DEPARTMENT OF LAND UTILIZATION

CITY AND COUNTY OF HONOLULU

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

JEREMY HARRIS
MAYOR

PATRICK T. ONISHI
DIRECTOR

LORETTA K.C. CHEE
DEPUTY DIRECTOR

95/SV-001(JT)

April 6, 1995

The Honorable Gary Gill, Director
Office of Environmental Quality Control
220 South King Street, 4th Floor
State of Hawaii
Honolulu, Hawaii 96813

Dear Mr. Gill:

CHAPTER 343, HRS
Environmental Assessment/Determination
Negative Declaration

Owner/Applicants	:	Dr. Dewey W.K. Tom and Mr. James Fujioka
Agent	:	R.M. Towill Corporation
Location	:	46-082 and 46-083 Keoe Way, Kaneohe, Oahu
Tax Map Keys	:	4-6-03: 86 and 87
Request	:	Shoreline Setback Variance
Proposal	:	To construct shore protection structures
Determination	:	A Negative Declaration Is Issued

Attached and incorporated by reference is the Final Environmental Assessment prepared by the applicant for the project. Based on the significance criteria outlined in Chapter 200, State Administrative Rules, we have determined that preparation of an Environmental Impact Statement is not required.

Very truly yours,

PATRICK T. ONISHI
Director of Land Utilization

PTO:am

Enclosures

g:ndkeoegg.jht

1995-04-23-OA-FEA - Seawall Construction at Keoe Way
Shoreline setback variance

OFFICE OF ENVIRONMENTAL QUALITY CONTROL (OEQC)

FINAL ENVIRONMENTAL ASSESSMENT

Seawall Construction at Keoe Way

KANEOHE, OAHU, HAWAII

MARCH 1995

Prepared for:
Dr. Dewey W.K. Tom and Mr. James Fujioka
Kaneohe, Oahu, Hawaii

RMTC
R. M. TOWILL CORPORATION
420 Waiakamilo Road, Suite 411
Honolulu, Hawaii • 96817-4941
Voice: (808) 842-1133
Facsimile: (808) 842-1937

OFFICE OF ENVIRONMENTAL QUALITY CONTROL

Final Environmental Assessment

SEAWALL CONSTRUCTION AT KEOE WAY

Kaneohe, Oahu, Hawaii

MARCH 1995

Prepared for:
Dr. Dewey W.K. Tom and
Mr. James Fujioka
Kaneohe, Oahu, Hawaii

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

TABLE OF CONTENTS

TABLE OF CONTENTS

PROJECT SUMMARY

PROJECT:	Seawall Construction at Keoe Way, Kaneohe, Oahu
APPLICANTS:	Dr. Dewey W.K. Tom 45-939 Kamehameha Highway, Room 203 Kaneohe, Hawaii 96744 Phone: (808) 247-3063, and Mr. James Fujioka 46-083 Keoe Way Kaneohe, Hawaii 96744 Phone: (808) 247-2085
TAX MAP KEY:	4-6-03: 86 and 87
ACREAGE:	14,640 Square Feet Total = 7,320 Sq. Ft. (TMK 4-6-03:86) 7,320 Sq. Ft. (TMK 4-6-03:87)
LOCATION:	Kaneohe, Oahu, Hawaii
OWNERS:	Dr. Dewey W.K. Tom and Mr. James Fujioka
EXISTING LAND USES:	Urban, Residential Subdivision
COUNTY ZONING:	R-7.5, Residential
STATE LAND USE DESIGNATION:	Urban
DEVELOPMENT PLAN DESIGNATION:	Koolaupoko Development District - Residential

SECTION 1 - INTRODUCTION

1.1 Project Description

The proposed activity is to construct a seawall mauka of the shoreline of two adjacent residential properties at Keoe Way, Kaneohe, Oahu. The purpose of the seawall is to prevent further erosion and loss of residential property. The project is intended to be similar to existing residential erosion protection walls adjacent to the project site. Wall specifications will be approximately 2 feet wide by 4-feet high, by approximately 190 lineal feet. Construction materials will be concrete rubble masonry (CRM).

1.2 Project Location

The proposed activity is located in the Koolaupoko District of Oahu (**Figure 1**). The site is comprised of two residential parcels at TMK: 4-6-03: Parcel 86 and 87. To the north is Kaneohe Bay. Immediately to the west is the Alii Shores Yacht Club, and to the south and southwest is Kaneohe, Oahu. Approximately 1-mile northeast is Marine Corps Base Hawaii (MCBH), Kaneohe. Access to the project site is via Keoe Way, which adjoins Yacht Club Street and Lilipuna Road (**Figure 2**).

