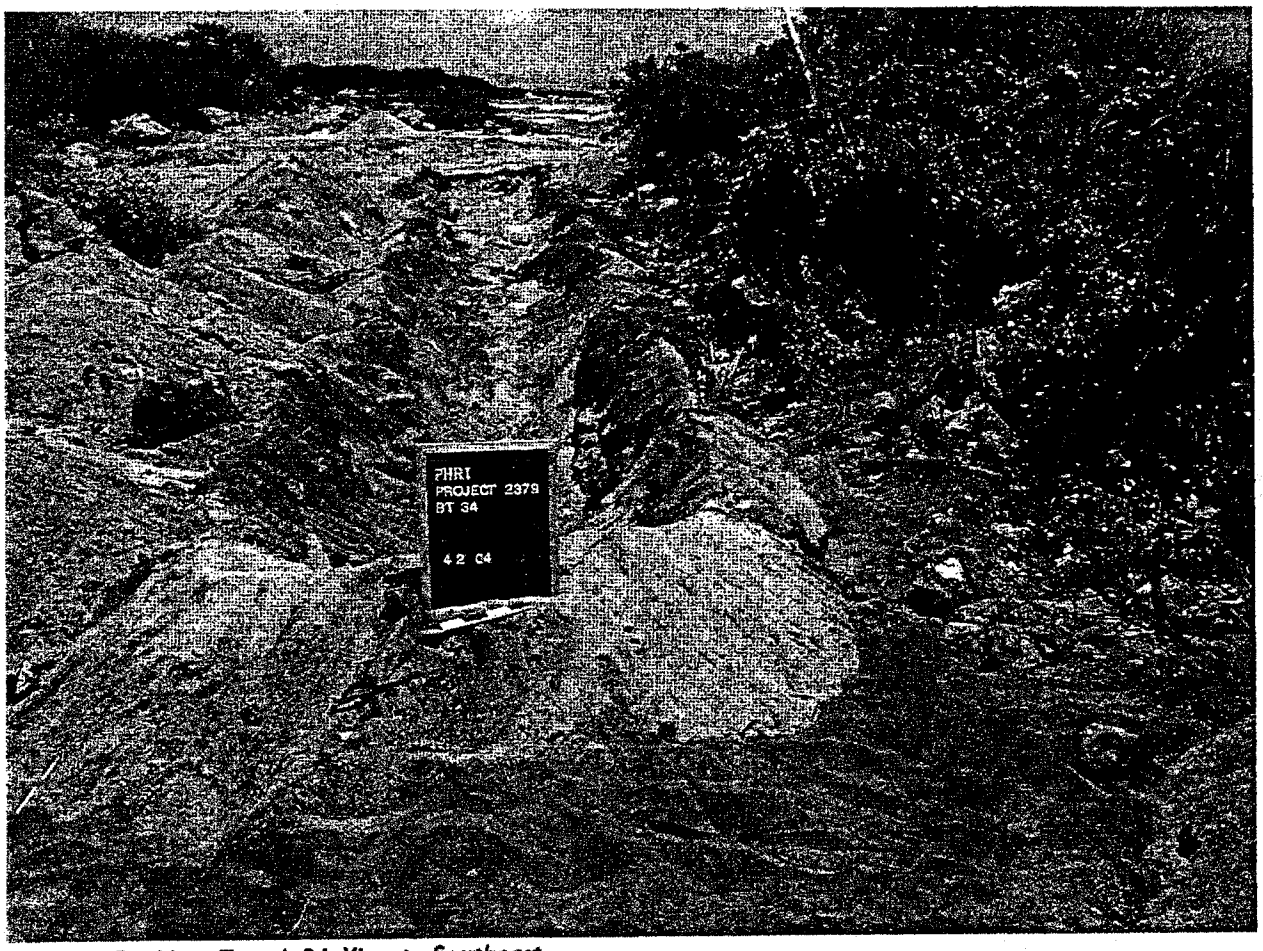


Figure 9. Backhoe Trench 34, View to Southeast

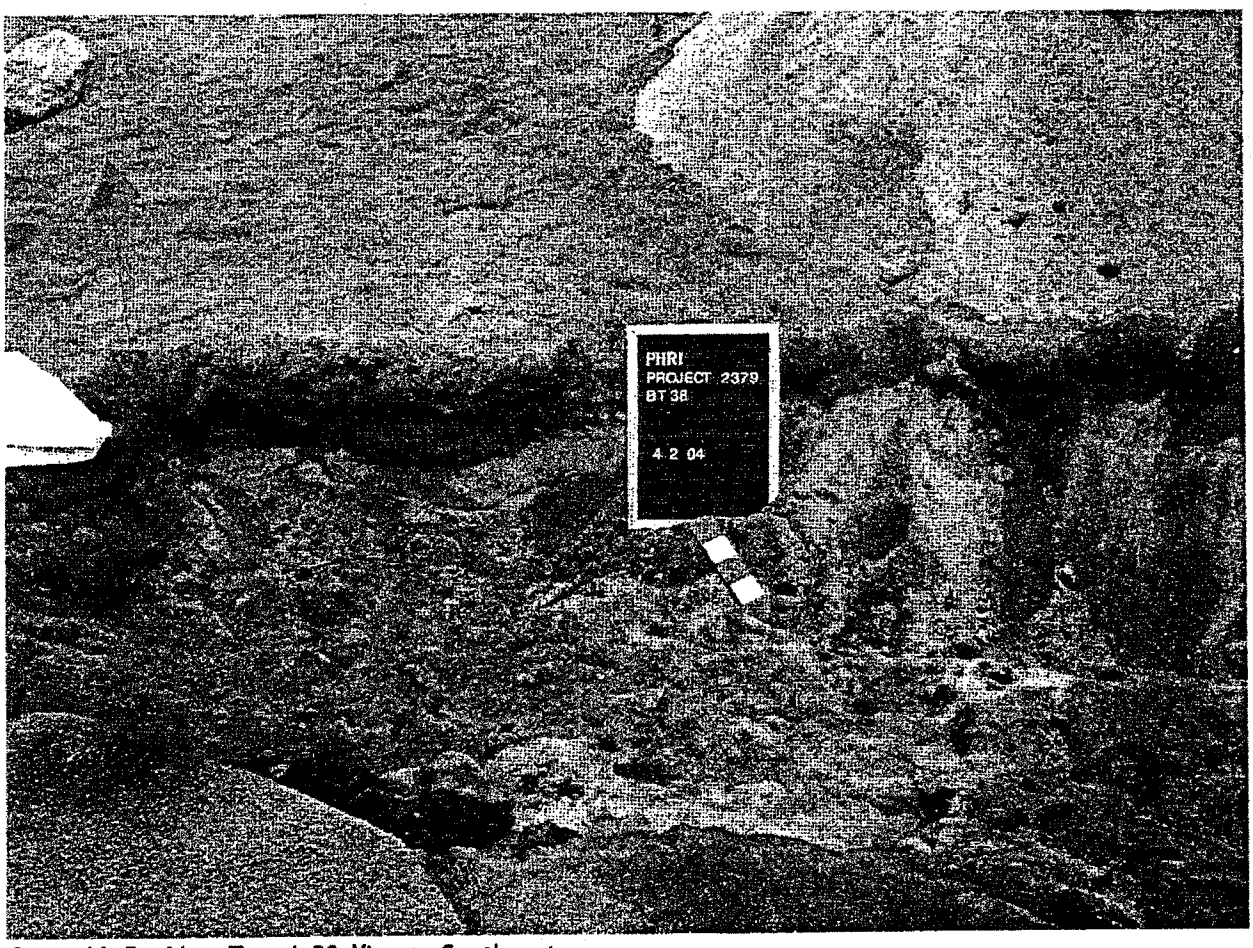


Figure 10. Backhoe Trench 38, View to Southwest

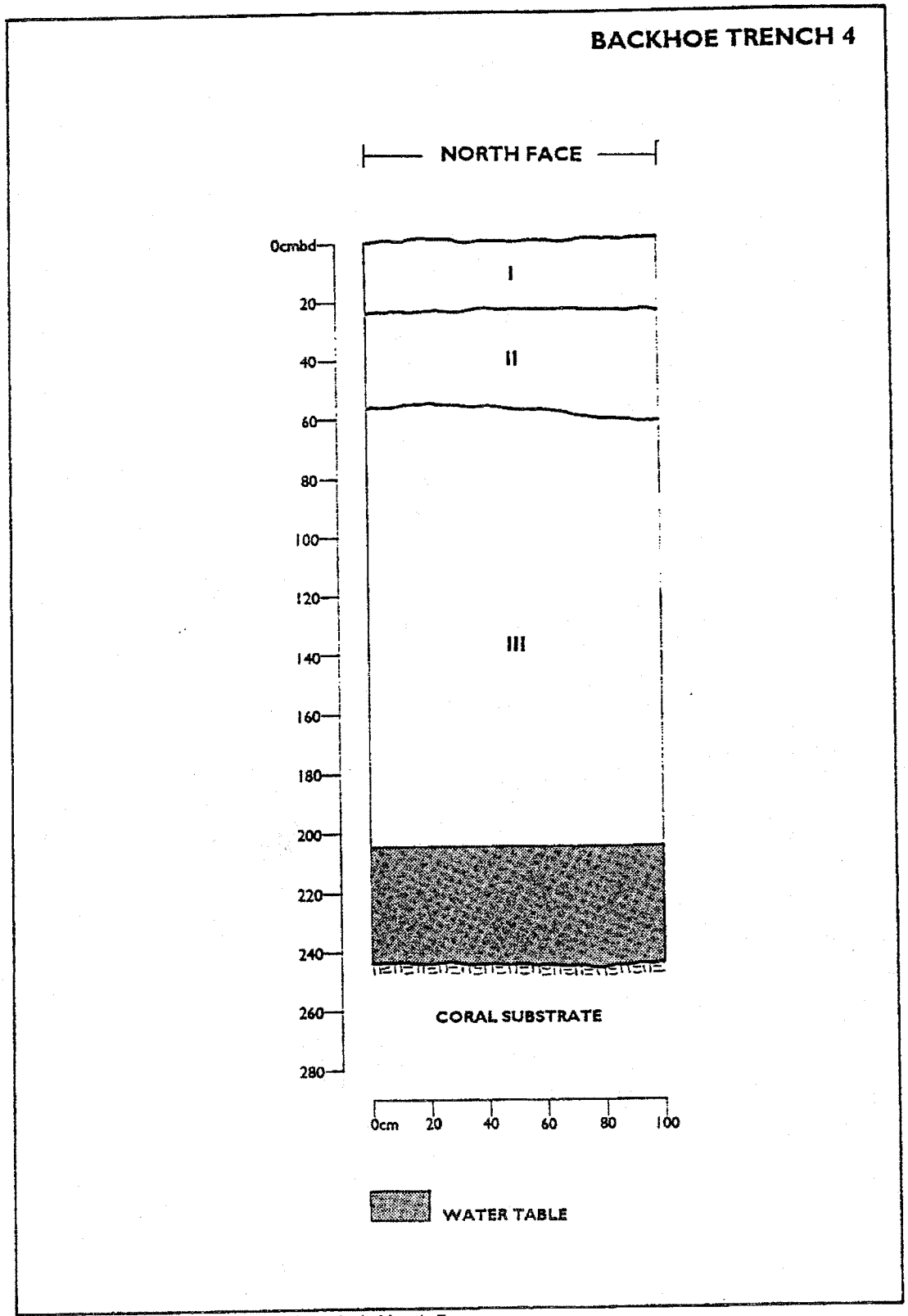


Figure 11. Profile of Backhoe Trench 4, North Face

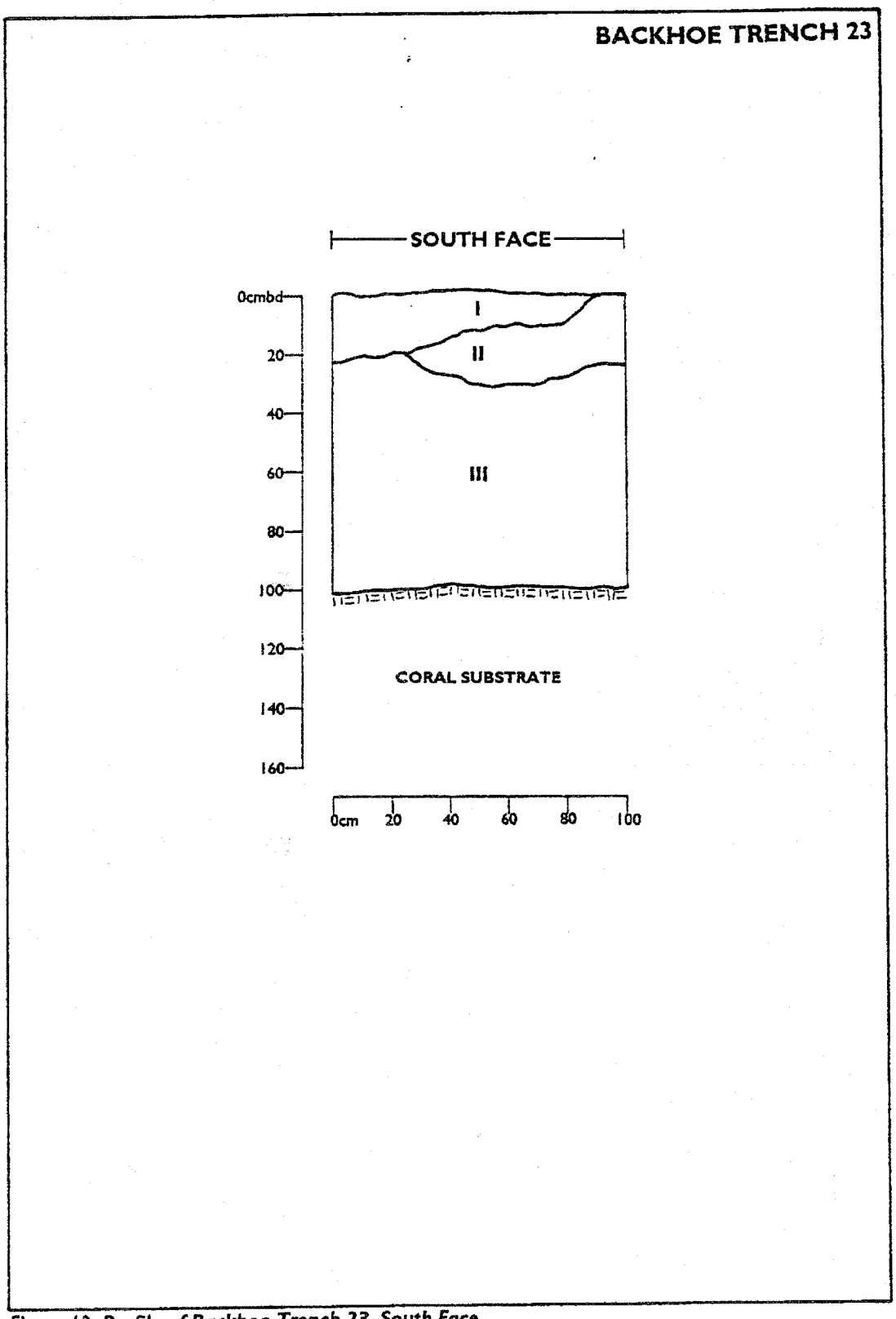


Figure 12. Profile of Backhoe Trench 23, South Face

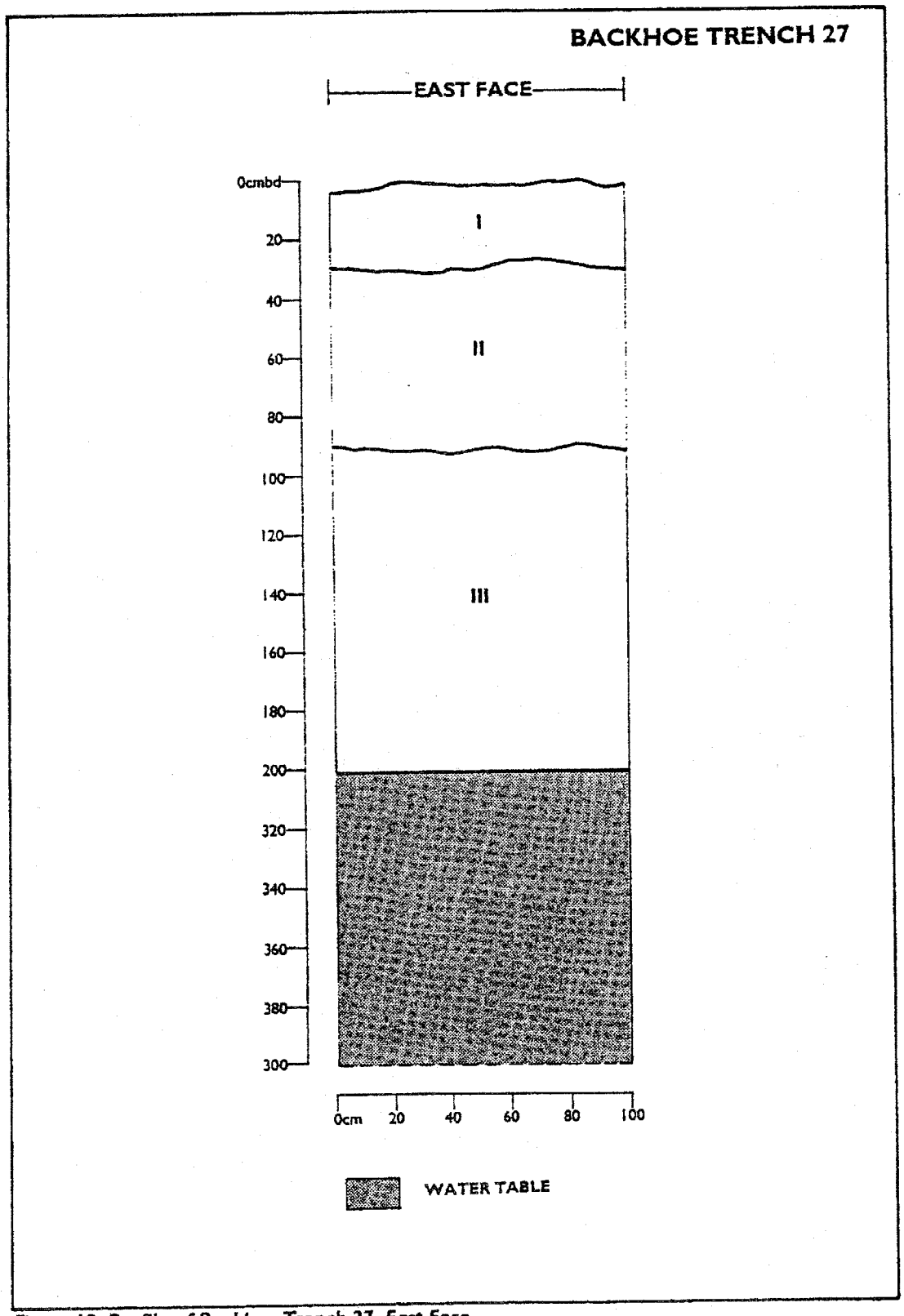


Figure 13. Profile of Backhoe Trench 27, East Face

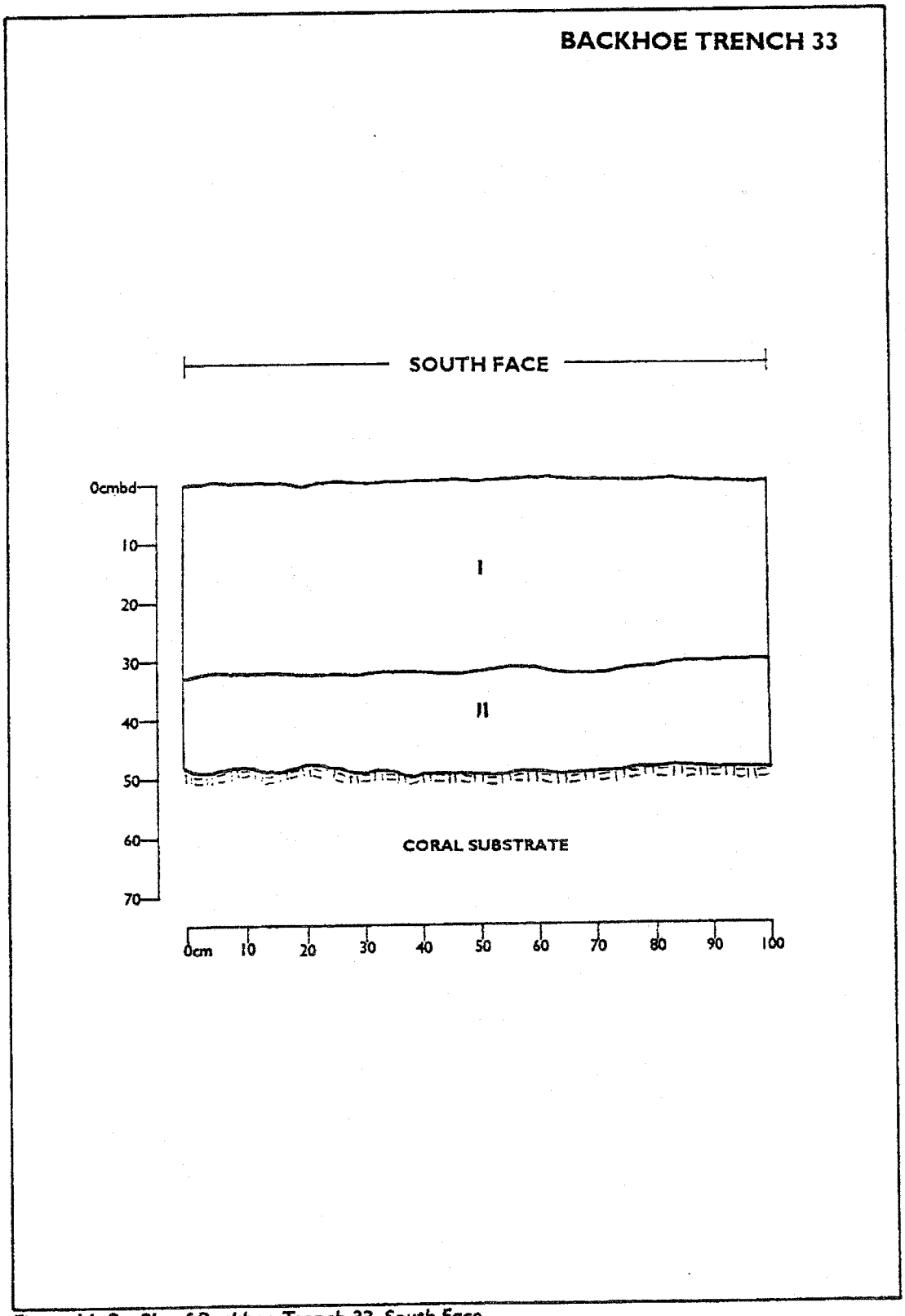


Figure 14. Profile of Backhoe Trench 33, South Face

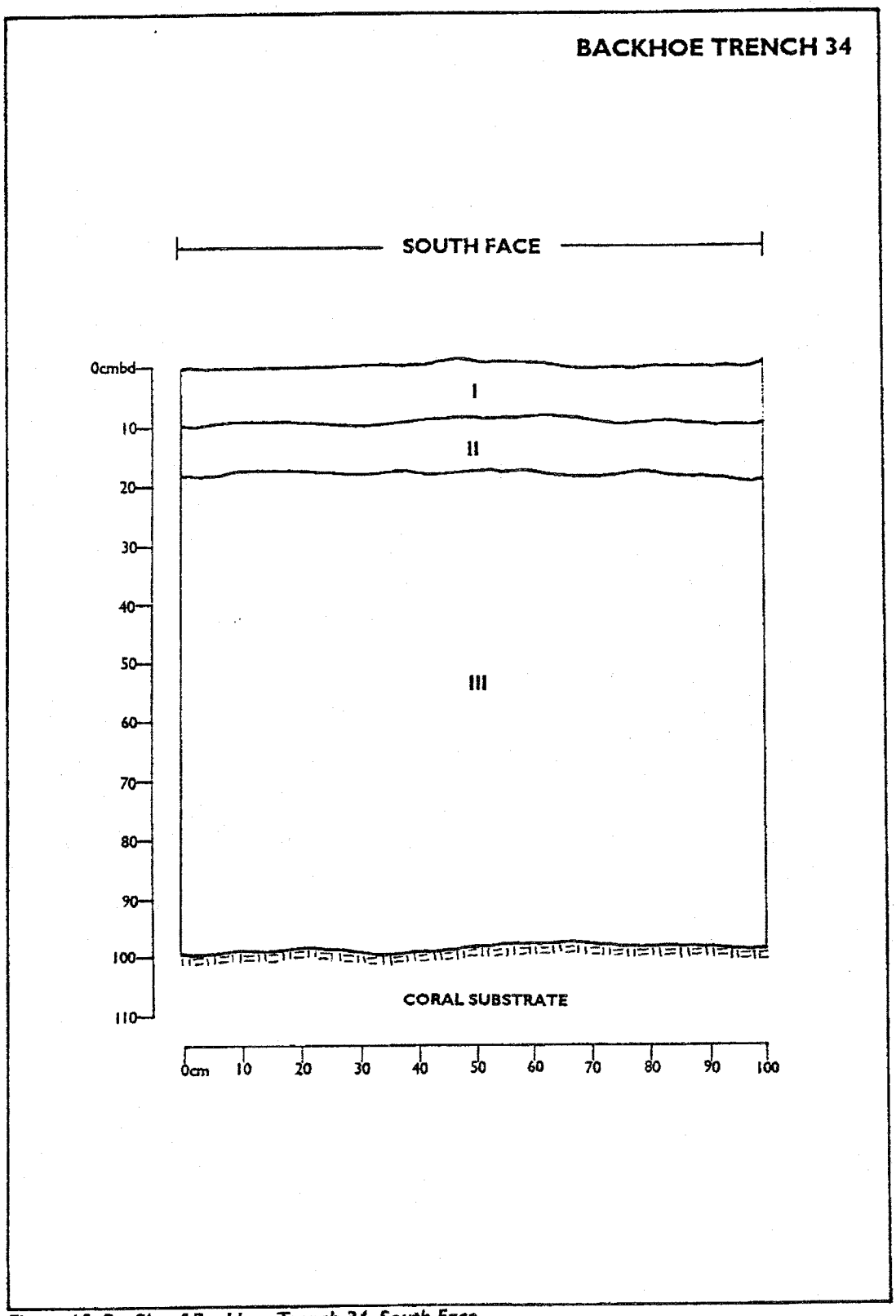


Figure 15. Profile of Backhoe Trench 34, South Face

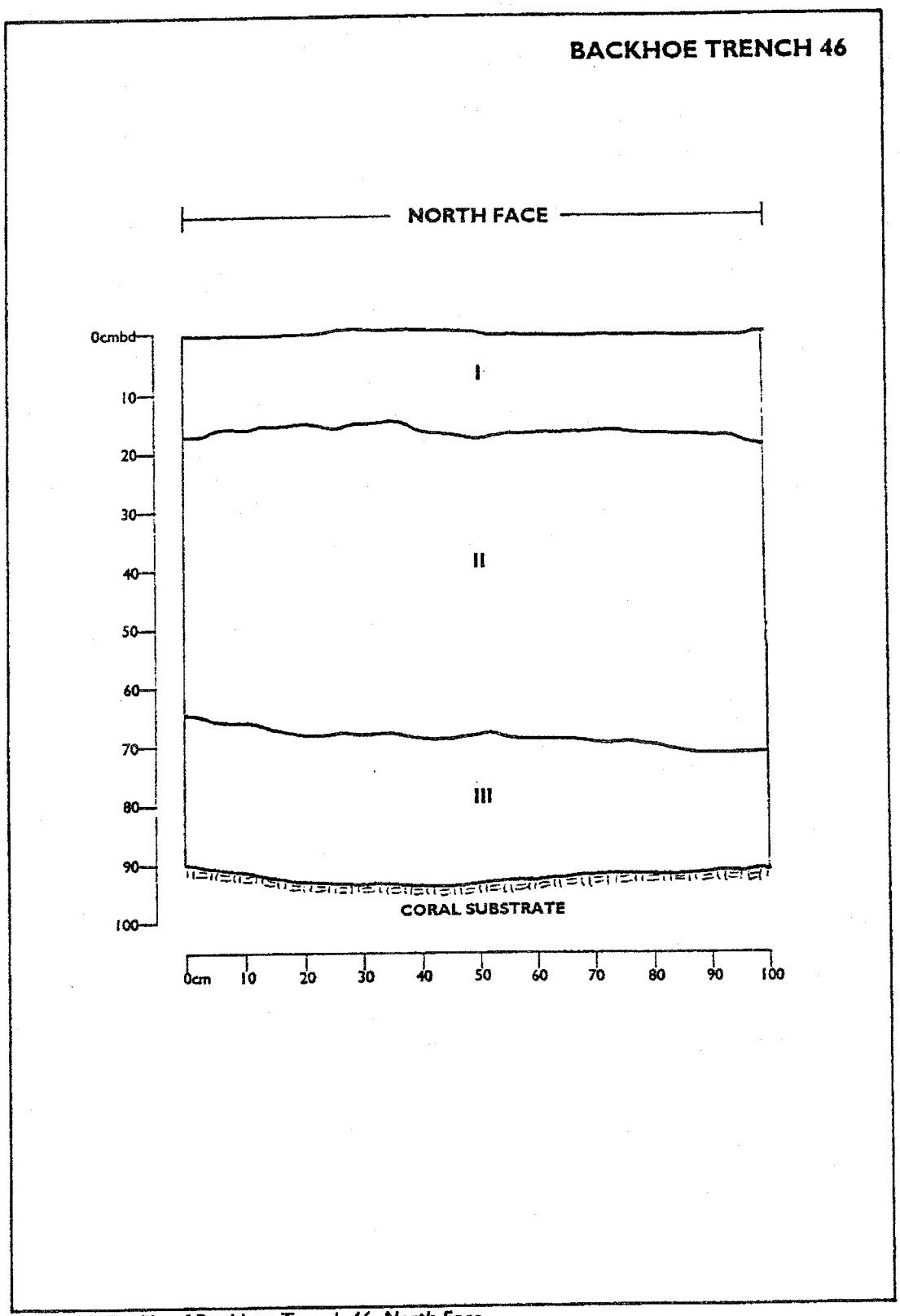


Figure 16. Profile of Backhoe Trench 46, North Face

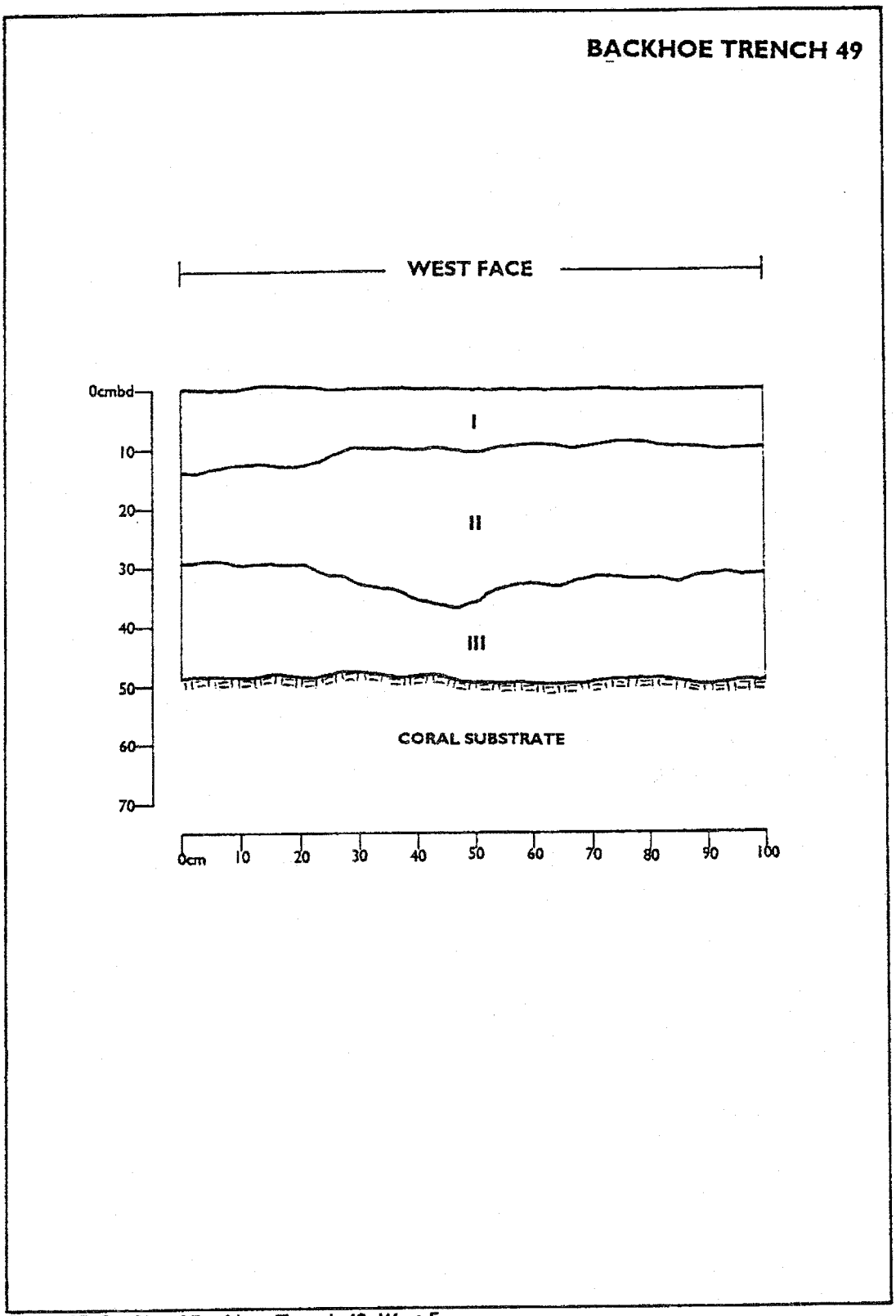


Figure 17. Profile of Backhoe Trench 49, West Face

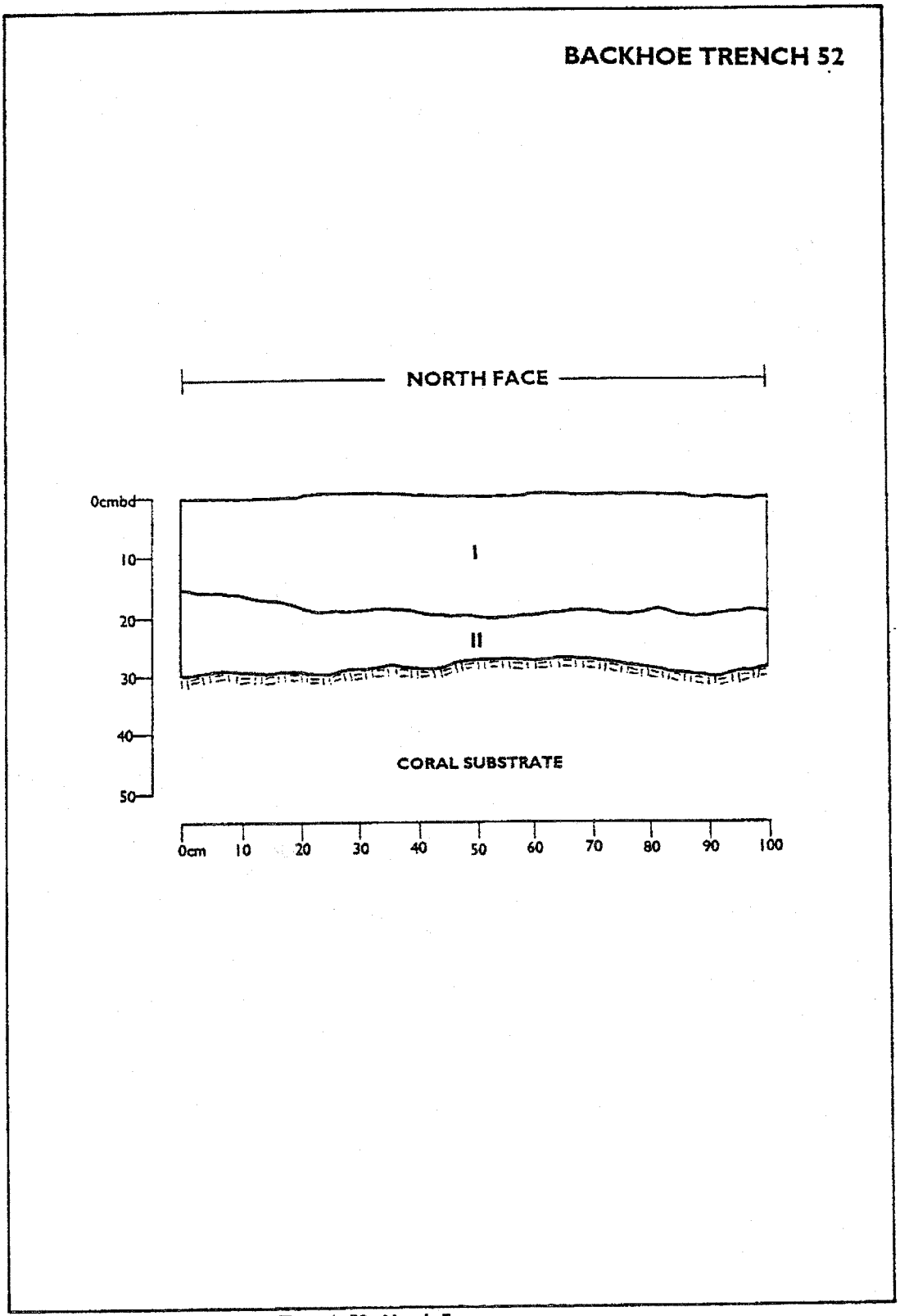


Figure 18. Profile of Backhoe Trench 52, North Face

Soil descriptions for all trenches are presented in *Appendix B*; *Table 2* provides descriptive statistics for the trenches.

Table 2. Backhoe Trench Descriptive Statistics

Kalo'i – 27 Trenches	Length (m)	Width (m)	Depth (m)
Mean	3.06	2.10	2.02
Median	3.00	2.00	2.00
Mode	3.00	2.00	1.00
StD	0.54	0.68	0.81
Range	2.95	2.75	3.04
Minimum	2.00	1.00	0.41
Maximum	4.95	3.75	3.45
Marina – 26 Trenches	Length (m)	Width (m)	Depth (m)
Mean	4.33	0.94	0.50
Median	3.00	0.71	0.45
Mode	3.00	0.71	0.45
StD	3.75	0.41	0.17
Range	17.35	1.29	0.73
Minimum	1.75	0.71	0.27
Maximum	19.10	2.00	1.00

MARINA CHANNEL TEST UNITS

Three 1.0 by 1.0 m test units were placed around the location of the inadvertent human burial discovered in 2001 (*Figure 3*). No human skeletal remains or prehistoric cultural remains were identified in any of the units. The soil stratigraphies of the individual units are presented below. *Figures 19-24* are profiles and photographs of the units.

Test Unit 1

Layer I 0.00-0.08 mbd: disturbed; dark; oily; contained recent materials;

Layer II 0.08-0.10 mbd: contained recent materials, and yellowish brown (10 YR 5/4) sand; structureless; fine; granular; loose, non-coherent; non-sticky, non-plastic; no roots; irregular boundary;

Layer III 0.10-0.40 mbd: Light grey (10YR 7/2) sand; structureless; fine; granular; loose, non- coherent; non-sticky, non-plastic; no roots.

Test Unit 2

Layer I 0.00-0.10 mbd: disturbed; dark; oily; contained recent materials; irregular boundary;

Layer II 0.10-0.25 mbd: yellowish brown (10 YR 5/4) sand; structureless; fine; granular; loose, non- coherent; non-sticky, non-plastic; no roots.

Test Unit 3

Layer I 0.00-0.10 mbd: disturbed; dark; oily; contained recent materials mentioned above; irregular boundary;

Layer II 0.10-0.35 mbd: yellowish brown (10 YR 5/4) sand; structureless; fine; granular; loose, non- coherent; non-sticky, non-plastic; no roots.