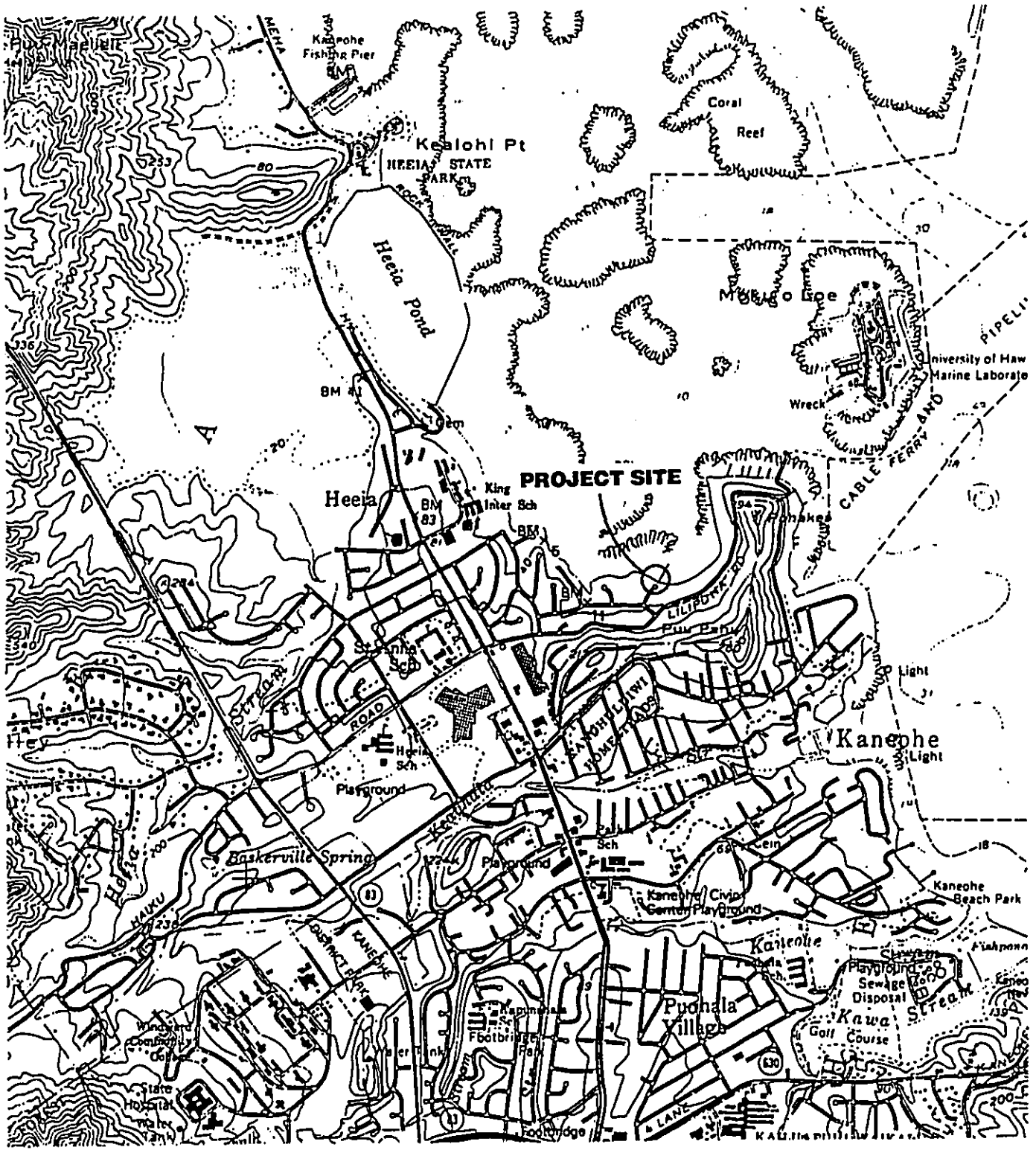


Figure 2
SITE MAP

Erosion Protection Wall at Keoe Way
Kaneohe, Oahu, Hawaii

Not to Scale

R. M. TOWILL CORPORATION

APRIL 1994

Figure 3
SITE PHOTOGRAPHIC ANALYSIS

Erosion Protection Wall at Keoe Way
Kaneohe, Oahu, Hawaii

R. M. TOWILL CORPORATION
APRIL 1994

Figure 3A
PHOTOGRAPHIC EVIDENCE OF EROSION

Erosion Protection Wall at Keoe Way
Kaneohe, Oahu, Hawaii

R. M. TOWILL CORPORATION
APRIL 1994

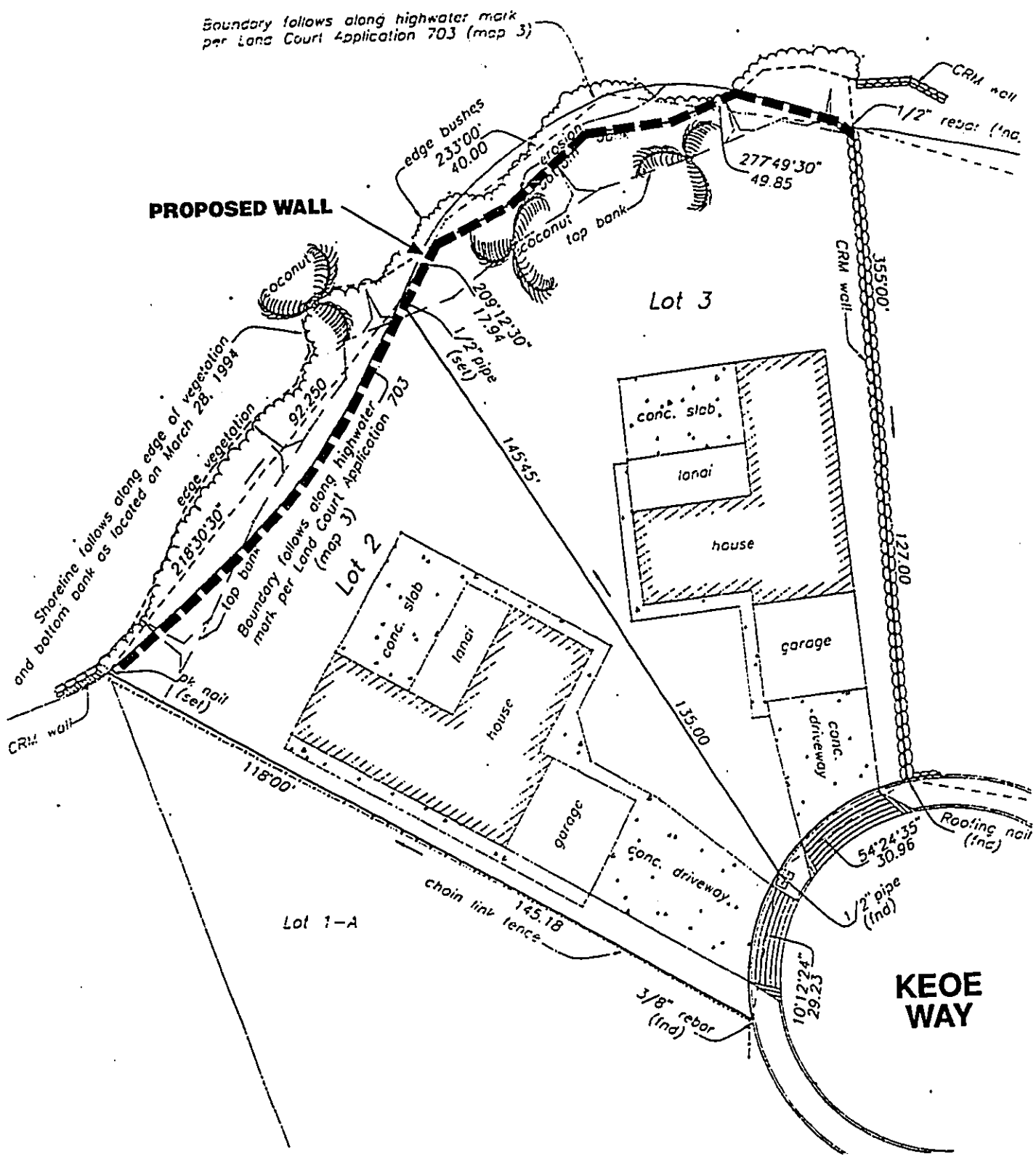


Figure 4
LOCATION OF EROSION PROTECTION WALL

Erosion Protection Wall at Keoe Way
Kaneohe, Oahu, Hawaii

Not to Scale

R. M. TOWILL CORPORATION
APRIL 1994

SECTION 2 - DESCRIPTION OF THE PROPOSAL

2.1 Background

The proposed action is to stabilize the shoreline and to prevent erosion from further damaging existing residential property. Surrounding neighboring residences have installed erosion protection walls to help stabilize individual shoreline properties. This is illustrated in **Figure 3 and 3A,** which identifies the project shoreline with severe erosion and undercutting. Further discussion concerning existing coastal shoreline conditions is provided in the attached coastal engineering report.

2.2 Development Activity

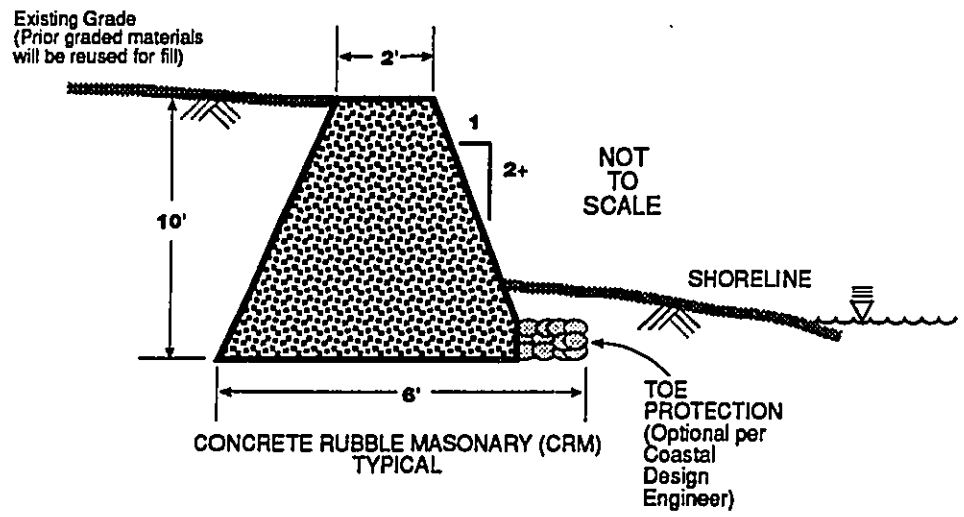
AFFECTED SHORELINE

The proposed erosion protection wall will be installed immediately mauka of the certified shoreline (**Figure 4**). Approximate dimensional requirements are indicated in **Figure 5**. Installation will involve excavation and grading to minus 5-6 feet to anchor the toe of the wall. During installation, infiltration of seawater below grade will be likely. Dewatering, however, is not anticipated due to limited requirements necessary to anchor the base of the wall. Use of silt screens and fine mesh geotextile filter fabric will be employed as necessary to ensure the waters of Kaneohe Bay are not disturbed during construction.

STRUCTURAL DESCRIPTION

Mauka of the wall, graded materials will be reused for fill and stabilization (**Figure 5**). Stockpiling and storage of construction materials will be accomplished on property owned by the residents.

Figure 5
Proposed Conceptual Design - Erosion Protection Wall



2.3 Public Access