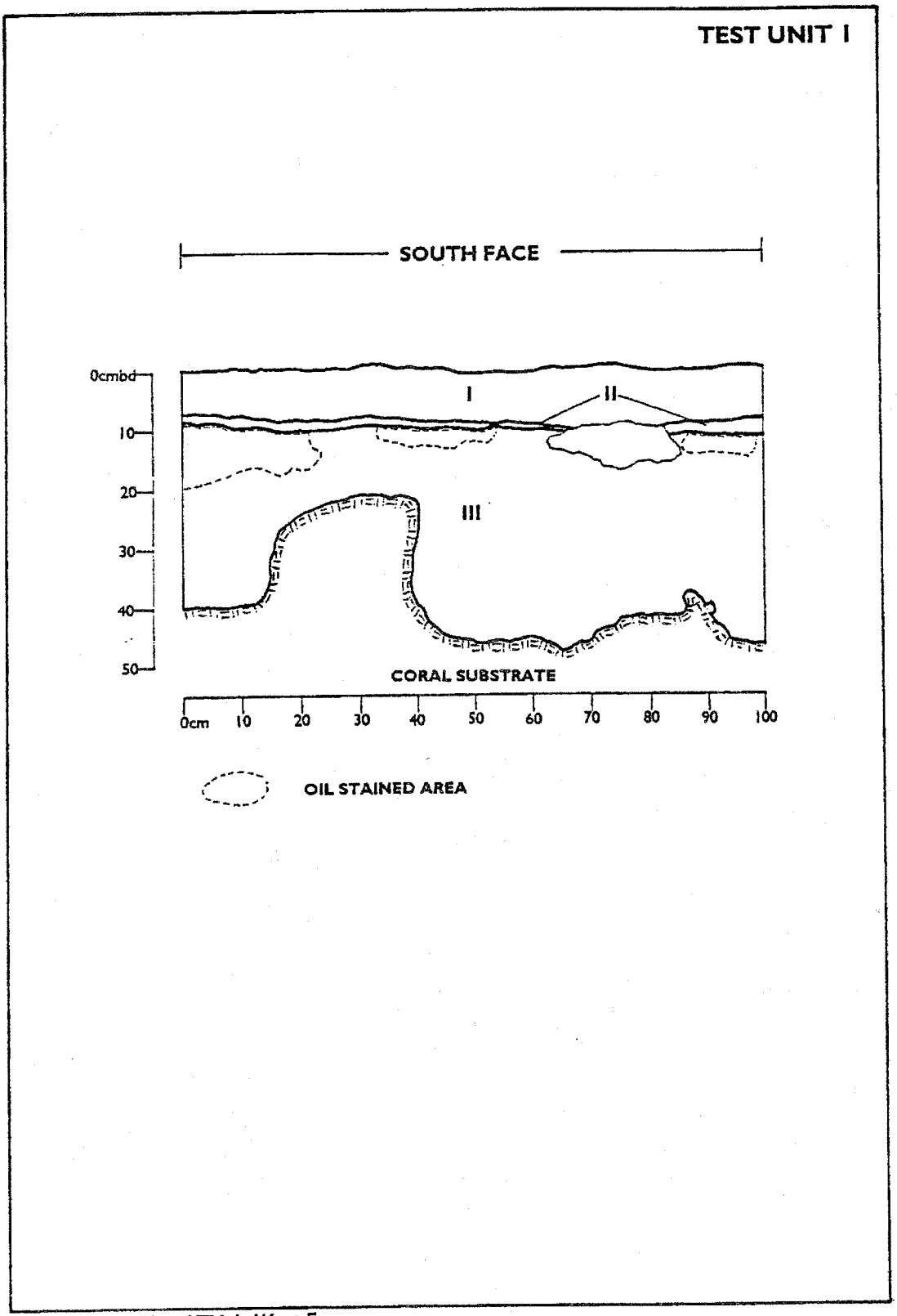


Figure 19. Profile of TU-1, West Face

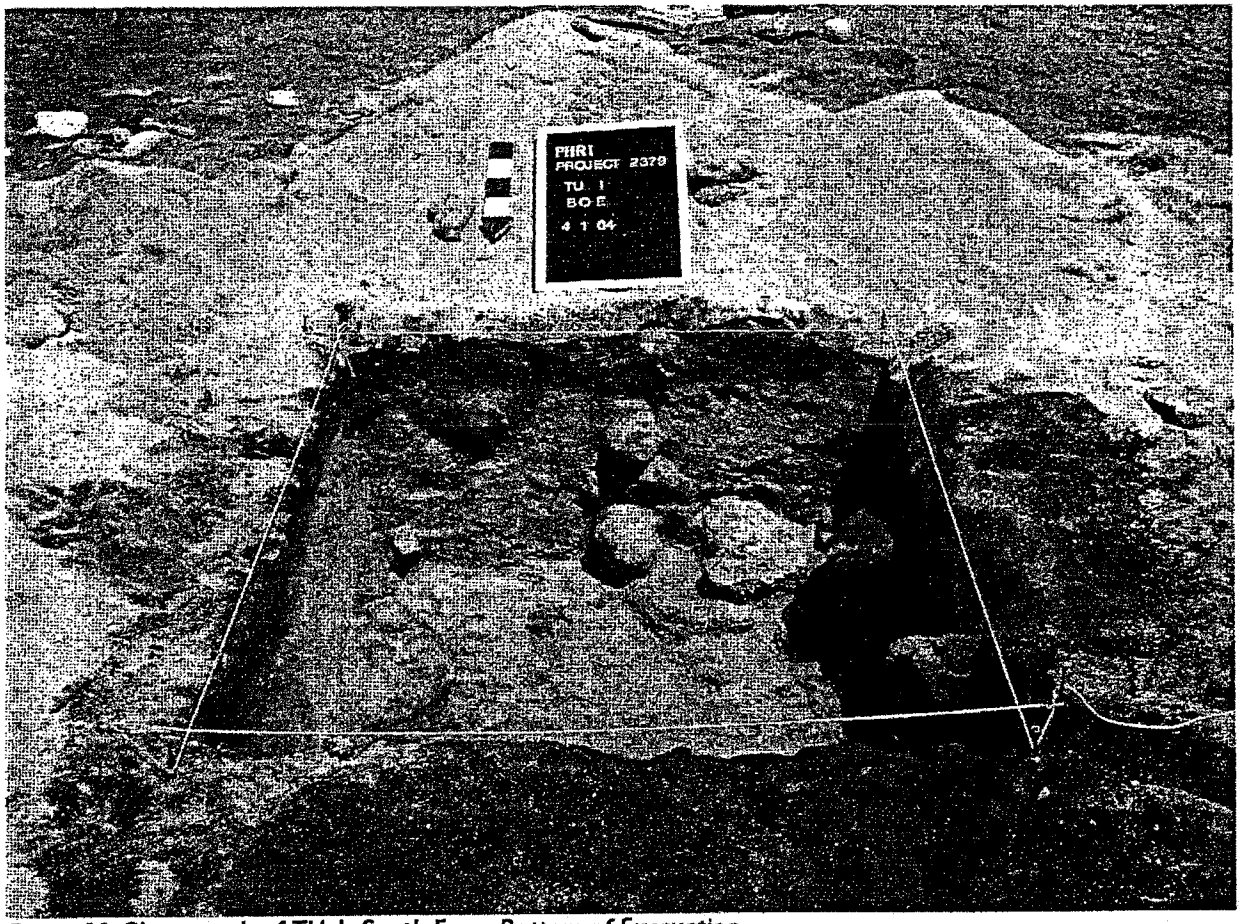


Figure 20. Photograph of TU-1, South Face, Bottom of Excavation

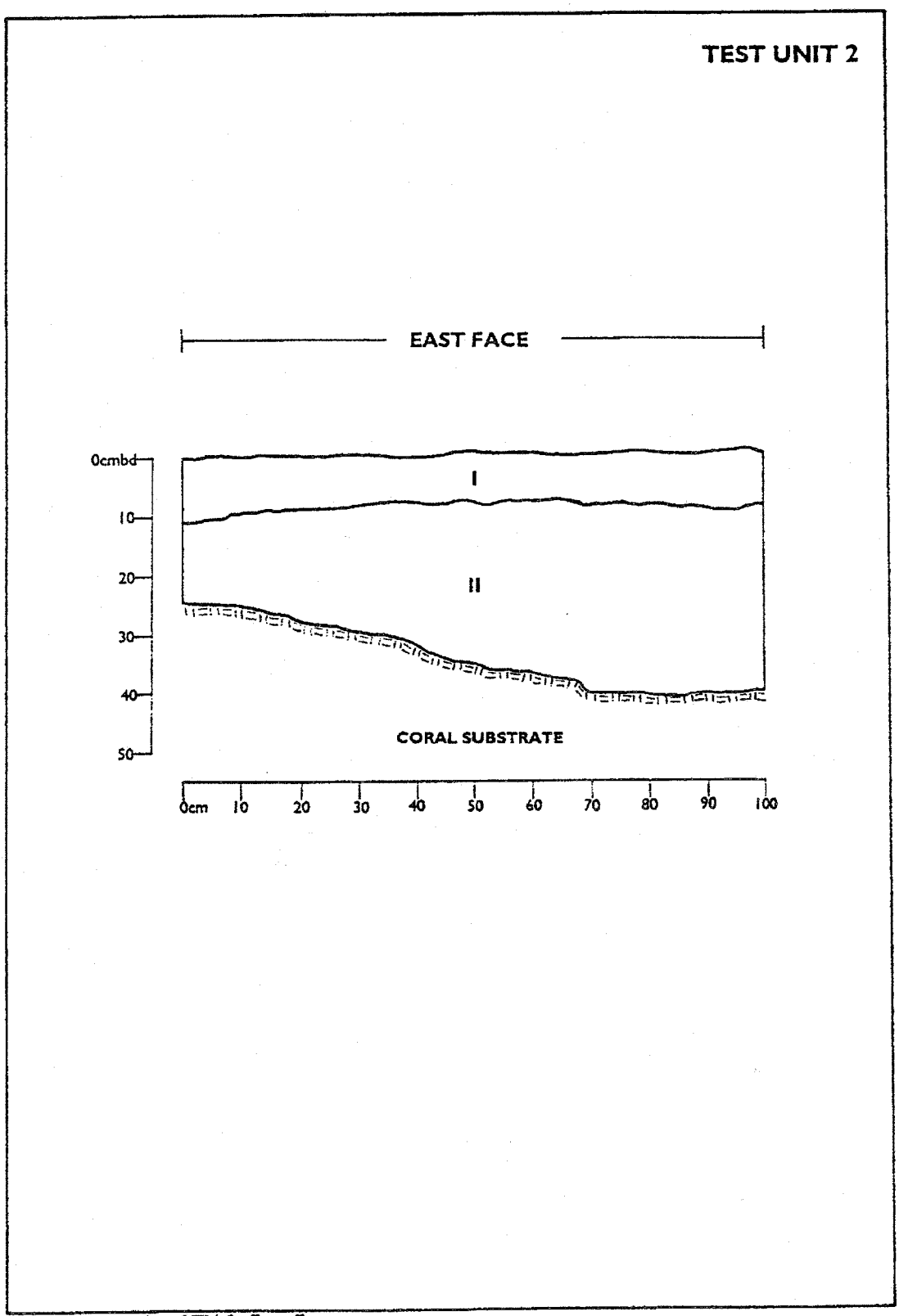


Figure 21. Profile of TU-2, East Face

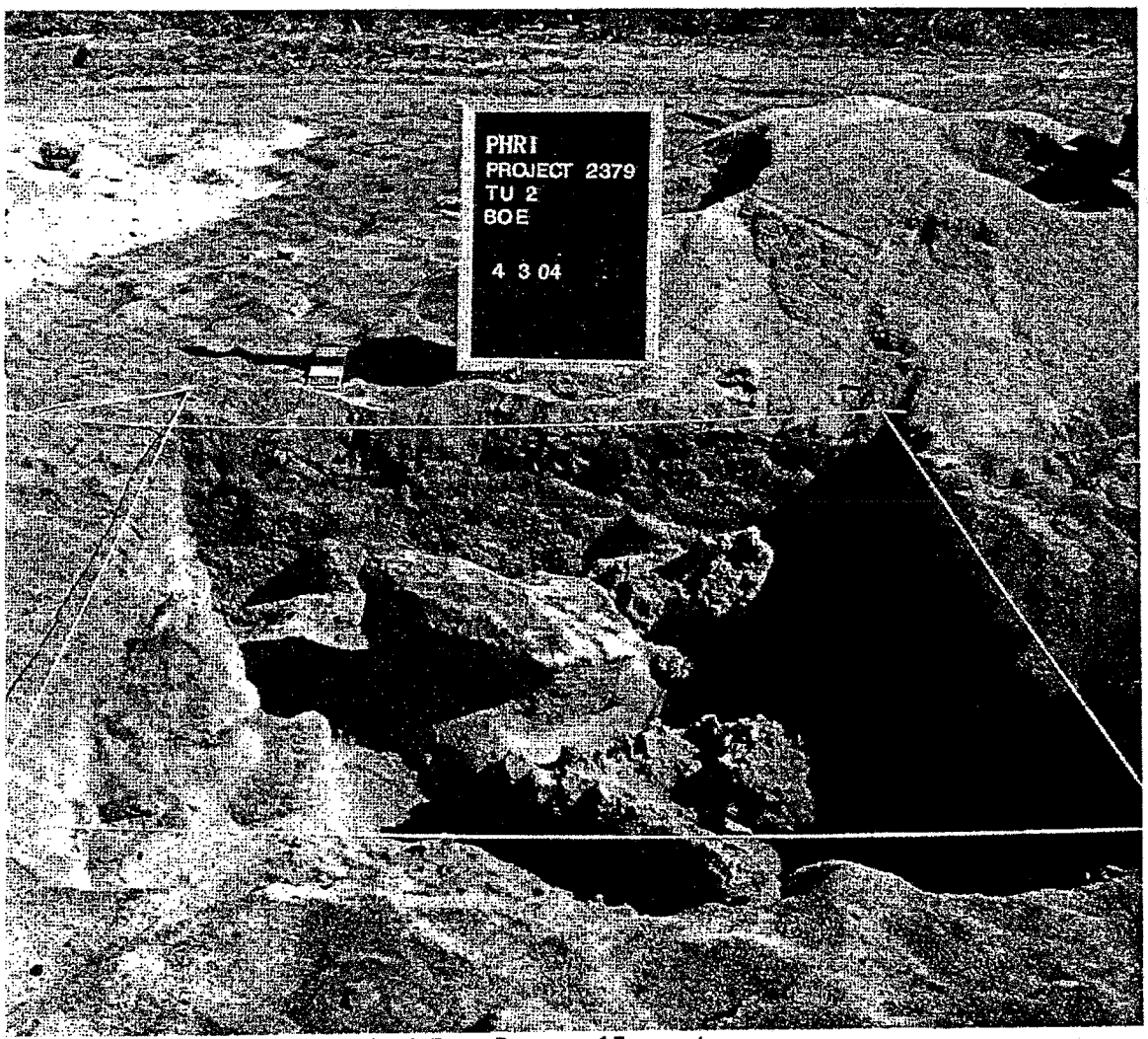


Figure 22. Photograph of TU-2, North Face, Bottom of Excavation

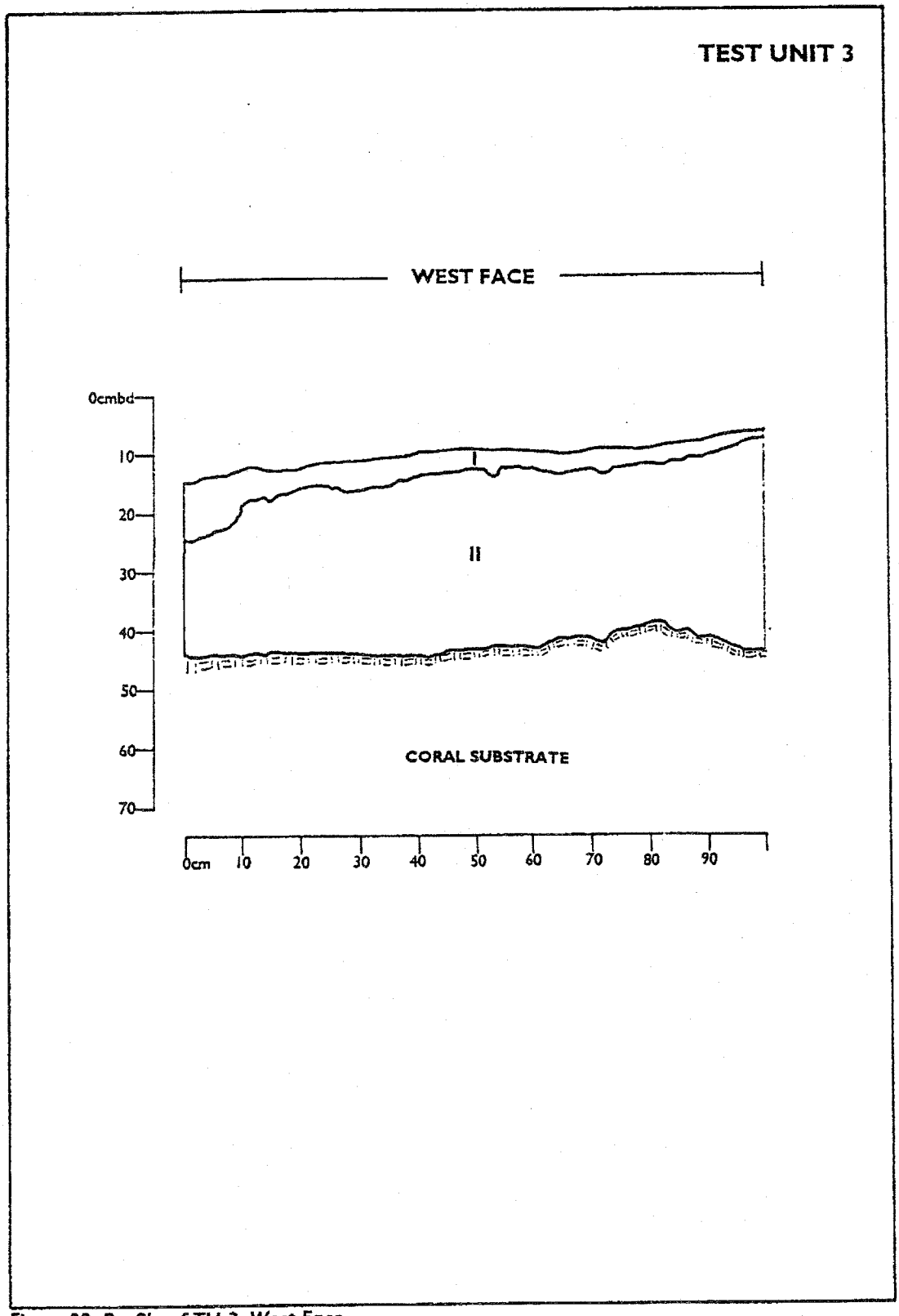


Figure 23. Profile of TU-3, West Face

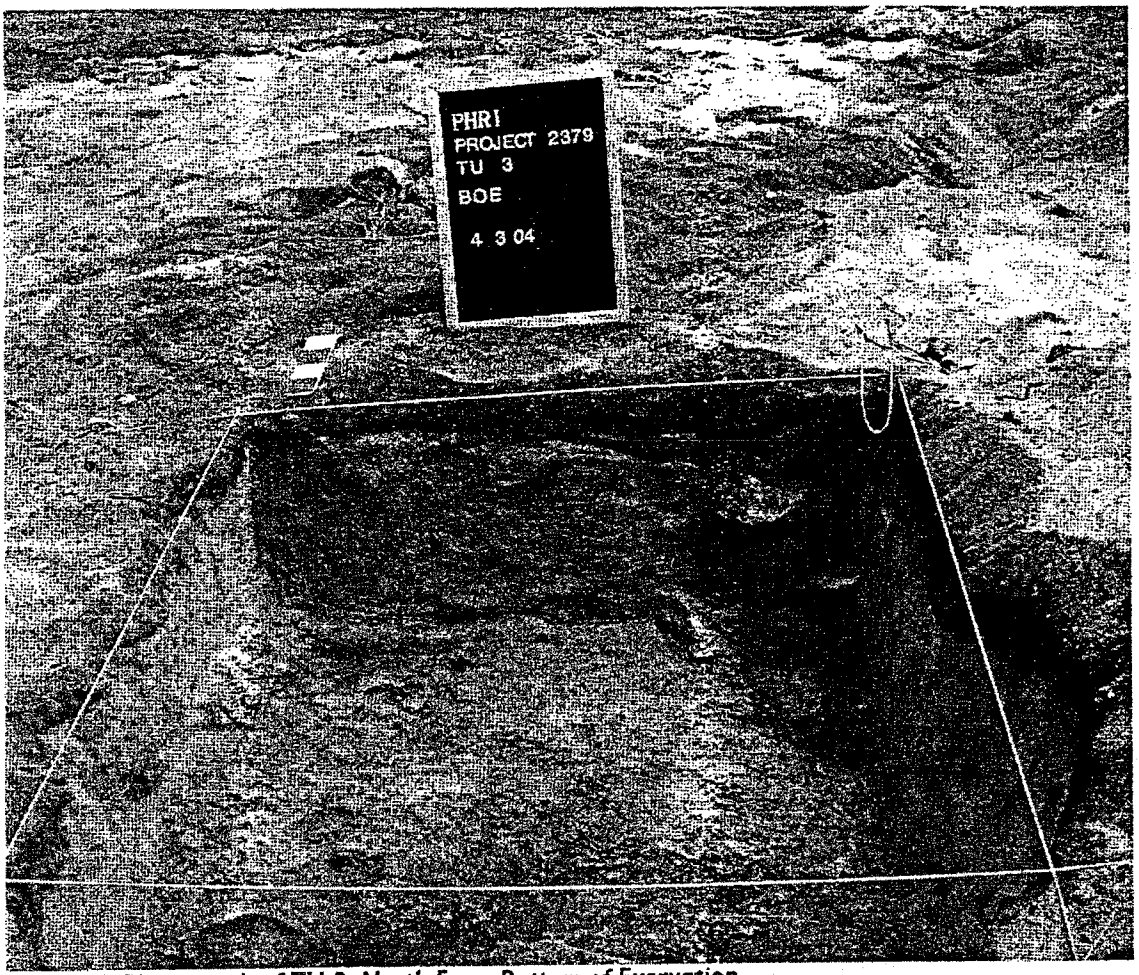


Figure 24. Photograph of TU-3, North Face, Bottom of Excavation

CONCLUSION

DISCUSSION

During the current testing four "types" of soils were encountered within the project areas. These types all constituted sand, the types being distinguished based on slight color differences and differences in compaction. Generally, sand compaction was related to depth: the deeper the strata, the more compact it became, until the water level was reached and the sand mixed with ocean water. If the water table was not reached, as was the case in many backhoe trenches, the sand remained compact.

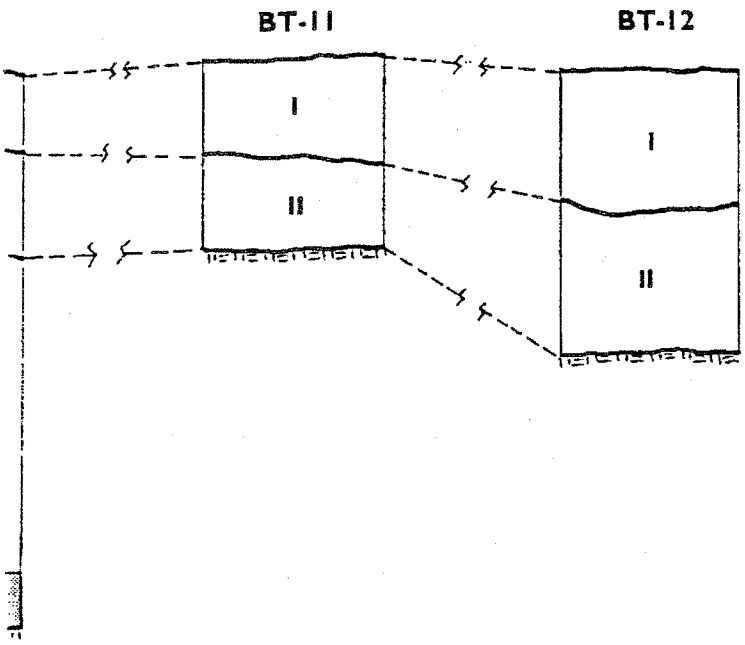
Layer I (Type 1) was a yellowish-brown sand generally greatly disturbed with recent materials such as bottle and glass fragments, unidentified metal scraps and fragments, unidentified plastic parts, rubber tubing, rope fragments, cloth fragments, wood fragments, aluminum cans, and recent charcoal and burnt wood. This layer ranged from 0.20 m to 1.00 m in thickness. Layer II was not, in most cases, as disturbed as Layer I and was generally composed of a light grey sand, ranging in thickness from 0.20 m to 2.75 m. Layer III was generally a light brownish grey layer ranging from 0.20 m to 2.10 m in thickness. Disturbance was usually confined to the first two layers, and in some trenches continued to the coral bedrock. Beginning in Layer II, and continuing into Layer III, the sand in most of the trenches became slightly more compact. Layer IV, present in only a few of the trenches, was a grey "soggy" sand layer, close to the water table; it is perhaps grey due to a wet, anaerobic environment, as are typical deep gley layers, except the soil involved is sand. The water table was reached in the majority of the units, at an average depth of 2.37 m below surface (the excavations took place over a long period of time, however, during fluctuating tides; also, the permeability of the project area subsurface is likely highly variable).