The proposed seawall will be constructed entirely within the owners' property and will not impede the existing level of public access along the shoreline.

2.4 Cost Estimate

The proposed activity is estimated at +$35,000, and will be constructed by the property owners.

SECTION 3 - DESCRIPTION OF THE AFFECTED ENVIRONMENT

3.1 Physical Environment

TOPOGRAPHY

The project location is at the end of Keoe Way, located along the north facing shoreline of Kaneohe Bay. The project site involves a sloped grade which rises from mean sea level approximately 4-5 feet above MSL (**Figure 4**).

GEOLOGY

Information on soil type is obtained from the Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii, as prepared by the U.S. Department of Agriculture, 1972.

According to the Soil Conservation Service, the soil association at the project location is Tropohumults-Drystrandepts. This includes gently sloping to very steep, soils that are underlain by soft weathered rock, volcanic ash, or colluvium, on narrow ridges and side slopes. Soils classified on site consist of Pearl Harbor clay (Ph) and Alaeloa silty clay, 15 to 35 percent slopes (AeE).

Pearl Harbor clay is located on low coastal plains adjacent to the ocean. It is level or nearly level. In a representative profile the surface layer is very dark gray, mottled clay about 19-inches thick. Prominent features are very dark gray and very dark grayish-brown, mottled clay that has angular and subangular blocky structure. The substratum is muck or peat. Permeability is very slow, and runoff potential is very slow to ponded, and the erosion hazard is no more than slight.

Alaeloa silty clay, 15 to 35 percent slopes occurs on smooth side slopes and toe slopes in the uplands. In a representative profile the surface layer is dark reddish brown silty clay about 10-inches thick. The subsoil, about 48-inches thick, is dark red and red silty clay that has subangular blocky structure. The substratus is soft, weathered basic igneous rock. Permeability is moderately rapid. Runoff is medium and the erosion hazard is moderate.

CLIMATE

Windward Oahu has a mild semitropical climate which is frequented by northeast tradewinds occurring approximately 80 percent of the time. The tradewinds are sometimes interrupted by cyclonic disturbances, usually during the winter months, commonly referred to as Kona Storms.

Mean monthly temperatures range from mid-80° F in the summer months, to low to mid-60° F during the winter. Rainfall averages 40-50 inches annually.

HYDROLOGY
The project site is adjacent to the shoreline of a residential neighborhood. There are no groundwater resources nearby.

COASTAL ENVIRONMENT
The project site is located on the southern shore of Kaneohe Bay which shelters the site from deep water waves by numerous shallow fringing reefs. Kaneohe Bay is a reef sheltered lagoon with a total bay front exposure of 4.6 miles between Kualoa Point to the northwest and Mokapu Peninsula on the southeast. This opening is mostly reef with only two navigable channels. These channels limit the wave energy entering the bay. The mean tidal range between mean lower low and mean higher high water is 2.1 feet. The tidal change is the major driving force for currents in the bay.

The eastern shore of Kaneohe Bay is sheltered from wave attack from the north, east and south by Mokapu Peninsula and by the island of Oahu from waves to the west. Waves that do enter the bay are greatly reduced by the shallow coral and sand bottom.

Prevailing winds generate waves that reach the shoreline but are limited in height by the short fetch. The Windward Oahu Hurricane Vulnerability Study, Sea Engineering, Inc., 1990, describes the winds produced by the hypothetical worst case scenario hurricanes which could occur in Hawaii. Maximum wind speeds of 106 mph would be generated by a worst case hurricane over a 7.5 mile long fetch in an average water depth of 9 feet. This would generate a worst case wave height of 4 feet. This storm although unlikely, would generate considerable flooding and cause severe coastal damage throughout Kaneohe Bay.

Northerly winds would generate the largest waves at the site, since the direction of approach corresponds to the longest fetch length. According to records compiled by the U.S. Naval Weather Service, north winds with speeds exceeding 27 knots occur much less that 1 percent of the time. Assuming constant depth across the bay and sustained wind speeds (both conservative assumptions), a 27 knot north wind would generate a 2.4 foot wave along the ocean side of the reef margin. The wave height reaching the shoreline would be reduced by the shallow water and the bottom roughness.

NEARSHORE BOTTOM
According to the Oahu Coastal Zone Atlas, 1981, the nearshore bottom is characterized by *rs* - a complex reef bottom consisting of mostly sand, but with limestone outcrops or boulders; and *rcs* - a complex reef bottom type consisting of a mixture of hard and mostly soft bottom. The shoreline slopes gently northward for 500 feet, crossing a shallow fringing reef, to a dredged channel approximately 30 feet deep, located parallel to the project site. The dredged channel is used by the Alii Shores Yacht Club for access to Kaneohe Bay. The proposed project will not adversely impact this nearshore area.

The tidal currents and prevailing low wave energy limit littoral transport. Offshore areas adjacent to existing seawalls show no sign of tow scour or alteration in the foreshore slopes, which would be typical in areas with littoral transport.

BIOLOGY

The project site is within an urbanized residential community. The area has been used for urban residential purposes for many decades and no threatened or endangered flora or fauna are known to inhabit the site. Several introduced fauna including the Common Indian Mynah (Acridotheres tristis), House Sparrow (Passer domesticus), Spotted or Lace-necked Dove (Streptopelia chinensis), Zebra Dove (Geopelia striata), and Cardinal (Cardinalis cardinalis) have been observed at the project location. Mammals such as cats and dogs owned by residents inhabit the area.

AIR QUALITY

No information was collected on air quality. It is assumed the subject project will have little or no impact since the project will not require industrial facilities, and will be of limited duration.

NOISE

No information was collected on noise levels. The subject site is within a residential neighborhood. Any proposed work activity will be governed by applicable State and City and County of Honolulu regulations governing noise generated during construction activity.

ARCHAEOLOGY

The proposed activity is within a residential neighborhood which has been heavily disturbed during development of the existing subdivision. If any potential remains existed it is most likely that they would already have been discovered and recovered. However, should any unidentified deposits be uncovered during construction, work will cease in the immediate area and the State Historic Preservation Officer will be contacted.

FLOOD HAZARD

The subject location is along the north/northwest facing shoreline of Kaneohe Bay. According to the Flood Insurance Rate Map (FIRM) the area is designated Zone X, and is determined to be outside the 500-year flood plain.

3.2 Socio-Economic Environment

POPULATION

According to the State of Hawaii Data Book, the 1990 resident population of Koolaupoko was approximately 117,964, which represents a 7 percent increase since 1980 (109,373 persons).

The proposed project is not anticipated to affect future population growth.

ECONOMY

In 1990, personal incomes for Oahu residents averaged $21,307 per capita, while the statewide average was $20,361. This compares to a 1980 per capita income for Oahu residents of $10,854, and a statewide income of $10,617.

The proposed project is anticipated to generate income for the construction contractor and related professionals assisting with the design and development of the erosion protection wall. Overall, while the proposed project is of a minor scale, positive economic benefits will result from stimulation of the local construction industry.

SECTION 4 - PROBABLE IMPACTS OF THE PROPOSED PROJECT AND MITIGATION MEASURES

4.1 Short Term Impact

Short term impacts are expected to be minimal. The construction contractor will need to access the project site via use of Keoe Way, which is a cul de sac. Noise will be generated from construction, and related mobilization of equipment.

Construction equipment is expected to include a gasoline or diesel powered backhoe or bulldozer. Construction of the seawall may also require use of a crane. All equipment will be muffled in accordance with standard engine operating practices. The work will be limited to daylight hours and engine exhausts will be governed in accordance with applicable state and county regulations.

Dust and associated nuisance problems are expected to be slight to insignificant due to the limited scope and scale of the project.

4.2 Long Term Impact

No long term adverse impacts are anticipated. All work will be undertaken on land mauka of the high water mark or certified shoreline. Upon completion, all equipment used on-site will be demobilized and all debris and waste materials disposed of at an approved city and county refuse facility.

SECTION 5 - RELATIONSHIP TO STATE AND COUNTY LAND USE PLANS AND POLICIES

5.1 Existing Land Use

The project site is located at the end of a cul de sac and is used for residential purposes. Lots within the area are developed single family dwellings.

5.2 State Land Use District

The project site is in the State Urban District.