To investigate the variance of depth of the coral bedrock and the incremental rise of the surface *makai-mauka* and along the shore within the Kalo'i Drainage Channel Area, two transects were established, forming a "cross" (*Figures 25 and 26*). One transect incorporated the west face profiles of BT-8, -9, -11, and -12 (*Figure 25*). BT-8 and -9 contained Layers I, II, and III, while BT-11 and -12 contained only Layers I and II and were much shallower. The water table was reached in BT-8 and -9 at 2.78 m and 2.80 m, respectively, while no water table was encountered in BT-11 and -12. These results were as expected, and are in concurrence with the fact that BT-11 and –12 are the two trenches farthest from the shoreline. Overall, the transect revealed only a slight surface rise, of approximately 0.20 m, between the *makai* and *mauka* trenches, while the coral bedrock in the two *mauka* trenches was encountered about two meters higher than in the *makai* trenches.

The other transect, parallel to the shore, incorporated the north face profiles of BT-6, -7, -8, -13, -17, and -21. BT-6, -7, -13, -17, and -21 contained Layers I and II, while BT-8 was the only trench containing Layer III. The water table was reached in BT-6, -7, and -8, at 3.02, 1.95, and 2.78 m, respectively, while no water table existed in BT-13, -17, and -21. This difference may simply relate to high and low tides, and the times the trenches were excavated. Overall, the transect revealed practically no discernible difference in surface rise/fall, with uneven rising and falling of the underlying coral bedrock.

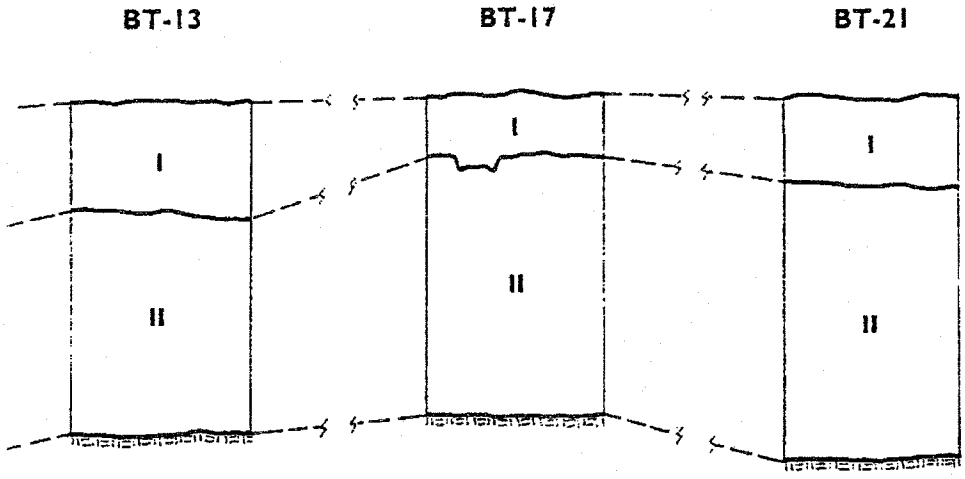
At the Marina Channel Area, with two exceptions, only two types of sand (I and II) were revealed. This area contained only shallow sand deposits that exist on a shelf overlooking the ocean. Sand accumulations there have been referred to as sand dunes in the past. However, "sand accumulations" would be the more accurate term; it is doubtful land forms that could be classified as dunes were not present, at least in recent times, because the entire vicinity sits on a coral bench, or shelf, above the water. The previously identified inadvertent human burial discovery referred in this report was apparently (based on an examination of the

WEST FACE



ATELY10 METERS ON CENTER

FACE



area of the burial) in an area of shallow accumulated sand. Apparently the sand had eroded sufficiently to reveal the burial remains.

At the Marina Channel, Layers I and II were greatly disturbed by modern trash, which included unidentified metal fragments, unidentified plastic fragments, wood fragments, bottle and glass fragments, paper scraps, ceramic fragments, cloth fragments, aluminum cans, and recent charcoal and burnt wood. Layer I was 0.10 m to 0.40 m thick, and Layer II was 0.05 to 0.82 m thick. In the Marina Channel area, the sand did not become compact with depth to any significant extent, and no water table existed, since the area is on a bench or shelf above the water.

Culturally, both the Kalo'i Channel and Marina areas evidence little prehistoric use, although the areas as a whole have abundant marine resources. This is probably due to the heavy post prehistoric use of the shoreline area for recreation. Inland from the shoreline, and outside the project area, site types identified through prior research, primarily the Ewa Marina Community Project (Franklin and Goodfellow 1995), included limestone sinks, house sites, walls, cairns, enclosures, C-shapes, shelters, terraces, midden deposits, paved areas, modified caves, and many mounds of coralline limestone boulders and cobbles. Artifacts recovered from this general area included stone debitage (exotic basalt and volcanic glass, and locally available limestone), bone and shell fishhooks and gorgets, bone awls, coral abraders, modified shell fishhook tabs, and shaped basalt. Ecofacts recovered consisted of marine shell, fish bone, bird bone, mammal bone, and botanical remains. Chronologically, this area is thought to have been inhabited as early as AD 1000, beginning with semi-permanent occupation of whole families and progressing to, perhaps, permanent settlement. Later, the area was used historically, as revealed by artifacts such as bottles, pottery (earthenware, stoneware, and porcelain-some hand-painted), spent military ammunition, glass, can fragments, nails, barbed wire, and gate parts.

The excavation strategy implemented during the current project, dependent on the strategic placement of numerous backhoe trenches and three test units, is deemed successful. In general, the strategy allowed intensive and systematic coverage of large areas. During the course of the current project, no human skeletal remains or prehistoric cultural materials were found. The only materials found were recent and constituted trash. Concerning project expectations, prior to fieldwork, the expectation was that the two inadvertent burial discoveries were isolated instances, and did not constitute a group burial or *ilina*. This was borne out by the fieldwork. The current findings concur with previous investigations within the current project area, including the excavation of 86 auger holes in which no human skeletal or prehistoric cultural remains were identified (Dunn and Haun 1991).

RECOMMENDATIONS

Due to the negative findings of the previous and current archaeological work within the project area, it is recommended that no further archaeological work be undertaken.

It should be noted, however, that there is always the remote possibility that potentially significant, unidentified subsurface cultural materials, including human skeletal remains, could be identified within the project area during the course of future land modifications. In such a situation, archaeological consultation should be sought immediately.

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APPENDIX A

Historical Documentary Research

by Helen Wong Smith, M.A. (taken and adapted from Dunn et al. [1991])

INTRODUCTION

Honouliull is the largest and most western *ahupua'a* in the Ewa District of Oahu (Hammatt and Folk 1981:29). From the ridgeline of Palikea in the Waianae Range, its western border extends to the sea at Piliokahe, and on the east it reaches to Puu Loa, west of Pearl Harbor's West Loch. It is from the waters of West Loch that Honouliuli takes its name, which means "dark harbor' or "dark bay" (Jarret IN Frierson 1972, and Pukui et al. *1974:5* 1).

Honouliuli contained all of the resource-zones necessary for full economic subsistence in ancient Hawaii: *uka* (mountain), *waena* (middle), and *kahakai* (seashore). The shoreline of Honouliuli at the project area is in the vicinity of what was once an area of fishponds, shellfish resources, and salt-drying (Frierson 1972:6). Nearby Puuloa, to the east, was once an important agricultural area, and it boasted a productive fishery as well, with fishponds and fish traps. The coastal waters from Keahi Point to Kualakai were, and still are, a source of *lipoa*, an edible seaweed (Sterling and Summers 1978:44). In modern times poultry and pig farms were located in the *kiawe* forest area *mauka* of the project area. The coastal portion of the district is now the site of Oneula (red sand) County Beach Park, Del Monte Beach Park, and Alii Park (Flanders 1986).

The project area lies in the *ahupua'a* of Honouliuli and is close to the neighboring *ahupua'a* of Puuloa (*Figure A-1*). For this reason, this report includes references to Puuloa. The Barber's Point Naval Air Station is near the project area but the history of this area receives only brief mention here. Because of the immense size of Honouliuli, this report is limited primarily to the history of the southeast portion, which fronts the West Loch portion of Pearl Harbor.

LEGENDS AND PRE-CONTACT HISTORY

Honouliuli contains the well-known beach where the hairless human beings *('olohe)* first landed on Oahu (Beckwith 1970:343). In Hawaiian legend the *'olohe* were said to live in caves or pits on the arid Ewa Plain. They lived in caves in the uplifted coral reef composing the plain. Such caves were once found throughout the area now occupied by the Naval Air Station.

The area behind Oneula, known today as the Coral Plains, is probably the legendary "Plain of Kaupe'a" said to be the realm of the *ao kuewa* or ao *'auwana*, the homeless wandering souls. Located next to Puuloa by Sterling and Summers (1978:36), this was the wandering place of those who died having no rightful place to go. These souls wandered "in the wiliwili grove of Kaupe'a on Oahu," according to Kamakau (1964:47). He writes that "these wanderers on the plain of Kaupe'a beside Pu'uloa...could go to catch moths (pulelehua) and spiders (nanana)" in the hope of finding helpful *'aumakua*, souls who could save them (ibid:49). Kelly agrees with Kamakau that Kaupea was known as the place on Oahu where these friendless souls wandered (1978:1).

Mary Kawena Pukui describes an encounter with these wandering ghosts:

> A wide plain lies back of Keahi and Pu'uloa where the homeless, friendless ghosts were said to wander about. These were the ghosts of people who were not found by their family 'aumakua or gods and taken home with them, or had not found the leaping places where they could leap into the nether world. Here they wandered, living on the moths and spiders they caught. They were often very hungry for it was not easy to find moths or to catch them when found.
>
> Perhaps I would never have been told of the plain of homeless ghosts if my cousin's dog had not fainted there one day. We (my cousin, aunt & I) were walking to Kalae-loa from Pu'uloa accompanied by Teto, the dog. The dog was a native dog (not the so-called poi dog of today) with upright ears and body and size of a fox terrier. For no accountable reason, Teto fell into a faint and lay still. My aunt exclaimed and sent me to fetch sea water at once which she sprinkled over the dog saying, "Mai hana ino wale oukou i ka holoholona a ke kaikamahine. Uoki ko 'oukou makemake ilio." (Do not harm the girl's dog. Stop your desire to have it.) Then with a prayer to her 'aumakua for help she rubbed the dog. It revived quickly and after being carried a short way, was frisky and lively as ever.
>
> Then it was that my aunt told me of the homeless ghosts and declared that some of them must have

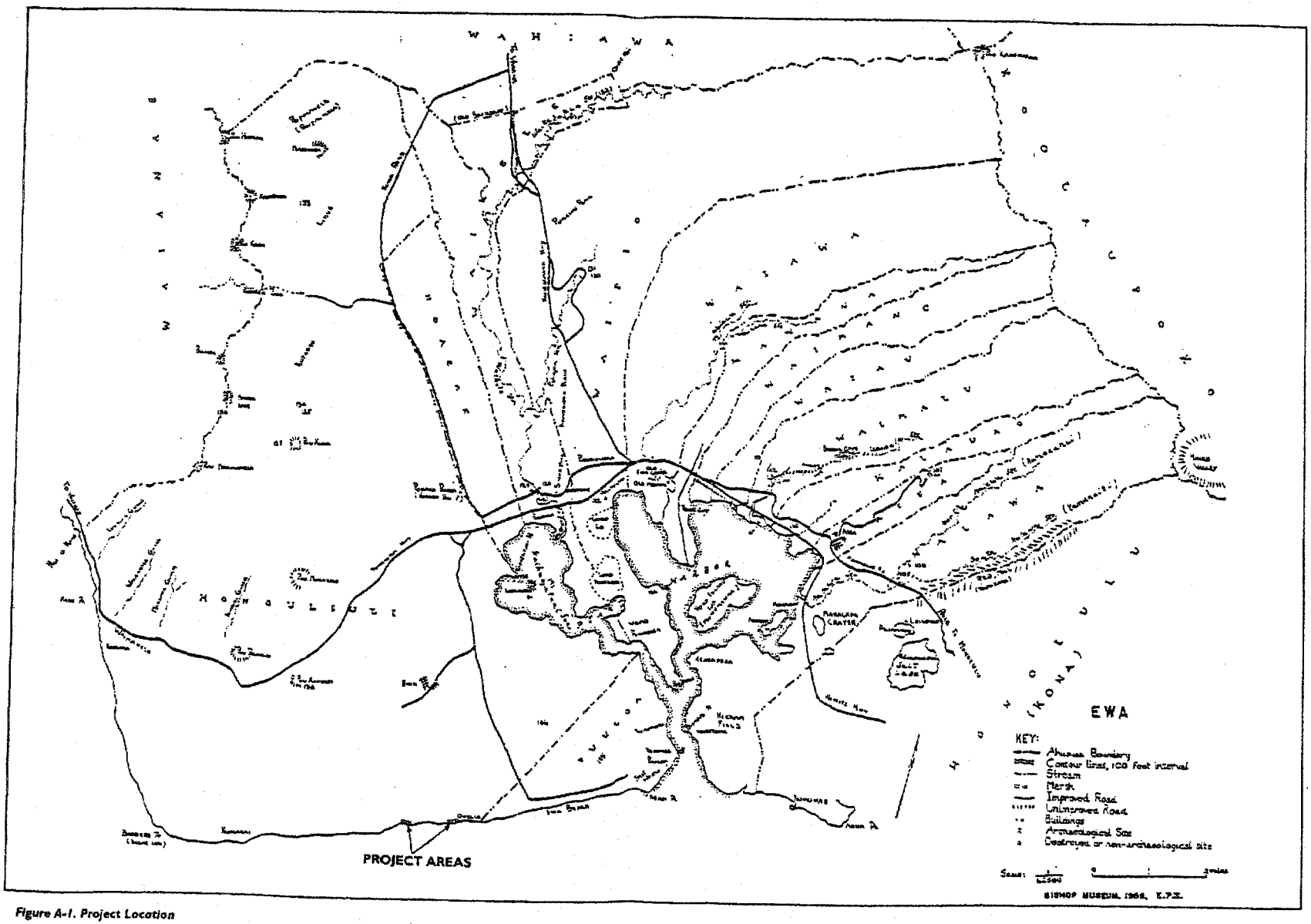

Figure A-1. Project Location

> wanted Teto that day because she was a real native dog, the kind that were roasted and eaten long before foreigners ever came to our shores (Pukui 1943).

Another legend holds that on the south shore of Honouliuli, at Waipuuli, is the cave where the young boy, Namakaokapaoo, hid his mother after killing his stepfather and throwing his head five miles. Thoughonly two and one-half feet tall, Namakaokapaoo is said to have conquered Oahu by defeating the king and 18 canoe-loads of warriors (Fornander 1913, V. 2:274-8 IN Lewis 1970:5).

Northwest of the project area is the inland hill known as Puuokapolei. This prominent topographical feature is prominent in legend as well. It was here that the demigod Kamapuaa is said to have established the court of his grandmother, Kamaunuaniho, an *ali'i* who came by canoe from Kahiki to Oahu. The people of Oahu, Kauai, and Hawaii are said to descend from Kamaunuaniho, which is why the Ewa district was called the "celebrated land of the ancestors" (Kamakau 1964:68, 84).

Kamapuaa had a practical reason for installing Kamaunuaniho at Puuokapolei: "This was to compel the people who were to pay tribute to bring all the necessities of life from a distance, to show [Kamapuaa's] absolute power over all" (Nakuina IN Lewis 1970). Nakuina claimed that the house foundations and the surrounding wall could still be seen in the late 1800s. A different version depicts Kamaunuaniho living at Puuokapolei with Kekeleaiku, the older brother of Kamapuaa, after they were driven out of Kaliuwaa in Kaluanui, Koolauloa (Sterling and Summers 1978:33).

Another legend of Honouliuli describes the strange fate of two women who lived on the plain called Pukaua, beyond Puuokapolei, toward Waianae. After going down to Kualakai, on the coast, to gather aama crabs, pipipi, and limu, they failed to return home before morning light, and were turned into a pillar of stone (Sterling and Summers 1962:39). Also well-known in legend is the place on the coast, west of the project area, called Kualakai. The spring located there, called Hoakalei, is associated with Hiiaka, the favorite sister of the fire goddess, Pele (Sterling and Summers 1962, I, 2:179).

Mary Pukui also tells a story about the waters of Puuloa, to the East. It was told to her by her uncle, Akoni Kawaa, a native of Aiea.

> At the entrance (of Pu'uloa) was a pond built out into the water in the shape of a tennis racket. This pond, called Kapakule, was said to have been the labor of the Menehune, a people who were something like the "little people" of old Ireland. On the left side of the pond stood the stone called Hina, which represented a goddess of the sea by that name. Each time the sea ebbed, the rock became gradually visible, vanishing again under water at high tide. Ku, another stone on the right, was never seen above sea level. This stone represented Ku'ula, Red Ku, god of fish and fishermen. From one side of the pond a long wall, composed of driven stakes of hard wood, ran toward the island in the lochs. When the fish swam up the channel and then inside of this wall, they invariably found themselves in the pond. A short distance from the spot where the pond touched the shore was a small *ko'a* or altar composed of coral rock. It was here that the first fish caught in the pond was laid as an offering to the gods. At the time I last saw it in 1907, this altar was fenced in by Edwin P. Mikalemi, the caretaker of the place and brother-in-law of Akoni Kawa'a. There were times when the sharks were caught in the pond at low tide, but no Hawaiian there ever dreamed of molesting them. Never shall I forget the day when a haole guest of Mikalemi went to harpoon one of the sharks in the pond. My uncle shouted for him to get away from there and swore as I had never heard him swear before. Those sharks were as dear to him as a relative, and he did not want to see them speared any more than he wanted us to be hurt in the same way. At the age of twelve, I was taken to the cave of Ka'ahupahau, Cloak-well-cared-for. Most of the cave was deep under water. A small plant laden with red berries hung over the entrance, and when I reached to pluck one, my uncle pulled my hand back quickly and chided me. Those belonged to Ka'ahupahau. Ka'ahupahau had a brother Kahi'uka, The Smitingtail, whose stone form was a good distance away from the cave, lying deep in the water. Yet it was plainly seen from the surface. Ka'ahupahau's son, Ku-pipi, had his home where the dry dock was built and sank about thirty years ago. These were not the only sharks at Pu'uloa, for like all members of royalty there were others to stay about and serve them. Ka'ahupahau was the chiefess of sharks in the length and breadth of the Pearl Lochs, hence the old saying, "Alahula Pu'uloa he alahele na Ka'ahupahau," "Everywhere in Pu'uloa is the trail of Ka'ahupahau."
>
> Her brother and she were born, not sharks, but human beings. One day a shark god saw them and converted them into sharks like himself. Every day they swam up a stream at Waipahu and there they were fed on *'awa* by relatives. *'Awa* was always the

food of the gods. When they became too large to swim upstream, the offerings of food were carried to the lochs for them.

Because the sharks, though numerous, were not harmful within Pearl Lochs, the natives used to have fun mounting on their backs and riding them as cowboys ride horses. To turn them around, a little pressure was used just back of the eyes. Is this a tall fish story of men riding sharks? No, it is not. My uncle said that it was true and so did the historian Kamakau (Pukui 1943).

The waters West of Puuloa, near Kalaeloa (Barber's Point), are said to be the home of a famous giant *kupua* (magical) fish, named Uhumakaikai. This fish is said to have taught the art of fighting to Kawelo, a mid-16th century chief (Sterling & Summers 1978:41).

The importance of fishing to Honouliuli in pre-contact times is suggested by the presence of a fishing shrine (*ko'a*), called Kalanamaihiki, near the west end of West Loch (Kaihuopalaai), and by the presence, not too far from there, of the fishpond, Laulaunui (Figure A-1). Two place names in Honouliuli *ahupua'a* also suggest associationswith fishing: Keoneoio, "sandy (place with) bone fish," and Puu Lailai, "young *lai* fish hill" (Pukui et al. 1974). The latter suggests an association with offshore fishing; the hill might have been used as a range or bearing marker for fishing grounds. The literal translation of Puu Makakilo, in the central part of the *ahupua'a*, is "observing eyes," which may also relate to fishing, because *kilo* is the Hawaiian word for a fishing observation tower or place (Hammatt and Folk 1981:33).

Puuloa is said to be the place where breadfruit was introduced to Hawaii. It is said to have been brought from Upolu, Samoa in the 12th century by Kahai, who was returning home from Tahiti (Fornander 1919-1920:313 IN Lewis 1970:5; Kelly 1985:165).

According to Sterling and Summers, Puuloa was also known as a place to collect bird feathers:

Among the places where the o'o, 'i'iwi and other indigenous birds were caught was at Puuloa on Oahu. There the 'o'o, 'i'iwi and other birds gathered when the noni fruit ripened. They came down to feed and when the season was over the birds retumed to the mountains. - Lahilahi Webb, Coll. on Kahilis Ms. (1978:45).