5.3 City and County of Honolulu - Development District

The project site is in the Koolaupoko Development District and is designated Residential (Ordinance 83-8). Work related to construction of the erosion protection wall is consistent with this designation provided that the activity is permitted within the zoning for this area (5.4 - City and County of Honolulu - Zoning).

5.4 City and County of Honolulu - Zoning

The project site is designated R-7.5, which include residential zoned, 7,500 square foot parcels.

The proposed activity is consistent with the designated land use provided that a Shoreline Setback Variance is obtained. The purpose of the variance will be to allow construction of the erosion protection wall within 40-feet of the certified shoreline.

SECTION 6 - ALTERNATIVES TO THE PROPOSED ACTION

The requirement to install the seawall is based on need to mitigate erosion of residential property. Various engineering design alternatives were evaluated and considered. Selection of the preferred alternative is discussed below.

6.1 Design Considerations

The project site is located on the southern shore of Kaneohe Bay. The site is sheltered from deep water waves by numerous shallow fringing reefs. The primary design concern for installation of a shore protection structure is prevention of scouring, undermining, and flanking. Toe failure of wave protection structures is a common problem which eventually leads to slippage, slope failure, or cracking of seawalls. Ideally, the toe of any structure should be located on hard foundation to prevent wave induced scouring and undermining. Dimensional features of toe design, therefore, must take into account need for appropriate structural support.

Overtopping of the shoreline protection structure must also be considered. The structure must be capable of withstanding wave overtopping which would otherwise lead to erosion at the landward end of the structure causing eventual failure. Remedies to this problem involve ensuring sufficient drainage (e.g., use of weepholes) from the landward side of the shore protection structure, use of suitable fill material which will not erode under specified design conditions, use of splash diversion to prevent accumulation of water, and use of a design which would prevent wave overtopping under normal circumstances.

Flood hazards create potential for erosion due to storm surges. Preservation of structural integrity will need to be considered if the shore protection structure is in an area of significant flood hazard. Because the project site is classified Zone X, and is designated outside the 500 year flood plain, potential for coastal flood hazards are considered insignificant.

6.2 Design Alternatives

REVETMENT

A revetment is a structural barrier placed directly on the nearshore. This structural barrier is usually composed of stones spalled to fit. Revetments provide protection and dissipation of wave energy, while allowing for circulation of seawater.

Revetments ensure good protection of the landward area immediately behind, but are prone to loss of support at the ends of the structure. This would be a major concern at the proposed project site, since it would be difficult to integrate the revetment with the adjacent vertical seawalls along the project shoreline.

After review, use of a revetment was not considered feasible for the following reasons: (1) integration of the existing adjacent seawalls with a proposed revetment would be a difficult and costly undertaking. A detailed design and engineering solution would need to be developed to address potential for flanking caused by wave action;

(2) use of a revetment has major disadvantages associated with the amount of land required for construction. For example, for a revetment with a total height of 5 feet and a sloping face of 1:3, the total width of the structure would need to be at least 15 to 18 feet; and

(3) installation of a revetment will require use of heavy construction equipment to place the many large revetment stones within the nearshore. It is possible that some of this equipment would require mobilization within the shoreline to accommodate construction. This would create turbidity both before and during construction: turbidity would be generated during installation of equipment near sea level, and during construction dredging would be required to prepare the nearshore for installation of the revetment stones.

SEAWALL

A seawall is a structural barrier consisting of a vertical or near vertical wall which facilitates wave dissipation. Construction materials are usually concrete or grouted masonry walls. The ends of the seawall must be designed to ensure there is no potential for erosion or undermining of the toe and foundation. Seawalls are very effective at protection of the landward area immediately behind and are suitable to areas with low wave energy (such as exhibited within the protected waters of south Kaneohe Bay). At the landward end weepholes are used for drainage of natural runoff and wave overtopping.

Compared to a revetment, a seawall will require less space and less need for dredging. The smaller volume of materials needed will similarly help to shorten time necessary for construction and will result in less disturbance to the immediate coastal environment. Based on design concerns, potential for environmental impacts and cost, use of a seawall to stabilize the project site is the preferred alternative.

GROIN

A groin was also considered for shoreline protection. A groin is a wall-like structure placed perpendicular to the shoreline. Groins are useful in controlling transport of sand and sediments moving parallel or lengthwise to the shoreline. Beach material will tend to accumulate on the side of the groin facing the travel of sediments. This is the primary feature which assists in stabilizing the nearshore preventing further shoreline erosion.

Use of a groin, however, is not considered feasible because: (1) a groin would need to be installed within the nearshore coral and limestone patches of Kaneohe Bay, facing the project site. Work to install the groin would result in short term

increases in turbidity and sediment loading. This would manifest in a turbidity plume or series of plumes which would last for the duration of the installation;

(2) a groin is a less desirable alternative because the project site does not appear to be subject to a large volume of sand and sediments moving parallel to the shoreline. Instead, the project site is comprised of a relatively shallow reef flat; and

(3) A groin would probably interfere with transiting yachts of the nearby Alii Shores Yacht Club, which is next door to the project site.

NO ACTION

According to the Coastal Engineering Report, there is evidence of significant active erosion along the shoreline:

> "A coconut tree between the two properties is undercut and has its roots exposed. The erosion scarp on either side of the tree has retreated landward, indicating erosion of approximately 6 to 10 feet. Other evidence of erosion includes the following: a PVC drain pipe exposed in the scarp; areas where the bank is undercut up to 3 feet and the vegetated lawn has slumped down onto the shoreface; and tension cracks in the lawn at the top of the bank where blocks of earth are slumping towards the shore."

The no action alternative will result in continued erosion. This would constitute a major hardship for the residents due to further loss of residential property and possible damage to adjoining, neighboring structures. The long term prospect could involve the erosion catching up to the foundations supporting each of the residences. This would result in need to relocate the dwellings, abandonment of the parcels, or development of an erosion protection structure in the future. Because of concern over further loss of shorefront property, construction of this wall at a later date is not considered a viable alternative.