The early Hawaiians used their ingenuity to make the dry inland areas of Honouliuli productive. McAllister tells how they used the naturally-occuring pits on coral plains for agriculture:

Site 146. Ewa coral plains, throughout which are remains of many sites. The great extent of old stone walls, particularly near Puuloa Salt Works, belongs to the ranching period of about 75 years ago. It is probable that the holes and pits in the coral were formerly used by the Hawaiians. Frequently the soil on the floor of the larger pits was used for cultivation, and even today one comes upon bananas and Hawaiian sugar cane still growing in them. They afford shelter and protection, but I doubt if previous to the time of Cook there was ever a large population here (McAllister 1933:109).

Puuokapolei was used in pre-contact times to mark the changing seasons. Here is how Kamakau says it was done:

In the same way the people of Oahu reckoned from the time when the sun set over Pu'uokapolei until it set in the hollow of Mahinaona and called this period Kau, and when it moved south again from Pu'uokapolei and it grew cold and the time came when young sprouts started, the season was called from their germination (oilo) the season of Ho'olilo. There were therefore two seasons, the season of Makali'i and the season of Ho'olilo (Kamakau Mo'olelo Hawaii Vol.I, Chap 2, p 23 IN Sterling and Summers 1978:34).

Puuokapolei also figured in at least one chant used in pre-contact times. On January 13th, 1900, the newspaper *Ka Loea Kalaiaina* contained an article which recalled the chant. Headlined "Na Wahi Pana o Ewa," the article reminded readers that Puuokapolei:

"...was one of the most famous hills in the olden days. The chant composed for games in the olden days began with the name of this hill and went on (with the place names) all around the island. This chant was used for those who swung with ropes, played on wooden ukeke instruments, or those who juggled with stones, noni fruit or kukui nuts" (Sterling and Summers 1978:33-34).

Several sources mention a *heiau* located on or near Puuokapolei. Thrum's mention is brief: "[a] heiau on

Kapolei hill, Ewa - Size and class unknown. Its walls thrown down for fencing" (1907:46). McAllister, an archaeologist, was able to supply more information:

> Pu'u Kapolei Heiau (Destroyed) Site 138, on Pu'u Kapolei hill. The stones from the heiau supplied the rock crusher which was located on the side of this elevation, which is about 100 feet away on the sea side. There was formerly a large rock shelter on the sea side where Kamapuaa is said to have lived with his grandmother (McAllister 1933:108).

One of the last pre-contact references to the area describes how the famous Oahu *kahuna*, Kaopulupulu, was killed by Kahahana's warriors at Puuloa sometime around the year 1782 (Kamakau 1961:133-134), and how two of Kamehameha's chiefs, Kekuamanoha and Kauhiwawaeono, lived at Puuloa (ibid:182). Kauhiwawaeono was the infamous murderer chief who used the bodies of his victims for shark bait (ibid:232). He was later discovered by Kamehameha I to have plotted against him (ibid:182).

POST-CONTACT HISTORY

Despite the plentiful marine resources of Honouliuli and Puuloa, early Westerners failed to appreciate the importance of these areas in the Hawaiian economic system. According to Kelly, "the coastal area near Ewa has historically provided significant marine resources, with neighboring areas, particularly Puuloa containing large fishponds and traps" (1978:1). Early Westerners ignored this abundance in their accounts and focused on the coral plain, which seemed marginal and desolate to them. The failure to understand the Hawaiian economic system frequently led to misconceptions concerning the importance of certain lands to the Hawaiians, and to misconceptions about Hawaiian land use patterns in general (Hammatt & Folk 1981:33).

In March of 1792, Captain George Vancouver sailed past the southwest point of Oahu, recording the first Western observation:

> This point is low flat land, with a reef round it, extending about a quarter of a mile from shore. The reef and low land continue some distance to the eastward towards Whyteete Bay....Not far from the S.W. point is a small grove of shabby cocoa-nut trees, and along these shores are a few struggling fishermen's huts" (Vancouver 1798, I:167).

> From these shores we were visited by some of the natives, in the most wretched canoes I had yet seen amongst the South-Sea islanders; they corresponded however with the appearance of the country, which from the commencement of the high land to the westward of Opooroah [Puuloa], was composed of one very barren rocky waste, nearly destitute of verdure, cultivation or inhabitants, with little variation all the way to the west point of the island (ibid. II:217).

A year later, while anchored in Pearl Harbor off Puuloa, Vancouver again recorded his observations:

> The part of the island opposite to us was low or rather only moderately elevated, forming a level country between the mountains that compose the east [Koolau] and west [Waianae] ends of the island. This tract of land was of some extent but did not seem to be populous, nor to possess any great degree of fertility; although we were told that at a little distance from the sea, the soil is rich, and all necessaries of life are abundantly produced (ibid. III:361-363).

Vancouver sent a boat into Pearl Harbor to take soundings, and the officer in charge reported:

> The soil in the neighborhood of the harbor appeared of a loose sandy nature; the country low for some distance, and, from the number of houses within the harbor, it would seem to be very populous, but the very few inhabitants who made their appearance were an indication to the contrary (ibid. II:215-216).

Vancouver's cartographer, Lt. C.R. Malden, indicated on his map the presence of a few stone walls, a few trees, and enclosures in the Kualakai area on the south shore of Honouliuli (Kelly 1985:160).

Barber's Point, west of the project area, was known to the Hawaiians as Kalaeloa ("the long point"). In 1786, Captain Nathaniel Portlock gave it the name, Point Banks, in honor of Sir Joseph Banks, who was then president of the Royal Society in London, and who had been naturalist on Cook's first voyage to the Pacific (Kelly 1985:165).

Point Banks was later renamed in honor of the unfortunate English Captain, Henry Barber, who lost his ship on the reef

off the Kualakai coast, near the point. There are several versions of the story of Captain Barber. Those below are cited in *Sites of Oahu*:

> In October 1795 Captain Henry Barber made one of several trips to Oahu. At this time Kamehameha I was on Oahu and he and Capt Barber became very friendly. When Barber departed he gave Kamehameha gifts. He intended giving him a keg of brandy but after thinking it over decided that to give the heathen king a whole keg of good brandy which he wouldn't appreciate was a great waste. He therefore had the keg half drained and filled up with water and sent this watered brandy to the king. On leaving Oahu he ran aground at Kalaeloa (Oct. 31, 1796) and when the natives saw the ship's plight they swarmed out to it taking everything they could lay their hands on. In the meantime Kamehameha had left for Kona and Barber seeking his help to recover the stolen goods went to Kona to see him. There he was treated cordially and a large feast was prepared. When the awa was passed around Barber was surprised and chagrined to find that his awa cup held nothing but watered awa, thus did Kamehameha remind Barber that he was not a fool. In spite of Barber's treatment of Kamehameha the king sent him back with kapu sticks and orders that the Hawaiians must return all which had been stolen. When the Hawaiians saw that Barber came with authority they immediately returned all that had been taken. - Joseph Emerson, as told to Mrs. Beatrice Greenwell (IN Sterling and Summers 1978).

> History recalls that on one of his visits to Hawaii Capt. Barber and his good ship *Arthur* became shipwrecked on a reef near Pearl Harbor. His crew of 22 men were saved, six were drowned. Hawaiian hospitality overwhelmed them and some time was spent here. Later, King Kamehameha salvaged a dozen brass cannon from the wreck of the *Arthur* and mounted them. Capt. Barber arriving unexpectedly two years later, had two kegs of gunpowder for the cannon. A sharp bargain was driven by the Hawaiian king and the swap was made. Barber admitted he was worsted in the transaction. - *Honolulu Advertiser*, Feb. 18, 1939 (ibid.).

> At the end of 1802 he sailed for China and again called at Honolulu. He took the opportunity to visit Kamehameha at Lahaina on Maui, and saw that the king had a battery of ten guns placed for the defense of his palace with its brick walls and glazed windows. Barber learned that these had been recovered from the wreck of the brig *Arthur* near Barber's Point, and he asked the King to return them, but Kamehameha refused. The king's divers had brought the guns up from the bottom with great difficulty and the king had had them for six years. He wouldn't be convinced that the original owner who had left them derelict, had any right to them. Possession was nine parts of the law.
>
> Nor would he listen to Barber's suggestion that his possession of the guns entitled the captain to "the most-favored individual" treatment. He wanted gunpowder that Barber had on the *Unicorn*, however, for his planned expedition against Kauai and Niihau, and refused to exchange provisions for anything but powder. Barber had to accept; Kamehameha got the powder and kept the cannon, and Barber got only the supplies. - Laselle Gilman, *Honolulu Advertiser*, July 2, 1939, Bishop Museum Scrapbook p. 102 (ibid.).

According to another source, Kamehameha's *ha'ole* advisor, John Young, succeeded in convincing the king to return Barber's goods:

> Numerous native canoes went back and forth, salvaging the cargo and ship's equipment. John Young interceded with Kamehameha I on behalf of Barber, so that the salvaged materials were returned to him rather than kept by the natives (*The Friend* 1862:43). Since then "the long point", *Ka lae loa*, has been known as Barber's Point (Lewis 1970:7).

Shortly after Western contact, the destruction of Hawaii's sandalwood forests began, as traders attempted to supply an insatiable Chinese market for the fragrant wood. In Honouliuli, sandalwood thrived in the higher elevations in the mixed evergreen forest, and dense stands of sandalwood probably extended down into the plain, to the 300-foot elevation, where it grew in the open grassland with scattered *'ohe* (bamboo) and *wiliwili* trees (Frierson 1972:4-6).

The *ali'i* and *konohiki* had cultivated a taste for exotic wares. They sent their retainers to the forests to harvest sandalwood to trade for the foreign goods they craved. As a result Hawaiians abandoned their taro patches and other means of subsistence. The sandalwood trade reached its peak between 1815-1830. Since the immensely valuable trees were distributed throughout the lower dry ridges of the Waianaes and leeward Koolaus, much of Honouliuli was

heavily harvested. Not only were thousands of trees cut down, but harvesters burned much of the Ewa Plain in order to detect by the odor of the smoke any sandalwood logs they had overlooked (St. John IN Frierson 1972:7).

Nearly one quarter of the entire Ewa District population lived in Honouliuli *ahupua'a* in the 1830s (Schmitt IN Kelly 1978:2). By the count of the 1831-32 missionary census, Honouliuli had a population of 1,026. But the area soon went into decline, probably due to disease brought in by Westerners (ibid.), and the 1835 census counted only 870 residents. Lowell Smith, an early missionary, estimated that in 1835 eight to 10 deaths occurred for every birth in the Ewa District (Ewa Station Reportfor 1835:8). Kamakau relates that at one time "Honouliuli had over ten school houses with their teachers...Oahu was then thickly populated." After that time "whole villages had vanished leaving not a man" (Kamakau 1961:424-5).

In 1839, E.O. Hall, a member of the mission, recorded his crossing of Honouliuli:

> Passing all the villages (after leaving Pearl River) at one or two of which we stopped, we crossed the barren desolate plain, at the termination of which is Barber's Point (Hall IN Kelly 1985:160).

Kamehameha III requested a survey in 1840, and it was recorded that, "There are no chiefs or any persons of distinction residing in the districts; the people are laborers or Kanakas, and the landholders reside near the King at Lahaina, or at Honolulu" (Wilkes IN Lewis 1970).

LAND TENURE

When Kamehameha I conquered Oahu in 1795, he placed his own supporting chiefs as managers over the various districts (*moku-o-loko*), *ahupua'a*, and the sub-district land divisions called *'ili 'aina*. From these lands they fed themselves, their families, and their supporters (Kelly 1985:165). It was at this time that Kamehameha installed Kekuamanoha and Kauhiwawaeono at Puuloa (see p.8) (Kamakau 1961:182).

In 1848, during the reign of Kamehameha III, the traditional Hawaiian land ownership system was replaced with a more Western-style system. This radical restructuring was called The Great Mahele (division). The Great Mahele separated and defined the undivided land interests of the King and the high-ranking chiefs, and the *konohiki*, who were originally those in charge of tracts of land on behalf of the king or a chief (Chinen 1958:vii and Chinen 1961:13). More than 240 of the highest-ranking chiefs and *konohiki* in the kingdom joined Kamehameha III in this division. The first mahele was signed on Jan. 27, 1848 by Kamehameha III and Princess Victoria Kamamalu, and by her guardians Mataio Kekuanaoa and Ione Ii. The last mahele was signed by the King and E. Enoka on March 7, 1848 (Chinen 1958:16).

The mahele did not convey title to any land. The chiefs and *konohiki* were required to present their claims to The Land Commission to receive awards for lands quitclaimed to them by Kamehameha III. They were also required to pay commutations to the government in order to receive royal patents on their awards. Until an award was issued, title remained with the government. The lands awarded to the chiefs and *konohiki* became known as Konohiki Lands. Because there were few surveyors in Hawaii at the time of the Mahele, the lands were identified by name only, with the understanding that the ancient boundaries would prevail until the land could be surveyed. This expedited the work of the Land Commission and speeded the transfers (Chinen 1961:13).

During this process all land was placed in one of three categories: Crown Lands (for the occupant of the throne), Government Lands, and Konohiki Lands. These were all "subject to the rights of native tenants," (Laws of Hawaii, 1848:22). Native tenants were the common Hawaiian people who lived on the land and worked it for their subsistance. Questions concerning the nature of these rights began to arise as the King, the government, and *konohiki* began selling parcels of land. On December 21, 1849 the Privy Council attempted to clarify the situation by adopting four resolutions intended to protect the rights of native tenants referred to in the 1848 law (Chinen 1958:29).

These resolutions authorized the Land Commission to award fee simple title to all native tenants who occupied and improved any portion of Crown, Government, or Konohiki lands. These awards were to be free of commutation except for house lots located in the districts of Honolulu, Lahaina, and Hilo (ibid.).

Before receiving their awards from the Land Commission, the native tenants were required to prove that they cultivated the land for a living. They were not permitted to acquire wastelands or lands which they cultivated "with the seeming intention of enlarging their lots." Once a claim was confirmed, a survey was required before the Land Commission was authorized to issue any award. These lands became known as "Kuleana Lands" (ibid:30). Until its

dissolution on March 31, 1855, the Land Commission issued thousands of awards to the native tenants for their *kuleana*; even so, less than 30,000 acres of land were awarded to the native tenants as Kuleana Lands.

In 1826, Kawaa was the *konohiki* for Honouliuli (Bingham IN Frierson 1972:9). The Mahele reserved no land there to the Crown or the government, though many other Ewa lands were reserved, including the entire *ahupua'a* of Aiea. Honouliuli's 43,250 acres were confirmed to M. W. Kekauonohi, a high chiefess, great-granddaughter of Kekaulike (King of Maui), and granddaughter of Kamehameha I. It is uncertain whether this award was through her father, Kinau, or her mother, Wahinepio, who was governess of Maui (Frierson 1972:9). Kekauonohi was one of Liholiho's five wives. She later ran off with a Kaahumanu stepson, after which she married Hoapili. He left her a widow, and she married again, this time to Levi Haalelea. Kekauonohi died in 1851 (Board of Commissioners 1929:27-28, 40-44, 50-52, 67-70, 301). Two years before her death, she had sold the 2,300 acre *ahupua'a'a* of Puuloa to Isaac Montgomery, for $11,000 (Bureau of Conveyances Book 4:41; Lewis 1970:12). When she died, her widower, Levi Haalelea, inherited the remainder of her lands.

According to Kelley, of the Honouliuli lands, 97 awards totalling 106.524 acres were set aside for people who claimed *kuleana* (Frierson gives a figure of 150 acres [1972:12]). Using Kelly's figure, the average grant size was 1.098 acres, with most of the awards granted in the wet-land taro gardens of Honouliuli, not in the dry plain. In 1863 all of these grants were deeded to Haalelea by their owners in payment of debts to him (Kelley 1985:168).

The only mention of the vegetation there at that time speaks of taro lands in the foothills, and of an "old kukui tree," which was one of the boundary markers between Honouliuli and Hoaeae. This tree was a lone reminder of the former forest, and Kunia Road now runs along the boundary it represented (Frierson 1972:11-12). No Land Commission Awards are listed for the immediate vicinity of the project area (Board of Commissioners 1929), nor are any settlements shown on W.D. Alexander's survey map of 1873. However, Division of Land Management records show that a 3/4-acre parcel at Oneula, being *Apana* 8 of Royal Patent (School) Grant No. 30, was set aside for the Board of Education in 1852. This lot and two others at Kualakai and Waimanalo had been abandoned by the turn of the century. A Territorial Land Court boundary map for Honouliuli, dated 1933-34, locates this parcel in the present Oneula Beach Park (Davis 1979:19).

Kelly (1985:168-9) reports that in 1858, Haalelea sued Montgomery's brother, Daniel, to get back the fishing rights associated with the land of Puuloa (Civil Court Case No. 348). Montgomery based his defense, in part, on the claim that after selling Puuloa, Kekauonohi withdrew her *konohiki* from the area and ceased to maintain any control over that fishery (Law Equity, Admiralty and Probate, 1857-1865:1-29; Reports of a Portion of the Decisions Rendered by the Supreme courts of the Hawaiian Islands.). But the judge ruled that Montgomery had only tenant's rights in the fishing grounds, along with all other tenants of Honouliuli (Civil Court Case No. 248:22-23).

Isaac Montgomery and Kamehameha III entered into a lucrative partnership for the salt works at Puuloa. At first the salt was traded to the other islands (Kamakau 1961:409), but by 1897 they counted local meat packers among their customers, and the Russian settlements in the North Pacific, which used the salt for packing salmon (*Hawaiian Gazette* 29 Jan. 1897). A saltworks was also established at Kualakai in Honouliuli, to the west. The remnants of the structures there were still visible in 1935 (Kelly 1985:169).

When Levi Haalelea died, the property went to his wife, Anadelia Amoe, who in 1871 rented it to James Dowsett and John Meek for grazing stock (Frierson 1972:13). These men introduced grazing in areas too high or dry for agriculture. The seed pods from the *kiawe* trees growing there provided food for the cattle, and *kiawe* wood made excellent charcoal (Henke 1929 IN Frierson 1972).

Amoe deeded Honouliuli to her sister's husband, John H. Coney, who sold it to James Campbell in September 1877, for $95,000. The deed put the size of Honouliuli at 43,640 acres, "or thereabouts" (Bureau of Conveyances Book 52:210), approximately 400 acres more than Kekauonohi's original award (Kelly 1985:169).

By 1881, Honouliuli was the site of a prosperous ranch that "had 10,000 acres devoted to agriculture, with abundant pasturage of various kinds." Campbell put up fences and chased out the 32,000 head of cattle, owned by other people, that roamed the area (Briggs IN Lewis 1970:13,Dillingham 1885). This was twice the number of cattle estimated for all of Oahu in 1879 (Henke IN Frierson 1972:13). Campbell also granted leases for rice lands, fishing rights at Pearl Harbor, and a lime quarry. In addition, he made a business of fattening and slaughtering cattle from other ranches to supply the Honolulu market (ibid.).

Campbell had contracted with John Ashley to drill a well behind his ranch house in Honouliuli in July of 1879, and the result was the first artesian well in the Hawaiian Islands. It flowed until 1939, when it was sealed by the City and County of Honolulu, and all that remains of it is a commemorative plaque on Fort Weaver Road (Pagliaro 1987:2). The success of this well inspired those who understood the link between water and prosperity, and from 1890 into the 1920's, 71 additional wells were drilled, with a capacity of over one hundred million gallons per day (Lewis 1970:14).

THE PLANTATION AND THE RAILROAD

With readily available water, commercial agricultural came to the plains. In 1889, Honouliuli was leased to Dillingham for 50 years, and on January 29, 1890, the Ewa Sugar Plantation Company was chartered. Ewa Plantation soon began operations in the lower portion of the *ahupua'a* (Kelley 1978:3). The first fields were plowed for sugar in 1890 (Lewis 1970:16), and Chinese tenants grew rice in taro fields abandoned by the vanished Hawaiians (Briggs IN Lewis 1970).

It was said that "what had been veritable desert now began to blossom into a full-fledged sugar venture" (Conde and Best 1973:278). Ewa Plantation was at one time said to be the "richest sugar plantation in the world" (*Paradise of the Pacific* Dec. 1902:19-22). Later, Oahu Sugar Company began operations in the upper portion of Honouliuli (Kelly 1978:3).

The plantation operators recognized the agricultural potential of the coral plain. For a few years during the early part of this century, Ewa Plantation undertook a land reclamation project in order to put some of this wasteland into cultivation. They devised a complex system of drainage ditches running from the lower slopes of the Waianae Range to the coral plain. Before the rainy season, the slopes were plowed so as to induce erosion, and when the heavy rains began, great quantities of soil were carried down into the drainage ditches and onto the plain. As much as this practice seems to contradict modern notions of soil conservation, it was considered successful by the men who used it, and in the few years it was tried, about 373 acres of coral wasteland were reclaimed (Immisch 1964:70).

Seeking a greater return on his investment, Campbell collaborated with Dillingham in 1885-1886 on a "great land colonization scheme" for Honouliuli (Thrum 1886:73-80). They proposed to form a development company that would offer small tracts of land for agriculture and homesteads. They touted 7000 acres of "rich, smooth bottom land lying at the southeastern end of the Waianae mountains," with an "inexhaustible supply of water" (Dillingham 1885). They described the climate as perfectly suited to sugar, rice, grapes and other fruits, but they had almost no takers.

Construction of a railroad by Oahu Railway and Land Company (OR&L) began in 1889, and by 1895 the tracks extended through Honouliuli to Waianae (Figure A-2). On June 19, 1890, *The Pacific Commercial Advertiser* noted, "The first carload of freight to Ewa Plantation went over the OR&L Co.'s line yesterday," and on August 1st, the *Honolulu Advertiser* reported:

> On Wednesday last the track of the Ewa Plantation railway was completed to the harbor front, so the first train reached the wharf and several carloads of bananas were placed in scows and put on board the Australia.

To create business for the railroad, Dillingham sublet all the land below 200 ft to William Castle, who sublet again to the Ewa Plantation Company, which planted sugar cane (Frierson 1972:15). Dillingham also established a string of ranches along the proposed line (ibid:16).

There are indications of a spirited legal battle between the plantation and the Oahu Railway & Land Co. over use of the OR&L Co. tracks in the plantation. The 1893 Annual Plantation Report describes the settlement:

> The settlement of the dispute with the Oahu Railway & Land Co., as regards the intention of the lease gives the plantation fee use of the Oahu Railway & Land Co.'s track within the boundary of the plantation for plantation purposes for the full term of the lease (Conde & Best 1973:279).

This appeared to benefit both the plantation and the railway. A reporter for the *Louisiana Planter* wrote in 1910:

> One of the biggest things about this plantation is its railway system. There are two or three motor cars on the plantation used on the railway tracks; in fact these are indispensable, as it is impossible to get from point to point, between which there is often a distance of several miles, quick enough without them. The general manager's car is two-seated and holds four persons, and in this we made our inspection of the many miles of track and the numerous fields being harvested. This plantation has thirty miles of permanent track rockballasted, and twelve or fifteen miles of portable trackage for



Figure A-2.
OR&L ROUTE

> transient field work. On the former, we at times sped along at 35 miles per hour, and almost as easily as in a Pullman. In spite of being able to attain great speed on straight stretches of track, it took us hours to see the whole plantation (ibid:280).

The beginning of the end for the railroad was the dissolution of ties with Oahu Railway and Land Company. The plantation manager's report for 1947 contains this comment: "For over fifty years we have depended upon the reliable and efficient service of the Oahu Railway & Land Co. to transport our sugar, molasses and supplies. We regret it has been necessary for them to terminate this service at the end of 1947" (ibid:315). The last load of sugar cane came in by rail from the fields on November 14, 1950. In an entry under "Harvesting," the Oahu Sugar Company manager noted that by the end of 1951, "transportation of the entire crop from field to factory was done for the first time, the railroad being eliminated" (ibid:316).

SOCIAL CHANGE AT EWA PLANTATION

Management of the immigrant labor force at Ewa Plantation was a complex and challanging job. This is evident in a report made by the first manager for Ewa Plantation Company, W.J. Lowrie:

> "There is one thing that probably some of you are not aware of, and that is, that the more scarce labor is, the more independent they are, and the less work they do. I am sure 3 Chinamen at the present rate of wages, $24.00 per month, are not any more than equal to what 2 Chinamen were two years ago at $18.00 per month; and if I am correct you can see that Chinese labor for the past season has cost exactly 100% more than two years ago (Ewa Plantation Co. Annual Report 1890:6).

> We expect to plant 1000 acres for the next crop, and will require by next July at least 500 more laborers. Our Japanese are doing very well. There were no deaths in 1890, but so far in 1891 we have lost two, quite a number of them are on the sick list, and it is not to be wondered at when we consider how they live. They seem to prefer sending a large portion of their earnings to Japan, rather than buying proper food and keeping in good health. But we are slowly overcoming this difficulty by encouraging them to eat meat, potatoes, etc. All other classes of people on the place appear to keep in good health (ibid.)

In her 1987 historical study of Ewa Plantation, Penny Pagliaro discusses such problems as labor-management relations and health care. She argues that Lowrie's cultural insensitivity was typical of the period (1987:6). She adds that his collected letters do not show him to have been either negative or positive toward specific immigrant groups, except in relation to their willingness to abide by their contract with the company (ibid.).

Lowrie's answer to labor shortages was to try to develop a stable work force by establishing a profit-sharing program for his employees. By 1894, he was able to report the formation of "five new [profit-sharing]companies, with about one hundred acres each. They are giving good satisfaction" (Ewa Plantation Co. Annual Report 1894:12). Ewa Plantation was spared much of the turmoil experienced elsewhere when the contract labor system was abolished in 1900, possibly due to the profit-sharing system. The succeeding manager, George F. Renton Sr., reported:

> While laborers came and went in the period of unrest following the termination of the contract system on June 14th last, there was practically no change in the personnel of the Profit Sharing 'Companies'; and...this branch of [the plantation] was not set back in the slightest degree (Ewa Plantation Co. Annual Report 1900:4).

Renton tried to insure that employees thought of Ewa Plantation as their permanent home. In 1918, he explained this to the stockholders:

> That in the evolution of things a better housing of our workmen and their families is necessary, and that any reasonable expenditure for their comfort and happiness in any direction will be profitable, is beyond doubt. The main idea being to have the employees look upon the plantations as their homes and not as temporary camps to be left as soon as enough money has been saved to enable them to do so (Ewa Plantation Co. Annual Report 1918:7).

This, Renton believed, was the foundation of a stable and reliable work force (Pagliaro 1987:10). This policy was continued by Renton Jr., who succeeded his father. He recorded that 4,967 persons lived in the various villages on Ewa Plantation lands as of December 31, 1928. Pagliaro notes that Renton's job included many duties normally the responsibility of a city mayor.

Possibly more important to the well-being of plantation residents was Renton Jr.'s crusade for improved health care, especially for infants and children. The infant mortality rate in 1929 reached a shocking 160.7 deaths per thousand. That year, in conjunction with Queen's Hospital, Ewa Plantation opened a small, experimental health center for the purpose of reducing the infant mortality rate. The results were spectacular, and within two years Hawaii Sugar Planters Association had agreed to underwrite a portion of the cost in return for the general dissemination of the results to all plantations (Pagliaro 1987:16).

By 1934, the full impact of the program was apparent:

> The Health Center is continuing its commendable work. Daily about 280 babies (approximately 90% of the total) are brought to the Health Center for their food. About 80 children, or a little over one-half of those attending our free Kindergarten, ages 3 to 6 years, are enrolled in our Health Center and thus obtain proper lunches. In the Ewa Public School there are about 1,030 children — ages 6 to 17 years. Of these, 620 are served with lunches at the school, the menus having been approved by the Director of the Health Center, and the other children bring their lunches from home.
>
> The general health of the children is good. With 100 live births this past year, there were but five deaths—three infants died of meningitis, one of beri-beri, and one was prematurely born. This represents an infant mortality rate of 50, which is considered good (Ewa Plantation Co. Annual Report 1934:9).

According to Pagliaro, the Ewa Plantation Health Center project revolutionized the concept of child health care on Island plantations (1987:17).

The next manager, J.D. Bond, recognized individual employees in the annual report for the first time, paying tribute to the contributions of his workers:

> You will find a list of names of 592 of you in this booklet. Those of you who are recorded have an unbroken service record at Ewa of at least 10 years. You have invested a part of your lives in this Company and in some slight recognition of this, we include this list in the annual report. At the top of the list, Mr. Joe Fernandez stands alone. Joe will have completed 48 years of continuous service at Ewa in 1939, and I hope will complete many more (Ewa Plantation Co. Annual Report 1938:18).

The Ewa Plantation Company operated until 1947 (Hammatt & Shideler 1989:7). It was sold on April 18, 1970 to Oahu Sugar Co. (American Factors) by Castle and Cooke, Inc. (*Honolulu Star-Bulletin* 1970:A-4).

FIBER CROPS AND COASTAL MARINE RESOURCES

Sugar was not the only crop the planters tried. Fiber plants, henequen and sisal, had been introduced about 1840 for rope production (Franck 1937 IN Frierson 1972). Sisal was planted in the area southeast of Puuokapolei, and on the land now occupied by Barber's Point Naval Air Station. According to the *Pacific Commercial Advertiser* (1894:7) sisal was planted first in 1894 for cordage, resulting in the name "Sisal" for the area southeast of Puuokapolei (Kelly 1978:3; Frierson 1972:11). Successful experiments with sisal in Hawaii led to the organization of the Hawaiian Fibre Company in 1898:

> This corporation secured about 300 acres on the coral limestone coastal plain which skirts leeward Oahu, and began planting on a commercial basis. The original investment represented about $37,000. The land controlled by this company now comprises about 3,000 acres, with a capitalization of $150,000, and an annual yield of about 500 tons. The company employs about 60 laborers, men and women; at present all are Japanese. The minimum [pay is] $1.25 per day (U.S. gold); in addition to this, living quarters, land for gardens, water, insurance, fuel, and medical attendance are furnished by the company. This gratuity represents an expenditure of over $.25 per day per laborer. These wages correspond with those of the sugar and pineapple plantation for the same classes of labor, and strikingly indicate that Hawaii, contrary to popular opinion upon the mainland, does not possess "cheap labor" (MacCaughey and Weinrich 1918:43).

William Castle Jr. describes the sisal fields and their surroundings in Honouliuli in 1913:

> From Pearl Harbor the train cuts across the broad cane fields of Ewa Plantation....Beyond, on the barren plains that slope upward to the Waianae Mountains, there are fields of sisal, each plant looking like a rosette of spears protruding from the ground. Through scrub algaroba [Kiawe] forests, where honey bees are raised, the railroad passes (Frierson 1972:17).

In the early 20th Century, fishermen occasionally built shanties by the shore, where they lived as squatters, trading fish for taro at Ewa. Their drinking water, taken from nearby ponds, was so brackish that other people could not drink it. Near Barber's Point there was a pond with freshwater shrimp, which were assumed to have been brought down from inland streams and put there to propagate (Herman Von Holt, interview April 6, 1970 IN Lewis 1970:16).

The following account by Eleanor Williamson of Bishop Museum, whose family lived at Kualakai (see Fig. 1), recalls the abundance of seafood in the area and includes a reference to the sisal which was so common:

> In the Honouliuli area the train stopped among the kiawe (algaroba) trees and malina (sisal) thickets. We disembarked with the assorted food bundles and water containers. Some of the Kualaka'i 'ohana met us to help carry the 'ukana (bundles) along a sandstone pathway through the kiawe and malina. The distance to the frame house near the shore seemed long.
>
> When we departed our 'ukana contained fresh lobsters, limu (algae), fish and i'a malo'o (dried fish)....Tutu ma (grandfolks and others) shared and ate the seafoods with great relish (Williamson IN Kelly 1985:160).

By 1920, land use in Honouliuli looked something like this:

> Ewa Plantation - 12,000 acres, including sugar cane, a large mill, residential areas for several thousand people, a sisal plantation, large wood-lot at Waimanalo, and a limestone quarry.
>
> Oahu Sugar Co. - 3000 acres, partially in sugar, which was primarily at the lower elevations.
>
> Honouliuli Ranch - 20,000 acres, much of it classified as "waste" because of rocks and gullies; 2000-4000 cattle, plus hogs, horses and mules.

Pineapple, forest, and wasteland occupied the remaining 6000 acres.

HONOULIULI FOREST RESERVE

Much of the pasture land later went into pineapple production, but some higher elevation pasture was included in the Honouliuli Forest Reserve, which was established on Feb. 2, 1925 (ibid:18). The October-December 1924 issue of the *Hawaiian Forester and Agriculturist* contained a detailed report on the Honouliuli Forest Reserve, which included the following description:

> [Honouliuli Forest Reserve consists] of 4,936 acres in the ahupua'a of Honouliuli...[it] is entirely owned by the James Campbell Estate. The land at present is under lease to the Oahu Railway and Land Co. with an unexpired term of about 15 years, and is used in part as a cattle range.
>
> Of the total area of 4,936 acres included in this reserve, 75% is covered with forest, and the heaviest forest is found in the Popouwela section at the north end, where higher elevations and a greater mountain mass induce more moisture. The wet or lehua type of forest naturally occurs near the crest of the range, and occupies 14% of the reserve area. The kukui type is found next below, in which clumps of koa on slopes, and other species already mentioned are frequent. It is of a very open nature, due largely to cattle and other depredations, and occupies 57% of the reserve area. At the south end, partly inside the kukui type, approximately 200 acres, or 4% of the reserve area, are occupied by a planted forest of cypress, eucalyptus, koa, plum, silk oak, sugi, and other species. Areas covered only with brush such as lantana and oi weed, with grass, or entirely bare of vegetation, amount to 25% of the total reserve area.
>
> The ridges at the south end of this section are bare as the result of erosion, and are exposed to drying winds. The native forest of koa on the ridges and kukui in the valleys has been badly depleted in the past by overgrazing, so that practically only half of the area is covered by original forest.
>
> The forest situation in this section has been vastly improved, however, by the artificial planting, done under the direction of Mr. H.M. von Holt during the past 20 years. This has resulted in an excellent forest in places of koa, several different species of eucalyptus, cypress, plum, Japanese cedar, and other sturdy trees.
>
> Although cattle have been kept out of this section for many years past, horses in limited numbers have been allowed on the area without much apparent damage.

Although there are no permanently running streams on the area at present, I feel, as did my predecessor, that it would be best in the long run to begin now the protection and extension of the native forest by the exclusion of cattle and other grazing stock (Judd 1924).

GOVERNMENT OCCUPATION

In 1888, the Hawaiian Government established the Barber's Point Lighthouse, one of the first government structures in the area (Thrum 1889:89). In 1937, United States Government emergency funds were used to construct about 18 miles of road in the Barber's Point area. A map of Ewa Plantation dated July 27, 1939 clearly depicts the United States Army Road running west from the Puuloa Area, paralleling the coast to its termination near Barber's Point Lighthouse (Albert 1980:290).

In late 1939 and early 1940, the United States Navy acquired over 3,500 acres of land from the Campbell Estate, and built the first military installation in Honouliuli, the Ewa Marine Corps Air Station, Barber's Point. The facility remained operational until the current Naval Air Station was commissioned in 1942 (Kelly 1978:3).

World War II accelerated the pace of construction at the Naval Air Station, and it was already being heavily used before its completion on April 15, 1942 (Kelly 1985:175). It was reported that by October 1947 the Station had the largest landing mat in the Pacific, and that takeoffs averaged 1,500 planes daily during World War II (ibid.).

During World War II, the military also used the OR&L rail system. In 1944, the plantation manager reported: "We have continued to haul large quantities of ammunition over our railroad tracks and are continuing to supply the Armed Forces with buildings and electricity" (Conde & Best 1973:282). Hammatt notes that the coastline "has clearly been dramatically altered, mostly for coastal defense during the early 1940's. Concrete structures, including antiaircraft emplacements, tank traps, etc. are still visible. Their construction would have involved bulldozing and grading in surrounding areas" (1984:2).

Oneula Beach Park is within the boundaries of the project area. The Oneula Archaeological District contains the last remaining archaeological sites in the vicinity (Flanders 1986). As of September 30, 1986, Site 50-OA-2873 within the Oneula Archaeological District was considered eligible for inclusion on the National Register of Historical Places.

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APPENDIX B:
KALO'I DRAINAGE CHANNEL AREA AND MARINA CHANNEL AREA BACKHOE TRENCH SOIL DESCRIPTIONS

KALO'I DRAINAGE CHANNEL AREA

Trench Number	Layer and Depth Range	Type and Description
1	Layer I 0.00-0.70	Type I-disturbed; many fine roots
	Layer II 0.70-1.50	Type II-slightly compacted
	Layer III 1.50-1.70	Type III-slightly compacted
	Layer IV 1.70-1.95	Type IV-(water level 1.75)
2	Layer I 0.0-0.20	Type I-disturbed; many fine roots
	Layer II 0.20-0.25	Type II-slightly compacted
	Layer III 0.25-0.70	Type III-slightly compacted
	Layer IV 0.70-2.75	Type IV-(water level 2.50)
3	Layer I 0.0-0.50	Type I-disturbed; many fine roots
	Layer II 0.50-0.70	Type II-slightly compacted w/ coral gravel
	Layer III 0.70-1.50	Types II and III mixed; compacted w/ small coral gravel
4	Layer I 0.0-0.56	Type I-disturbed; many fine roots
	Layer II 0.56-2.0	Type II and III mixed-slightly compacted
	Layer IV 2.00-0.2.75	Type IV-(water level 2.02)
5	Layer I 0.0-0.25	Type I-disturbed; many fine roots
	Layer II 0.25-1.20	Type II-slightly compacted
	Layer III 1.20-3.00	Type III-compacted (water table 2.25)
6	Layer I 0.0-1.18	Type I-disturbed
	Layer II 1.18-3.45	Type II-compacted (water table 3.02)
7	Layer I 0.0-1.00	Type I-disturbed
	Layer II 1.00-2.10	Type II-(water table 1.95)
8	Layer I 0.0-0.70	Type I
	Layer II 0.70-1.95	Type II-compact
	Layer III 1.95-3.00	Type III (water table 2.78)
9	Layer I 0.0-0.45	Type I-disturbed; many roots
	Layer II 0.45-1.00	Type II
	Layer III 1.00-3.10	Type III (water table 2.80)
10	Layer I 0.0-0.40	Type I-disturbed; many roots
	Layer II 0.40-0.95	Type II
	Layer III 0.95-2.83	Type III (water table 2.25)
11	Layer I 0.0-0.50	Type I-disturbed
	Layer II 0.50-1.00	Type II-compact

12	Layer I 0.0-0.72	Type I-disturbed
	Layer II 0.72-1.78	Type II
13	Layer I 0.00-0.60	Type I-disturbed
	Layer II 0.60-1.80	Type II
14	Layer I 0.0-0.25	Type I-disturbed
	Layer II 0.25-0.74	Type II
	Layer III 0.74-2.35	Type III-compact (water table 2.30)
15	Layer I 0.00-0.48	Type I-disturbed
	Layer II 0.48-1.00	Type II-mottled
16	Layer I 0.0-0.80	Type I-disturbed
	Layer II 0.80-1.30	Type II
17	Layer I 0.00-0.32	Type I-disturbed
	Layer II 0.32-1.78	Type II
18	Layer I 0.0-0.25	Type I-disturbed
	Layer II 0.25-2.50	Type II- (water table 2.25)
19	Layer I 0.0-0.20	Type I-disturbed
	Layer II 0.20-1.00	Type II
20	Layer I 0.0-0.20	Type I-disturbed
	Layer II 0.20-1.75	Type II
21	Layer I 0.0-0.45	Type I-disturbed
	Layer II 0.45-2.00	Type II
22	Layer I 0.0-0.40	Type I-disturbed
	Layer II 0.40-2.43	Type II-(water table 2.25)
23	Layer I 0.0-0.30	Type I-disturbed
	Layer II 0.30-1.00	Type II
24	Layer I 0.0-0.30	Type I-disturbed
	Layer II 0.30-0.41	Type II
25	Layer I 0.0-0.80	Type I-disturbed
	Layer II 0.80-2.18	Type II-(water table 2.15)
26	Layer I 0.0-0.30	Type I-disturbed
	Layer II 0.30-1.00	Type II
27	Layer I 0.0-0.85	Type I-disturbed
	Layer II 0.85-3.00	Type II-(water table 3.0)

MARINA CHANNEL AREA

28	Layer I 0.0-0.30	Type I
	Layer II 0.30-0.66	Type II
29	Layer I 0.0-0.33	Type I
	Layer II 0.33-0.70	Type II

30	Layer I 0.0-0.10	Type I
	Layer II 0.10-0.40	Type II
	Layer III 0.40-0.70	Type III
31	Layer I 0.0-0.20	Type I
	Layer II 0.20-0.50	Type II
32	Layer I 0.0-0.10	Type I
	Layer II 0.10-0.60	Type II
33	Layer I 0.0-0.32	Type I
	Layer II 0.32-0.50	Type II
33	Layer I 0.0-0.32	Type I
	Layer II 0.32-0.50	Type II
34	Layer I 0.0-0.18	Type I
	Layer II 0.18-1.00	Type II
35	Layer I 0.0-0.32	Type I
	Layer II 0.32-0.60	Type II
36	Layer I 0.0-0.22	Type I
	Layer II 0.22-0.36	Type II
37	Layer I 0.0-0.35	Type I
	Layer II 0.35-0.45	Type II
38	Layer I 0.0-0.10	Type I
	Layer II 0.10-0.35	Type II
39	Layer I 0.0-0.26	Type I
	Layer II 0.26-0.45	Type II
40	Layer I 0.0-0.30	Type I
	Layer II 0.30-0.45	Type II
41	Layer I 0.0-0.20	Type I
	Layer II 0.20-0.45	Type II
42	Layer I 0.0-0.20	Type I
	Layer II 0.20-0.27	Type II
43	Layer I 0.0-0.40	Type I
	Layer II 0.40-0.50	Type II
44	Layer I 0.0-0.25	Type I
	Layer II 0.25-0.45	Type II
45	Layer I 0.0-0.11	Type I
	Layer II 0.11-0.39	Type II
46	Layer I 0.0-0.18	Type I
	Layer II 0.18-0.65	Type II
	Layer III 0.65-0.90	Type III
47	Layer I 0.0-0.15	Type I
	Layer II 0.15-0.47	Type II

48	Layer I	0.0-0.10	Type I
	Layer II	0.10-0.35	Type II
49	Layer I	0.0-0.30	Type I
	Layer II	0.30-0.50	Type II
50	Layer I	0.0-0.33	Type I
	Layer II	0.33-0.45	Type II
51	Layer I	0.0-0.25	Type I
	Layer II	0.25-0.30	Type II
52	Layer I	0.0-0.15	Type I
	Layer II	0.15-0.30	Type II
53	Layer I	0.0-0.15	Type I
	Layer II	0.15-0.40	Type II

Key:
Type I: yellowish brown (10YR 5/4)
Type II: light grey (10YR 7/2)
Type III: light brownish grey (10YR 6/2)
Type IV: Greenish grey (6/1; chart 1 for Gley)

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Project 2379
July 8, 2004

P. Holland McEldowney, Ph.D., Administrator
State Historic Preservation Division
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawai'i 96707

Subject: Replacement pages for PHRI Report 2379-050104
Supplemental Archaeological Survey:
Subsurface Testing of Beach Areas at Marina Channel and
Kalo'i Drainage Channel, Ocean Pointe Project
Land of Honouliuli, 'Ewa District
Island of O'ahu (TMK:9-1-012:var.)