SECTION 7 - RELATIONSHIP BETWEEN LOCAL SHORT TERM USES AND MAINTENANCE AND ENHANCEMENT OF LONG TERM PRODUCTIVITY

The purpose of this project is to construct a seawall to protect and preserve residential waterfront property from erosion. Potential short term impacts resulting from construction of the seawall are temporary and include noise, exhaust, and fugitive dust nuisances caused from mobilization and construction activities. Because the preferred alternative is a seawall, impacts to the coastal environment are not anticipated.

Completion of the seawall will help to stabilize the shoreline fronting the project site. This will result in long term benefits including: (1) protection of valuable personal residential property with an improvement in the general aesthetics of the area, by substitution of a seawall for a foreshore consisting of rubble and weeds; and (2) an enhancement of the long term productivity of the neighborhood and residents due to preservation of personal residential property.

SECTION 8 - IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Development will involve the irretrievable loss of material and financial resources. These include construction materials, labor, energy and equipment mobilization costs.

It is expected that construction associated with the project will commit construction materials and human resources. Reuse for most of these materials and resources will not be possible. Labor will be compensated during work.

SECTION 9 - NECESSARY PERMITS AND APPROVALS

9.1 City and County of Honolulu

A Shoreline Setback Variance will be requested from the City and County of Honolulu, Department of Land Utilization, in order to construct the erosion protection wall within the 40-foot shoreline setback.

9.2 State of Hawaii

Because construction work will not be undertaken in the waters of Kaneohe Bay no further permits are anticipated.

SECTION 10 - CONSULTED AGENCIES

CITY AND COUNTY OF HONOLULU

DEPARTMENT OF LAND UTILIZATION
Honolulu Municipal Building
650 South King Street
Honolulu, Hawaii 96813

Point of contact:
Mr. Art Challacombe, Chief, Environmental Affairs
Ms. Joan Takano, Planner

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES
Kalanimoku Building
1151 Punchbowl Street
Honolulu, Hawaii 96813

Division of Land Management
Point of contact:
Mr. Cecil Santos, Land Agent, Oahu

Office of Conservation and Environmental Affairs
Point of contact:
Mr. Steven Tagawa, Planner

OFFICE OF STATE PLANNING
No. 1 Capitol District
250 South Hotel Street
Honolulu, Hawaii 96813

Coastal Zone Management Office
Point of contact:
Mr. John Nakagawa, Planner

SECTION 12 - DRAFT EA COMMENTS RECEIVED

This section contains the Draft EA comments received and the responses to the comments:

95-015586

University of Hawai'i at Mānoa

Environmental Center
A Unit of Water Resources Research Center
Crawford 317 • 2550 Campus Road • Honolulu, Hawai'i 96822
Telephone: (808) 956-7361 • Facsimile: (808) 956-3980

'95 MAR 13 PM 3 21
DEPT OF LAND UTILIZATION
CITY & COUNTY OF HONOLULU

March 10, 1995
EA:00109

Ms. Joan Takano
City and County of Hawaii
Department of Land Utilization
650 South King Street
Honolulu, Hawaii 96813

'95 MAR 13 PM 3 21
DEPT OF LAND UTILIZATION
CITY & COUNTY OF HONOLULU

Dear Ms. Takano:

Draft Environmental Assessment
Keoe Way Seawalls
Kaneohe, Oahu

The applicants propose to construct a seawall along two abutting properties on Keoe Way. The concrete rubble masonry walls, which will be located just mauka of the shoreline within the 40-foot shoreline setback, will be approximately 2 feet wide, 4 feet high, and span a total of 190 lineal feet. The purpose of the proposed seawalls is to protect the residential properties from erosion.

We have reviewed this Draft Environmental Assessment (EA) with the assistance of Charles Fletcher, Geology and Geophysics; and Paul Berkowitz of the Environmental Center.

General Comments

The proposed project seems relatively benign given the nature of the shoreline geology. We have only a few comments on the project. First, the proposed seawalls may increase wave reflection, which could have a slight impact on the offshore environment. Second, the document fails to mention public assess. Presumably this is because the shoreline is private, and public assess already is restricted. At any rate, the project should maintain at least the present level of public assess.

In short, we believe this project will not have any significant negative effects on the environment. In fact, the proposed seawall may even mitigate some potential erosion problems due to backyard slumping.

Thank you for the opportunity to review this Draft EA.

Sincerely,

John Harrison
Environmental Coordinator

cc: OEQC
R.M. Towill Corporation
Roger Fujioka
Charles Fletcher
Paul Berkowitz

R. M. TOWILL CORPORATION

420 Waiakamilo Rd. #411 Honolulu, HI 96817-4941 (808) 842-1133 Fax (808) 842-1937

March 22, 1995

Mr. John Harrison
Environmental Coordinator
Environmental Center, Crawford 317
University of Hawaii at Manoa
2550 Campus Road
Honolulu, Hawaii 96822

Dear Mr. Harrison:

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR KEOE WAY SEAWALLS AT KANEOHE BAY, OAHU

Thank you for your comments of March 10, 1995 regarding the proposed construction of seawalls at Keoe Way. We appreciate your review of this document.

The proposed seawalls will provide protection to the residential properties of Dr. Dewey Tom and Mr. James Fujioka. Wave reflection will be partially mitigated by use of a sloped rather than a completely vertical sea wall face. The angle of the wall face is based on design criteria provided by the U.S. Army Corps of Engineers and review by the Department of Land Utilization.

The existing level of public access will not be impeded by the proposed project.

If you should have any questions or additional comments please contact us at our above address.

Very truly yours,

Brian Takeda

Brian Takeda
Senior Planner

BT/bt

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

JEREMY HARRIS
MAYOR

KENNETH E. SPRAGUE
Acting DIRECTOR AND CHIEF ENGINEER

DARWIN J. HAMAMOTO
DEPUTY DIRECTOR

ENV 95-041

February 10, 1995

MEMORANDUM:

TO: PATRICK T. ONISHI, ACTING DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM: BY KENNETH E. SPRAGUE
ACTING DIRECTOR AND CHIEF ENGINEER

SUBJECT: ENVIRONMENTAL ASSESSMENT (EA)
KEOE WAY SEAWALLS
TMK: 4-6-03: 86 AND 87

We have reviewed the subject EA and have the following comment:

Please ensure that the best management practices (BMPs) mentioned in Section 2.2 be incorporated into construction plans.

Should you have any questions, please contact Mr. Alex Ho, Environmental Engineer, at Local 4150.

R. M. TOWILL CORPORATION

420 Waiakamilo Rd. #411 Honolulu, HI 96817-4941 (808) 842-1133 Fax (808) 842-1937

March 22, 1995

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

Dear Mr. Sprague:

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR KEOE WAY SEAWALLS AT KANEOHE BAY, OAHU

Thank you for your comments of February 10, 1995 regarding the proposed construction of seawalls at Keoe Way. We appreciate your review of this document.

Per your instructions, the proposed mitigation measures will be incorporated into the construction plans for this project. If you should have any questions or additional comments please contact us at our above address.

Very truly yours,

Brian Takeda
Senior Planner

BT/bt

BENJAMIN J CAYETANO
GOVERNOR

GARY GILL
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
220 SOUTH KING STREET
FOURTH FLOOR
HONOLULU, HAWAII 96813
TELEPHONE
FACSIMILE

March 10, 1995

Mr. Patrick T. Onishi
Director of Land Utilization
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Attention: Joan Takano

Dear Mr. Onishi:

Subject: Draft Environmental Assessment for the Keoe Way Seawall

The property owners propose to construct on each of two abutting lots along Kaneohe Bay (46-082 and 46-083 Keoe Way) a seawall mauka of the shoreline and within the 40-foot shoreline setback. The purpose of the seawall is to protect the residential properties from shoreline erosion.

We recommend that the proposed seawall not be constructed. We believe that if shore protection structures are needed to save residential properties, the structures should be constructed within the owners' properties and should follow the strictest guidelines established by the City and County of Honolulu.

Thank you for the opportunity to comment. If you have any questions, please call Jeyan Thirugnanam at 586-4185.

Sincerely,

Gary Gill
Director

c: R.M. Towill

R. M. TOWILL CORPORATION

420 Waiakamilo Rd #411 Honolulu, HI 96817-4941 (808) 848-1133 Fax (808) 848-1937

March 22, 1995

Mr. Gary Gill
Director
Office of Environmental Quality Control
220 South King Street, Fourth Floor
Honolulu, Hawaii 96813

Dear Mr. Gill:

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR KEOE WAY
SEAWALLS AT KANEOHE BAY, OAHU

Thank you for your comments of March 10, 1995 regarding the proposed construction of seawalls at Keoe Way. We appreciate your review of this document. We are providing the following in response to your concern that the seawalls should not be built:

1) Per your statement, the proposed seawalls will be constructed entirely within the owners' property. No portion of the seawall will be built on public land; and

2) The proposed seawalls will follow design guidelines established by the U.S. Army Corps of Engineers and the City and County of Honolulu, Department of Land Utilization.

If you should have any questions or additional comments please contact us at our above address.

Very truly yours,

Brian Takeda
Senior Planner

BT/bt

Engineers • Planners • Photogrammetrists • Surveyors
Construction Managers • Environmental Services

SECTION 13 - DETERMINATION

The action proposed is intended to protect two residential properties in danger of continuing shoreline erosion. The foregoing discussion indicates there will be no adverse environmental or socioeconomic impacts according to Chapter 343, Hawaii Revised Statutes (HRS).

It is recommended that an Environmental Impact Statement (EIS) not be required and that a negative declaration be issued for this project.

REFERENCES
(Arranged in Chronological Order)

Soil Conservation Service and University of Hawaii, 1972. Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii. U.S. Department of Agriculture, Soil Conservation Service and University of Hawaii Agriculture Experiment Station, Washington, D.C.

Harbors Division, Department of Transportation, 1981. Oahu Coastal Zone Atlas, Harbors Division/CZM Overprint Edition. AECOS Inc., 970 Kalaheo Avenue, Suite A300, Kailua, Hawaii 96734.

Department of Geography, University of Hawaii, 1983. Atlas of Hawaii. *University of Hawaii Press, Honolulu.*

Research and Economic Analysis Division, November 1988. Population and Economic Projections for the State of Hawaii to 2010 (Series M-K). Department of Business, Economic Development, and Tourism, Honolulu.

City and County of Honolulu, Department of Land Utilization, November 1989. Oahu Shoreline Study, Part 2, Management Strategies. Sea Engineering Inc., Waimanalo, Hawaii.

Department of Defense, State of Hawaii, and U.S. Army Corps of Engineers, Pacific Ocean Division, 1990. Windward Oahu Hurricane Vulnerability Study. Sea Engineering, Inc., Makai Research Pier, 41-202 Kalanianaole Highway, #8, Waimanalo, Hawaii 96795.

Marine Corps Air Station, Kaneohe Bay, December 1992, Basis of Design for Shoreline Protection, Prepared for R. M. Towill Corporation, Prepared by Edward K. Noda and Associates, Inc., 615 Piikoi Street, Ste. 1000, Honolulu, Hawaii 96814.

Research and Economic Analysis Division, March 1993. The State of Hawaii Data Book, 1992. Department of Business, Economic Development, and Tourism, Honolulu.

Coastal Engineering Report for the Proposed Seawall at 46-082 and 46-083 Keoe Way, Kaneohe, Hawaii, September 1994. Prepared for R. M. Towill Corporation, Prepared by Sea Engineering, Inc., Makai Research Pier, 41-202 Kalanianaole Highway, #8, Waimanalo, Hawaii 96795.

ENVIRONMENTAL ASSESSMENT

APPENDIX A - COASTAL ENGINEERING REPORT

COASTAL ENGINEERING REPORT FOR THE PROPOSED SEAWALL AT 46-082 AND 46-083 KEOE WAY, KANEOHE, HAWAII

Prepared For:

R. M. Towill Corporation
420 Waiakamilo Road, Ste. 411
Honolulu, HI 96817

Prepared By:

Sea Engineering, Inc.
Makai Research Pier
41-202 Kalanianaole Hwy., Ste. 8
Waimanalo, HI 96795

September 1994

94-62

LOCATION AND INTRODUCTION

The two adjacent residential properties under consideration for shore protection are located on the east shoreline of Kaneohe Bay, at 46-082 and 46-083 Keoe Way. General location maps are shown in Figures 1 and 2.