Dear Dr. McEldowney:

Enclosed for your approval are replacement pages for PHRI Report 2379-050104, which you recently reviewed (SHPD review letter dated 29 June 2004; Log No:2004.1904; Doc No:0406SC14). The pages have been revised per the review comments in your letter. For your convenience, the comments have been reproduced here (attached), with each comment followed by a PHRI response.

If you have any questions, please call me at our Hilo office, (808)969-1763.

Sincerely yours,

Paul H. Rosendahl, Ph.D.
President and Principal
Archaeologist

Encl: Replacement pages (title, ii, 1, 9-14, 18, 46-50)
cc: Perry White, Planning Solutions, Inc., with replacement pages

ATTACHMENT

Supplemental Archaeological Inventory Survey
At One'ula and Ocean Pointe

(PHRI responses in italics)

HAR 13-276-5(a) (1)(B) & HAR 13-276-5(a) (2)
Pursuant to the above citation, please provide all of the Tax Map Parcels covered by the subject report. The complete TMK information should also appear on the report's cover and the title page. Also please include the names of all landowners whose property is covered by the subject report. Even though the subject report is, de facto, an archaeological assessment report (cf. HAR 13-284), this information is still required.
PHRI Response: Complete TMK information is now included, and the names of all landowners has been added to the report (title page, and pages ii and 1).

HAR 13-276-5(b)(2)
Although the subject report appears to be an archaeological assessment, we are somewhat perturbed by the rather dated references used in the archaeological background section. For example, the significant body of work produced by the US Navy's consultants during the closure of the former Barbers Point Naval Air Station is not mentioned at all, nor are some more recent reports for the 'Ewa region, such as the West Beach report. We recommend that some efforts be made to update your apparently "boilerplate" synthesis of previous archaeological work in 'Ewa.
PHRI Response: The Previous Archaeological Work section has been augmented; the West Beach report, the cultural resource management report on the Barber's Point Naval Air Station, and IARII's work in conjunction with the proposed closure of the station, are now mentioned.

HAR 13-276-5(d) (4) (D) (i) & (ii)
On page 18 you state that three layers of sand were observed, yet a Layer IV is mentioned (page 42) and listed in Appendix B. Please make the necessary corrections or clarifications.
PHRI Response: The statement was that three primary layers were found: Layer IV is mentioned below that and in other areas of the report. The existence of Layer IV has been further clarified on page 18.

HAR 13-276-5(g)
There is no statement regarding the nature or extent of any consultation process carried out pursuant to the section of the rules cited above. Although Appendix A presents historical information on the project area and 'Ewa, it is not clear that any consultation occurred with individuals knowledgeable about the project area's history.
PHRI Response: The section referred to above states in part: "The report shall contain information on the consultation process with individuals knowledgeable about the project area's history, if discussions with the SHPD, background research or public input indicate a need to consult with knowledgeable individuals." The site visit to the inadvertent discovery location in 2001 by the Oahu Island Burial Council (OIBC) and discussions among PHRI, the OIBC (including Burials Program ManagerKai Markell and Burials Program Cultural Specialist Kanai Kapeliela), Perry White of Planning Solutions, Dr. Sara L. Colllins, SHPD Archaeology Branch Chief, and the City and County of Honolulu (CCHONO) constitute the consultation process. Given the negative findings of the assessment in terms of presence/absence of human skeletal remains, it is believed that further consultation is not appropriate or required. The historical information on the project area and 'Ewa, presented in Appendix A, is adequate to provide a historical background for the area.

Recommendations

We do not concur that no further work is necessary. Given the results of the supplemental survey, and the prior burial finds, we believe that archaeological monitoring of ground-disturbing activities associated with construction of the marina entrance channel and the Kalo'i Drainage Channel is warranted. An acceptable archaeological monitoring plan will need to be reviewed and approved, prior to any construction work.

PHRI Response: PHRI is puzzled by the above statement "given the results..." The testing program entailed the placement of 53 backhoe trenches and three test units in defined, limited areas, with trenches spaced closely. In addition, the previous intensive archaeological survey and test excavations and Phase II data recovery work resulted in the placement of 153 test units, 122 shovel tests, and 24 backhoe trenches. The results of all the testing were negative for presence/absence of human skeletal remains. Had the testing proved positive, we feel this comment would be justified and a monitoring program warranted. We feel that the negative results indicate that monitoring is not warranted. Apparently, the SHPD considers that, in this case, the results have little bearing on whether a monitoring program is warranted or not. PHRI stands by its original recommendation of no further archaeological work.

If, however, the SHPD insists that monitoring is necessary, we would like to point out that the approved archaeological mitigation plan for the Ewa Marina project includes a plan for monitoring; we believe it would not require much work to modify the approved plan—as has been done in other recent instances—so that it is applicable to the current project (PHRI Report 763-110890 [Haun, Rosendahl, and Goodfellow 1991]; Archaeological Mitigation Plan, Ewa Marina Community Project – Phase I, Mitigation Plan for Data Recovery, Interim Site Preservation, and Monitoring).

APPENDIX F

Report 1596-033199:

Phase III Archaeological Site Preservation Plan,

Appendix B: Limited Oral History Interviews

and

Historical Documentation Concerning

the Honouliuli Area and Kamaaina Interviews

Report 1596-033199:

Phase III Archaeological Site Preservation Plan:

Phased Mitigation Program, Ewa Marina Community Project,

Land of Honouliuli, Island of Oahu,

Appendix B: Limited Oral History Interviews

Paul H. Rosendahl, Ph.D., Inc.

March 1999

Historical Documentation Concerning the Honouliuli Area and Kamaaina Interviews

Arline Wainaha Pu'ulei Brede-Eaton
Henry Chang Wo

R.M. Towill Corporation
August and September 2004

APPENDIX F:
HISTORICAL DOCUMENTATION CONCERNING THE HONOULIULI AREA AND KAMAAAINA INTERVIEWS

F.1 HISTORICAL DOCUMENTATION

The source of information used to prepare this section including the use of the region in the area of the project site is from the *Supplemental Archaeological Survey: Subsurface Testing of Beach Areas at Marina Channel and Kaloi Drainage Channel, Ocean Pointe Project, PHRI, 2004*. The following is a brief overview and post contact summary from the survey.

Overview

Honouliuli is the largest and westernmost ahupuaa in the Ewa District of Oahu (Hammatt and Folk, 1981:29). From the ridgeline of Palikea in the Waianae Range, its western border extends to the sea at Piliokahe, and on the east it reaches to Puu Loa, west of the West Loch of Pearl Harbor. Honouliuli, which means “dark harbor” or “dark bay,” takes its name from the waters of West Loch (Jarret IN Frierson, 1972, and Pukui et al. 1974:5 1).

Honouliuli contained all the resource zones necessary for full economic existence in Ancient Hawaii: uka (mountain), waena (middle), and kahakai (shoreline). The shoreline in the project area is in the vicinity of what was once an area of fishponds, shellfish resources, and salt-drying. Nearby Puuloa, to the east, was once an important agricultural area that boasted a productive fishery with fishponds and fish traps. The coastal waters from Keahi Point to Kualakai were, and still are, a source of lipoa, an edible seaweed (Sterling and Summers, 1978:44). In modern times poultry and pig farms were located in the kiawe forest area mauka of the project area. The coastal portion of the district is now the site of Oneula (red sand) Beach Park.

Post Contact Summary

By 1879 the first artesian well in the Hawaiian Islands was drilled in Ewa. It flowed until 1930, when it was sealed by the City. All that remains of the well is a commemorative plaque on Fort Weaver Road (Pagliaro, 1987:2). With readily available water, commercial agriculture came to occupy a prominent role on the Ewa Plain. It was said that "what had been veritable desert now began to blossom into a full-fledged sugar venture" (Conde and Best 1973:278). According to *Paradise of the Pacific,* in December 1902, Ewa Plantation was said to be the "richest sugar plantation in the world." The plantation operated until the 1990s, when it was closed. In the interim the Ewa Plain was used for cattle ranching and various other agricultural activities, including taro farming, sisal production, and the harvesting of marine resources.

Fisherman occasionally built shanties by the shore in the early Twentieth Century, where they lived as squatters, trading fish for taro at Ewa. Their drinking water, taken from nearby ponds, was so brackish that other people could not drink it. Near Barbers point there was a pond with freshwater shrimp, which were assumed to have been brought down from inland streams and put there to propagate (Herman Von Holt, Interview April 6, 1970 IN Lewis, 1970:16).

By 1939 and early in 1940, the U.S. Navy acquired land from the Campbell Estate and constructed the first military installation in Honouliuli, the Ewa Marine Corps Air Station, Barbers Point. The facility remained operational as the Barbers Point Naval Air Station; it has since closed.

F.2 KAMAAINA INTERVIEWS

Native Hawaiians and others use the Ewa Shoreline and nearshore areas to gather marine resources, including limu, fish, lobster, and other shellfish. Oral histories associated with use of the Honouliuli-Puuloa Area were conducted by Kepa Maly in May 1997 to record the cultural use of and sites associated with the area as part of the

Archaeological Preservation Plan for the Ocean Pointe project. Interview sessions were conducted to provide input to development of the site preservation plan.

Subsequent interviews with Kupuna who were knowledgeable of the shoreline and nearshore resources at Oneula Beach Park were conducted on July 27, 2004. These interviews were conducted by Sharene Saito Tam of HASEKO and Brian Takeda, R.M. Towill Corporation.

F.2.1 1997 INTERVIEWS

Ms. Arline Wainaha Pu'ulei Brede-Eaton was interviewed on March 4, 1997. Ms. Eaton has lived in Puuloa (Ewa) nearly all of her life. Her father oversaw ranch operations for the Dowsett family and worked at the Honolulu Ironworks. By the time of her birth her father had bought land and built a home at Puuloa, living in Kalihi on week days. Today, she is one of the oldest Native Hawaiian residents to have grown up in Ewa.

Summary comments provided during the interview include:

- The whole region was our playground, we'd go to Keahi, go by canoe to Laulaunui and fish, and in the other direction, we'd walk as far as Kalaeloa ...We would walk from Puuloa to the shore at (Ke) Oneula, and then on to Kualakai, and along the way we would gather limu (seaweed). There was limu kohu, lipoa, and eleele, and the fish were so plentiful, not like now. Back when I was a child, there was more sand also, the entire shoreline was like the beach at Barbers Point. Today, the shoreline has all of that craggy coral, before had sand between the coral and the water. Things have changed now, I don't know why.

- While no one was living full-time out between Keoneula and Kualakai, there were families that would come out for several months at a time... The people would fish, gather limu, and make paakai (salt).

- There's water out there, its wai kai (brackish), but we were used to that water, not like today. You can tell that there's water there along the shore, you can see it bubbling up, and the limu eleele will only grow where there is fresh water coming out of the papa (reef flats). And you know, when I was young, there was a lot more water in the ponds back there. People don't believe me, but I remember when I was a child, there was a lot of water there.

Miss Thelma Genevieve Parish was interviewed with Arline Wainaha Pu'ulei Brede-Eaton on May 2, 1997. Selected comments include:

- ...I have known and taken a very vivid interest in my family, on both my father's side, which was the Dowsett side. And my mother's side which comes from the other side of the island in Waiahole-Hakipuu. So my grandmother, Mary Kaohinani Dowsett-Parish, built one of the first homes in Kaimuki, when it was a very new subdivision in Honolulu. And as a member of the Dowsett family, she had inherited acreage down here in the area that we now call Ewa Beach.

- (Kepa Maly (KM): As a child, do you remember, were there good areas for limu, like lipoa, or fish like oio?) Oh! Ewa, Kupaka was noted for its limu. The limu banks would pile up as high as 3 feet along the shoreline. (KM: Along the area fronting here [pointing to the ocean shore fronting Kupaka]. So there is a papa, a reef flats or something?) Yes, in fact you'd think there was no reef area because there is no line of breakers. But the limu was extremely plentiful.

- (KM: So there was good limu; all kinds, or a particular variety?) All kinds ...and the manauea was particularly important. (KM: Was there wawaeiole?) Yes. (KM: Lipoa?) Plenty. (KM: Kohu?) Yes, limu kohu... There's still plenty when you go to Barbers Point, because nobody goes in. They don't have access. I just got some limu kohu, Mary went to make some.

- (KM: So was that a popular occurrence, friends and family might come down to gather limu or fish when you were young children?) Occasionally, it was almost untouched, as we knew it. (KM: And you said it was as much 3 feet thick?) Three feet above the sand level. Yeah. And beautiful white sand beaches in the Kupaka Area, what we would call Parish Drive now. That was all beautiful white sand beach. And then, noted for it's limu and noted for it's cat's eyes, those little shells, the little door that flaps, opens up.

F.2.2 2004 INTERVIEWS

Ms. Arline Wainaha Pu'ulei Brede-Eaton and Mr. Henry Chang Wo were interviewed on July 27, 2004. The purpose of the interview was to obtain information that could supplement the prior 1997 interviews, and provide a better understanding of the cultural significance of the shoreline and nearshore resources found in the vicinity of the Oneula Beach Park. The following information is based on handwritten notes taken during the interview session.

Ms. Arline Wainaha Pu'ulei Brede-Eaton

Ms. Eaton's foster mother's parents and grandparents lived in the area known as Kupuka, Puuloa (Ewa). She shared the story of her birth, and told how she was born in the back bedroom of a home belonging to her mother's friend at 1033 Morris Lane, in

Kapalama during a luau, when she was wrapped in blankets and placed in a porcelain bowl. Her mother gave her to her aunt to raise because the two women were very close. Her father, William Elia Brede, worked as a foreman for Honolulu Iron Works, and as a Luna for the Parish Ranch at Keahi, Puuloa. She lived with her mother and father in Honolulu at 1508 Kalihi Street during the week, so she could go to school at the Kapalama School. She would go to Puuloa on the weekends. She mentioned that there were no schools in Puuloa at that time.

According to Ms. Eaton, in the old days there were few roads to Puuloa. The road went as far as where St. Francis West Medical Center is now, where there used to be a church. But after that point, there were no roads, and they had to come down to Honouliuli, where some Hawaiians lived, but mostly Japanese workers for the sugar plantation. She recalled how the Japanese somehow always knew they were coming, and would give them buckets of water and sushi. She said the only water in the area was found by looking for little swirls of clear water in the ocean, which indicated a source of brackish water, which is also where the limu was, like ‘Ele’ele.

She noted there was also water in Kualakai near Hau Bush. There was also ‘Ele’ele limu in Kualakai. The quality of the limu depended on the purity of the water. Sometimes the limu was “almost black,” indicating it was sweet and clean. She used to live on Ewa Beach Road in Keahi. The limu there was “a kind of green.” This place was called Hale O Na Limu or the House of the Limu “because limu would be washed ashore to your knees.”

Ms. Eaton recalled that, “Every limu had a purpose. You can use it for food, but had to know how to use it for medicine. Now you have to turn to doctors to find treatment. Now the young people don’t know about this and that’s why Uncle Henry (Mr. Henry Chang Wo) is trying to do something about it.” In the use of limu for medicine, Ms. Eaton noted the importance of knowing how to prepare it, but that it was important to know something about the person you are giving the limu to. “You would never give it

to someone not willing to accept it." Sometimes sea urchins, lole or vana, would be used in conjunction with the use of medicinal limu.

Mr. Henry Chang Wo

Mr. Wo spoke of the significance of limu to the Hawaiians, and that it was a source of trade for the Hawaiians who lived in the mountains, who did not have ready access to it. Mr. Wo spoke of Ewa as the Motherland that stretched from the shore to the breakers and of its wide and shallow foreshore. A long time ago there were acres of limu. There were many streams and rivers flowing into the ocean along the shore. There were five different streams and rivers flowing into Pearl Harbor. The land at Ewa was "top-dry" but he said there was caprock water and wells along the vegetation line. At places like the Lion's Club and Ted Farm's lot (east of Oneula Beach Park), there is still water, although it is not flowing as profusely. Along the shore there was manowai or ogo (the Japanese term for it), "which needs constant fresh water." He said it grew 60 to 70 yards from the shoreline, indicating the water cap. "We had the best ogo on all the islands because of the flavor and texture." Fish like mullet and moi would travel and migrate to Ewa to rest and to eat the limu.

Mr. Wo stated that in the 1970s people did not know any better, which led to the over harvesting of limu. "When the limu was there it helped to prevent the coral from bleaching. So now that soapsuds and other forms of pollution are going into the ocean we are losing the water quality, and with it, we lose these things [referring to limu and fishes]." Mr Wo noted that what he and others with the Limu Project are trying to do "is to teach kids how it was so they can help bring it back." He recalled that it appears that the limu started disappearing in the 1970s due to a number of factors, including over harvesting and the loss of freshwater going into the ocean along the shoreline. He believes that the loss of freshwater includes both watershed or overland loss and a reduction in groundwater discharge. As Mr. Wo noted, "Today, I know where the water was coming out and some of it is being lost now."

In his closing remarks, Mr. Wo noted that a portion of the coastal area along the Ewa Shoreline should be set aside as a preserve to protect the limu and marine environment. Uncle Henry was referring to the regional drainage plan when he spoke about testing and carefully monitoring to see if the system is working or whether something else needs to be done, and not the proposed moratorium.

APPENDIX G

Concept Plan

Kaloi Drainageway Improvements at Oneula Beach Park

Ewa, Oahu

Concept Plans

Kaloi Drainageway Improvements At Oneula Beach Park

EWA , OAHU , HAWAII

TAX MAP KEY : 9-1-012-025

PREPARED FOR:

HASEKO (EWA), INC.

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R. M. TOWILL CORPORATION

SINCE 1930

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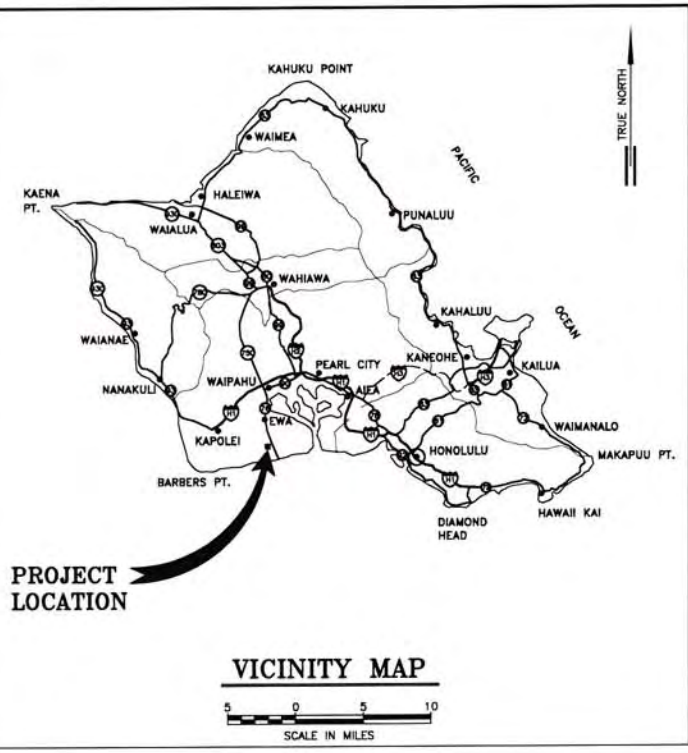
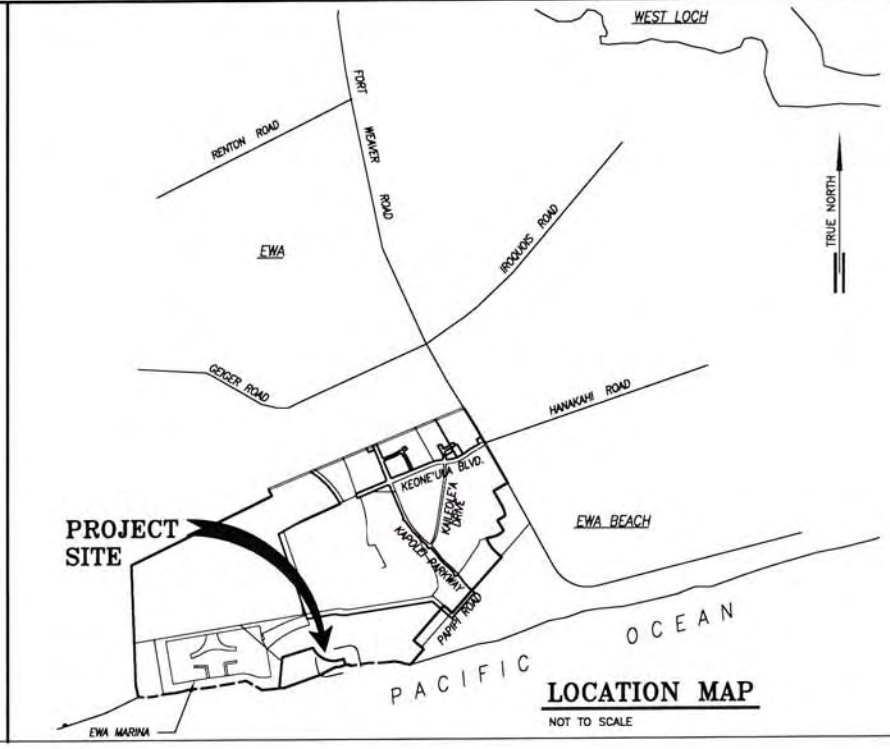


VICINITY MAP

5 0 5 10

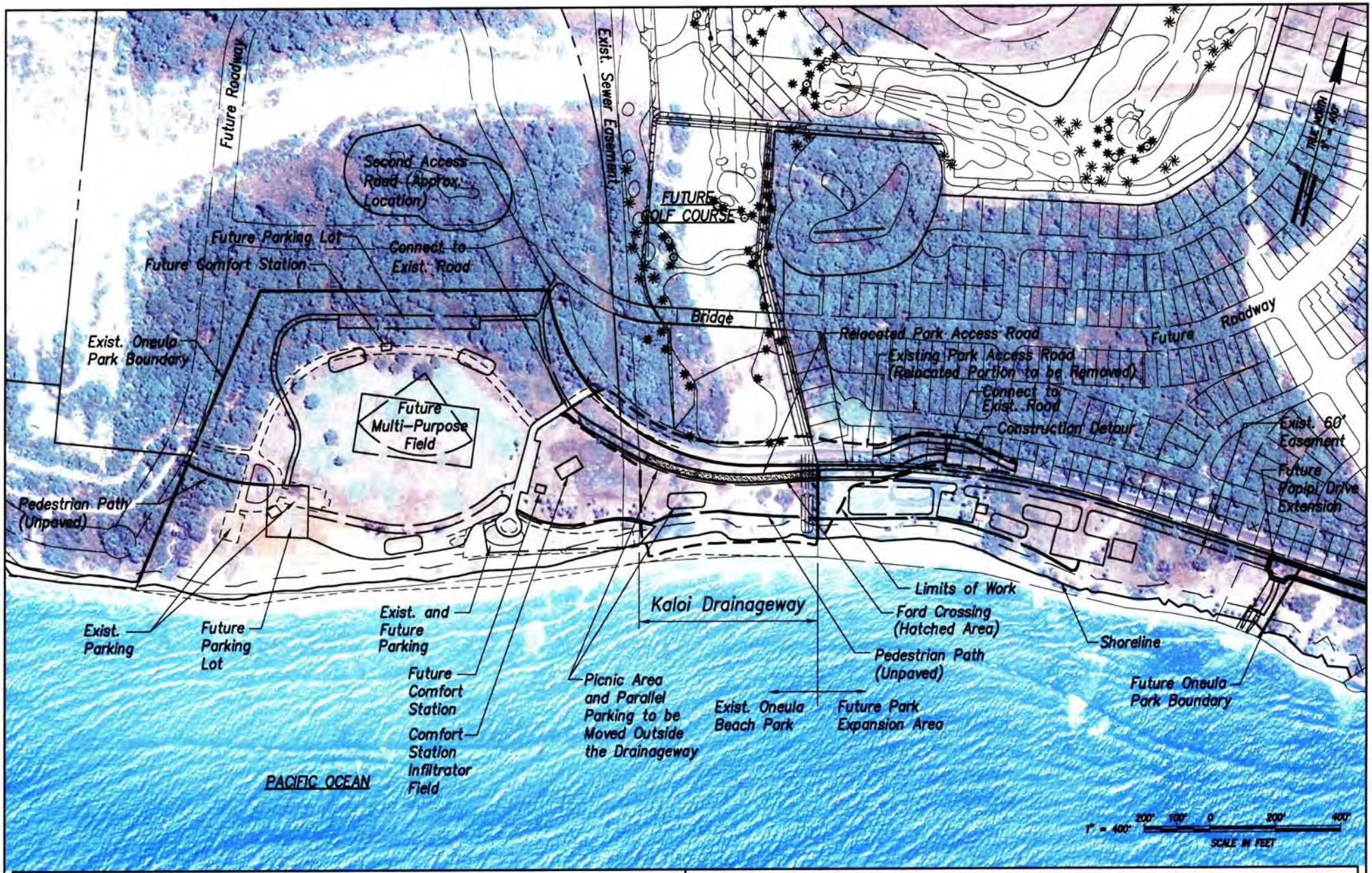
SCALE IN MILES



LOCATION MAP

NOT TO SCALE

FIGURE 1



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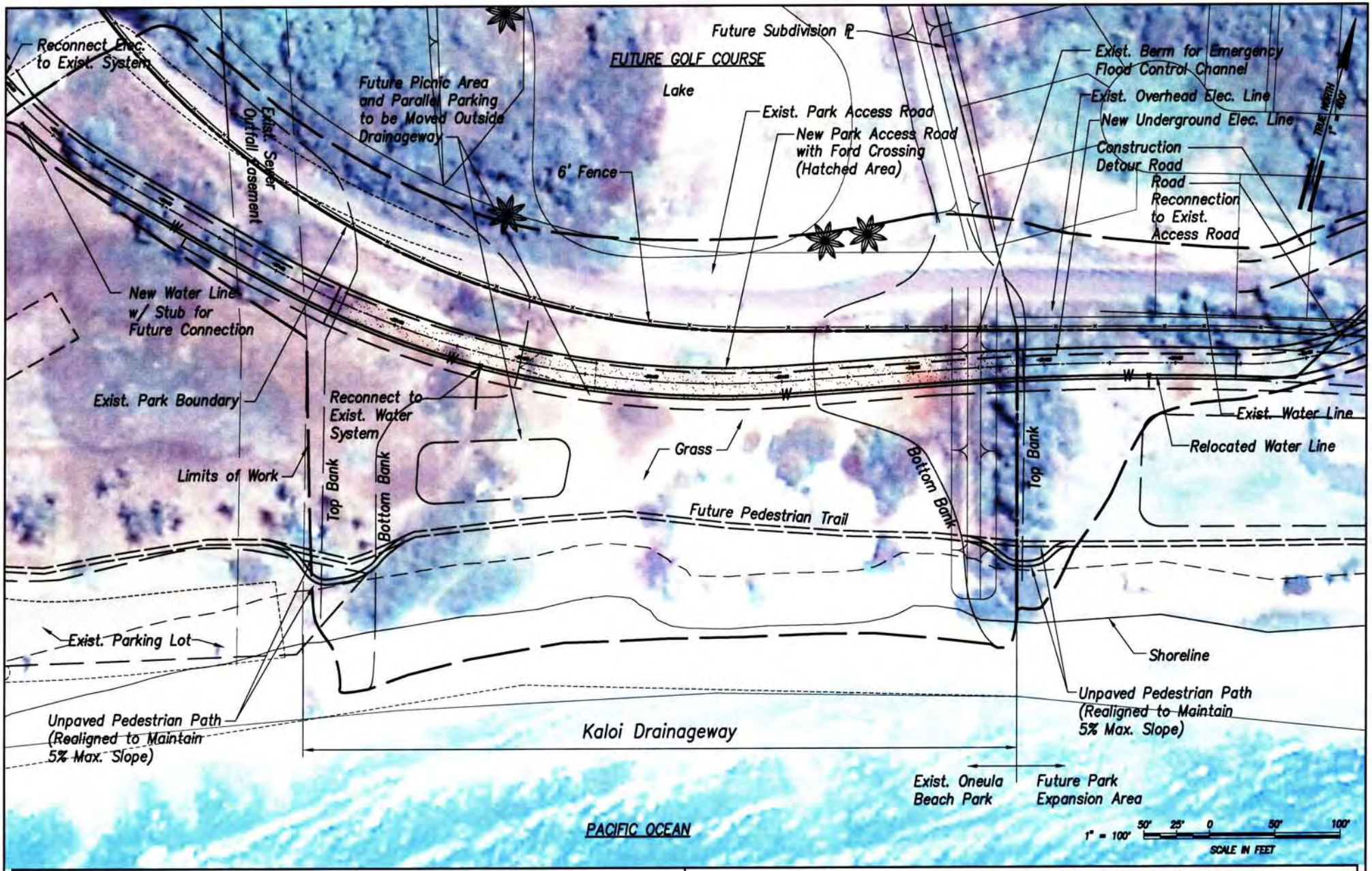
Kaloi Gulch Drainageway Improvements at Oneula Beach Park

GENERAL PLAN

Figure 2



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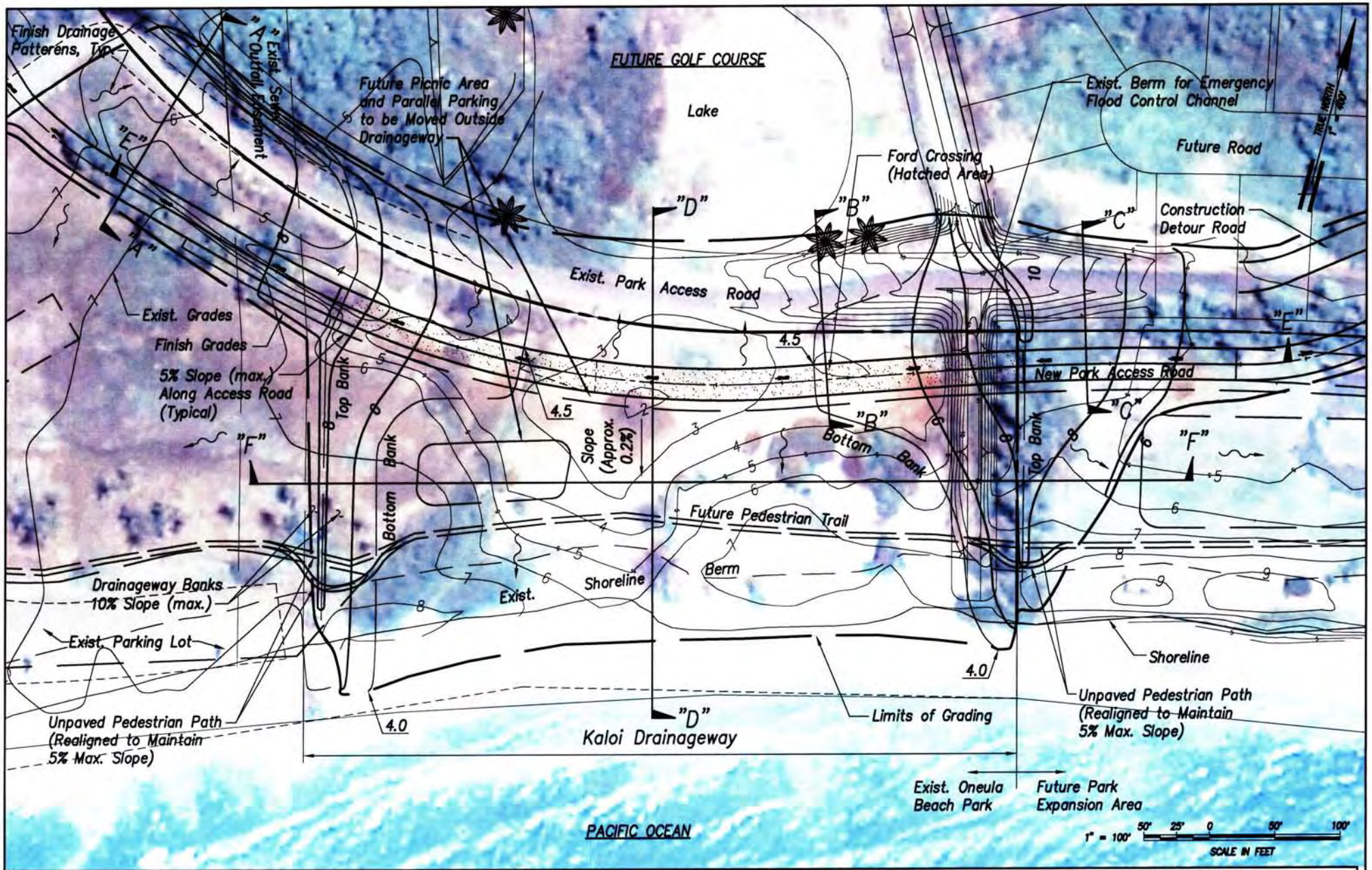
Kaloi Gulch Drainageway Improvements at Oneula Beach Park

SITE PLAN

Figure 3



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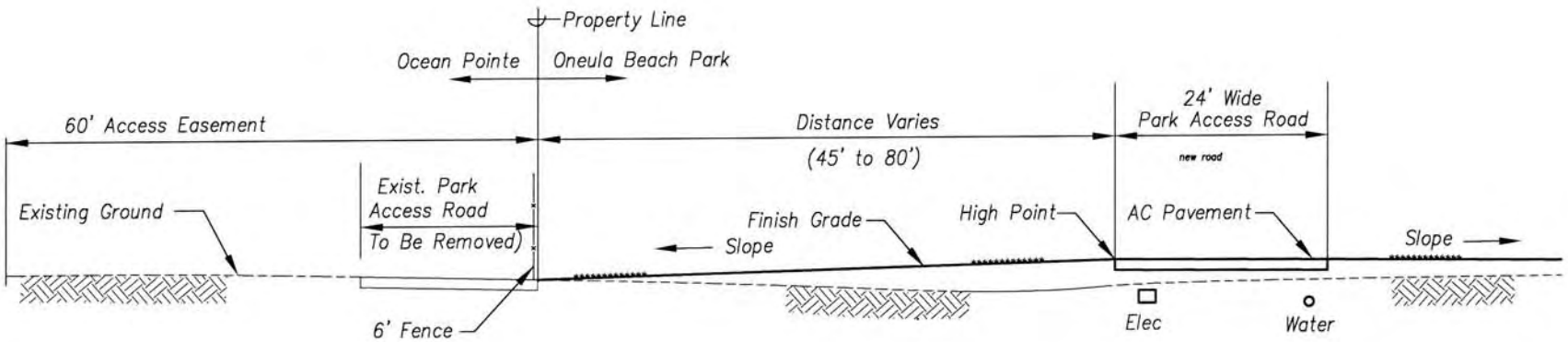
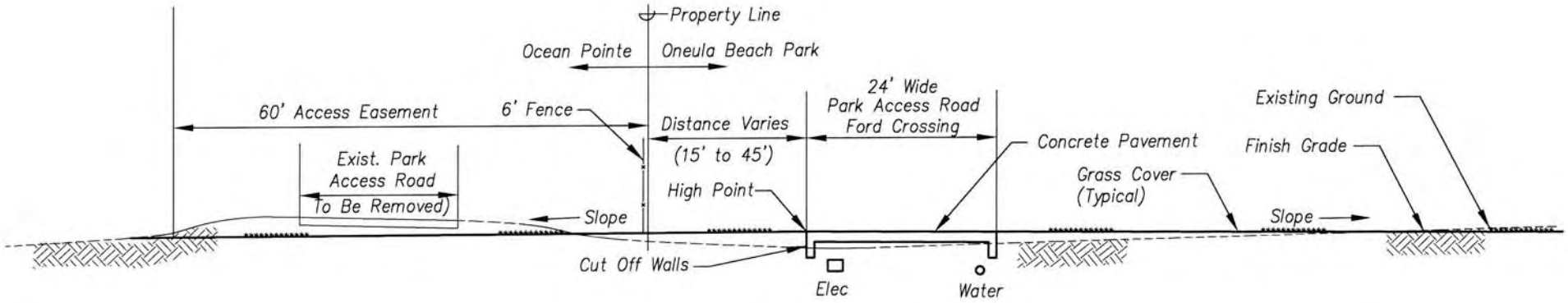
Kaloi Gulch Drainageway Improvements at Oneula Beach Park

GRADING PLAN

Figure 4



A **TYPICAL SECTION – ONEULA BEACH PARK ACCESS ROAD**
SCALE: 1" = 20'
(WEST OF THE DRAINAGEWAY)



B **TYPICAL SECTION – ONEULA BEACH PARK ACCESS ROAD**
SCALE: 1" = 20'
(WITHIN THE DRAINAGEWAY)

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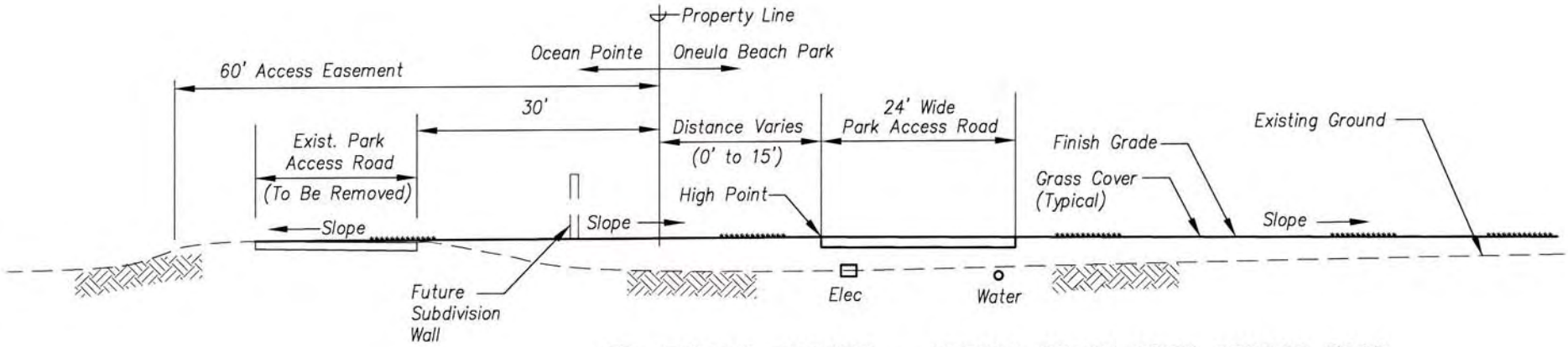
Kaloi Gulch Drainageway Improvements at Oneula Beach Park

TYPICAL SECTION – 1

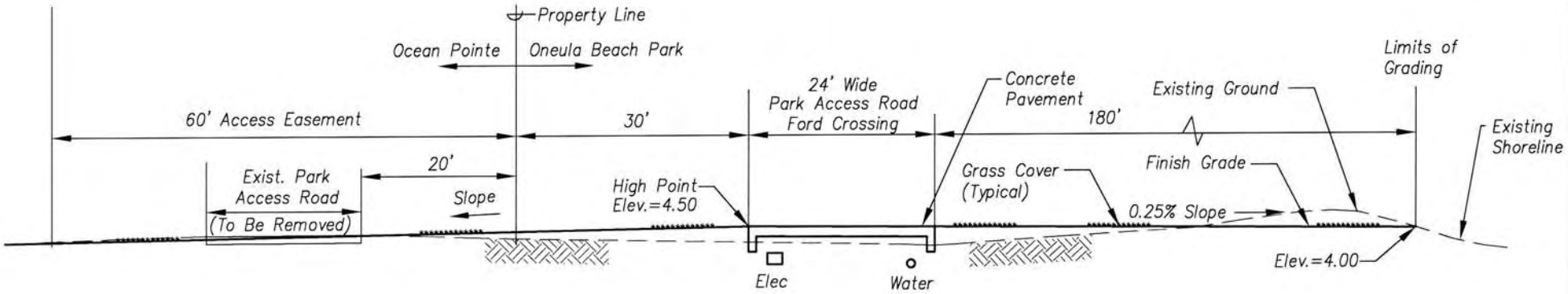
Figure
5



C **TYPICAL SECTION – ONEULA BEACH PARK ACCESS ROAD**

SCALE: 1" = 20'

(EAST OF THE DRAINAGEWAY)



D **PROFILE – ALONG CENTERLINE OF KALOI DRAINAGEWAY**

SCALE: 1" = 20'

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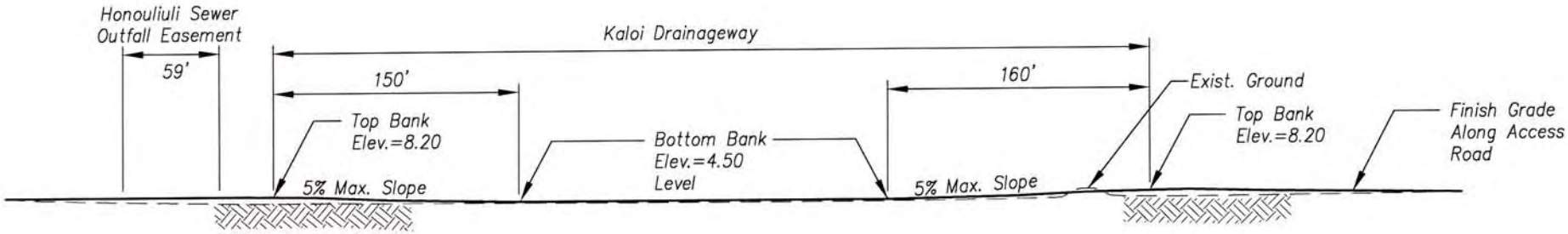
Kaloi Gulch Drainageway Improvements at Oneula Beach Park

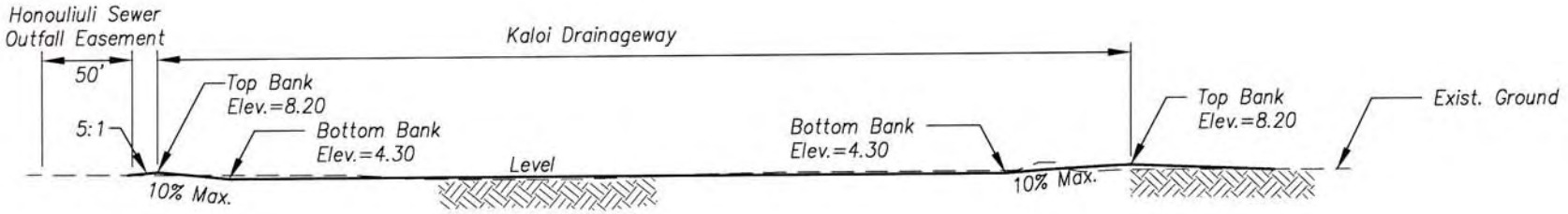
TYPICAL SECTION – 2

Figure 6



E **PROFILE – ALONG ONEULA BEACH PARK ACCESS ROAD**

SCALE: 1" = 100'



F **TYPICAL SECTION – KALOI DRAINAGEWAY**

SCALE: 1" = 100'

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Kaloi Gulch Drainageway Improvements at Oneula Beach Park

TYPICAL SECTION – 3

Figure 7