Immediately to the west of the project site is the Alii Shores Yacht Club, while to the east are residential properties. The adjacent properties have vertical or near-vertical seawalls and the project shoreline is one of the few unprotected areas in the general vicinity. Erosion is occurring at the project site, as indicated by the erosion scarp cut into the backshore and undermined trees. The proposed seawall would protect the properties from further erosion, and prevent possible damage to the neighboring structures.

COASTAL SETTING

Kaneohe Bay is a reef sheltered lagoon with a total bay front exposure of 4.6 miles between Kualoa Point to the northwest and Mokapu Peninsula on the southeast. This opening is mostly reef with only two navigable channels, which limits the wave energy entering the bay. The mean tidal range between mean lower low and mean higher high water is 2.1 feet. The tidal change is the major driving force for currents in the bay.

The eastern shore of Kaneohe Bay is sheltered from wave attack from the north, east and south by Mokapu Peninsula and by the island of Oahu from waves from the west. Waves that do enter the bay are greatly reduced by the shallow coral and sand bottom.

Prevailing winds generate waves that reach the shoreline but are limited in height by the short fetch. The Windward Oahu Hurricane Vulnerability Study prepared by Sea Engineering, Inc. (1990) for the State of Hawaii Department of Defense and the U.S. Army Corps of Engineers, Pacific Ocean Division describes the winds produced by the hypothetical worst case scenario hurricanes which could occur in Hawaii. Maximum wind speeds of 106 mph would be generated by the scenario hurricane over a 7.5 mile long fetch in an average water depth of 9 feet. This would generate an extreme worst case wave height of 4 feet. This storm although unlikely, would generate considerable flooding and cause severe coastal damage.

Northerly winds would generate the largest waves at the site, since the direction of approach corresponds to the longest fetch length. According to records compiled by the U.S. Naval Weather Service, north winds with speeds exceeding 27 knots occur much less than 1 percent

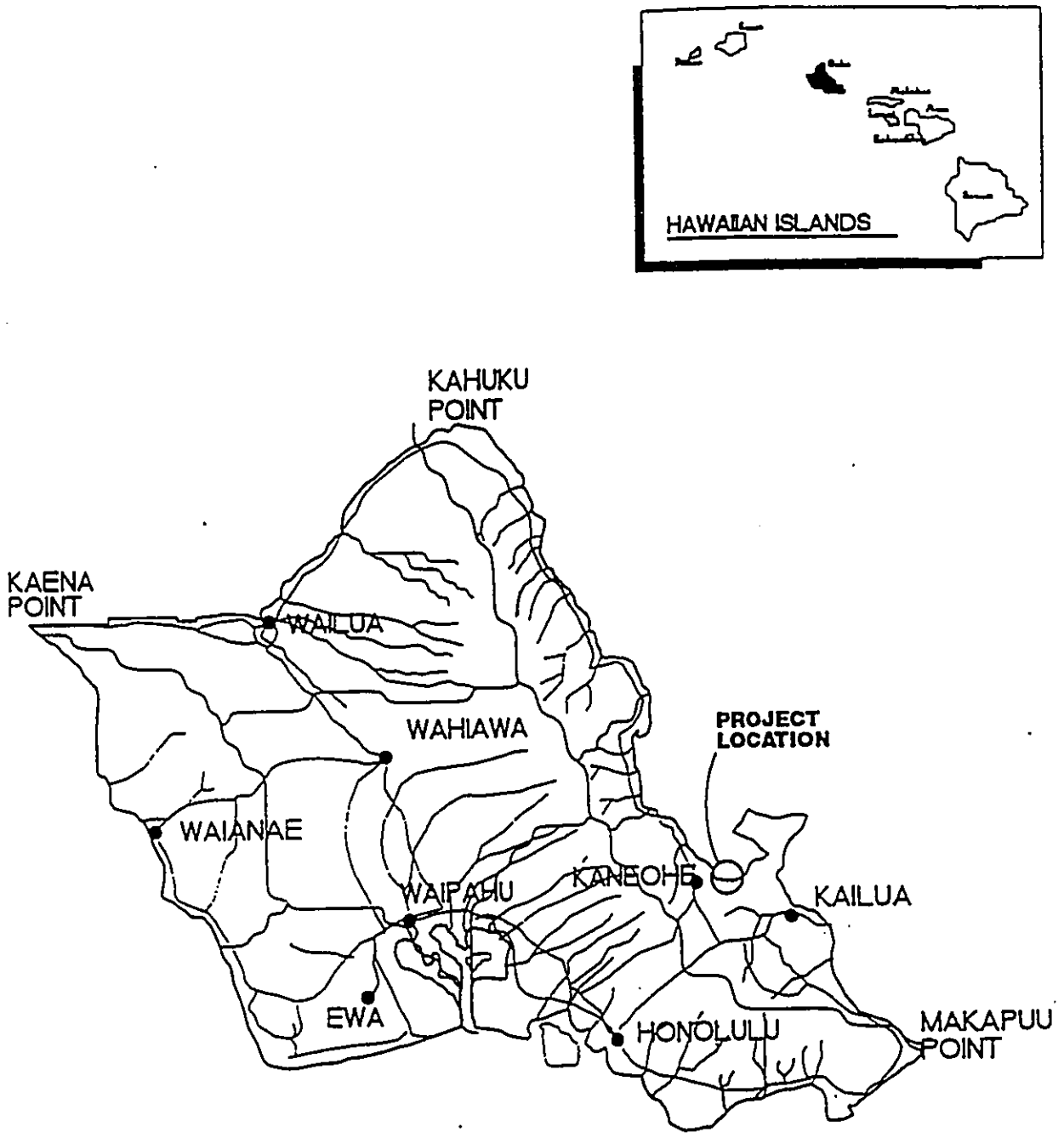


Figure 1
LOCATION MAP
Erosion Protection Wall at Keoe Way
Kaneohe, Oahu, Hawaii

R. M. TOWILL CORPORATION
APRIL 1994

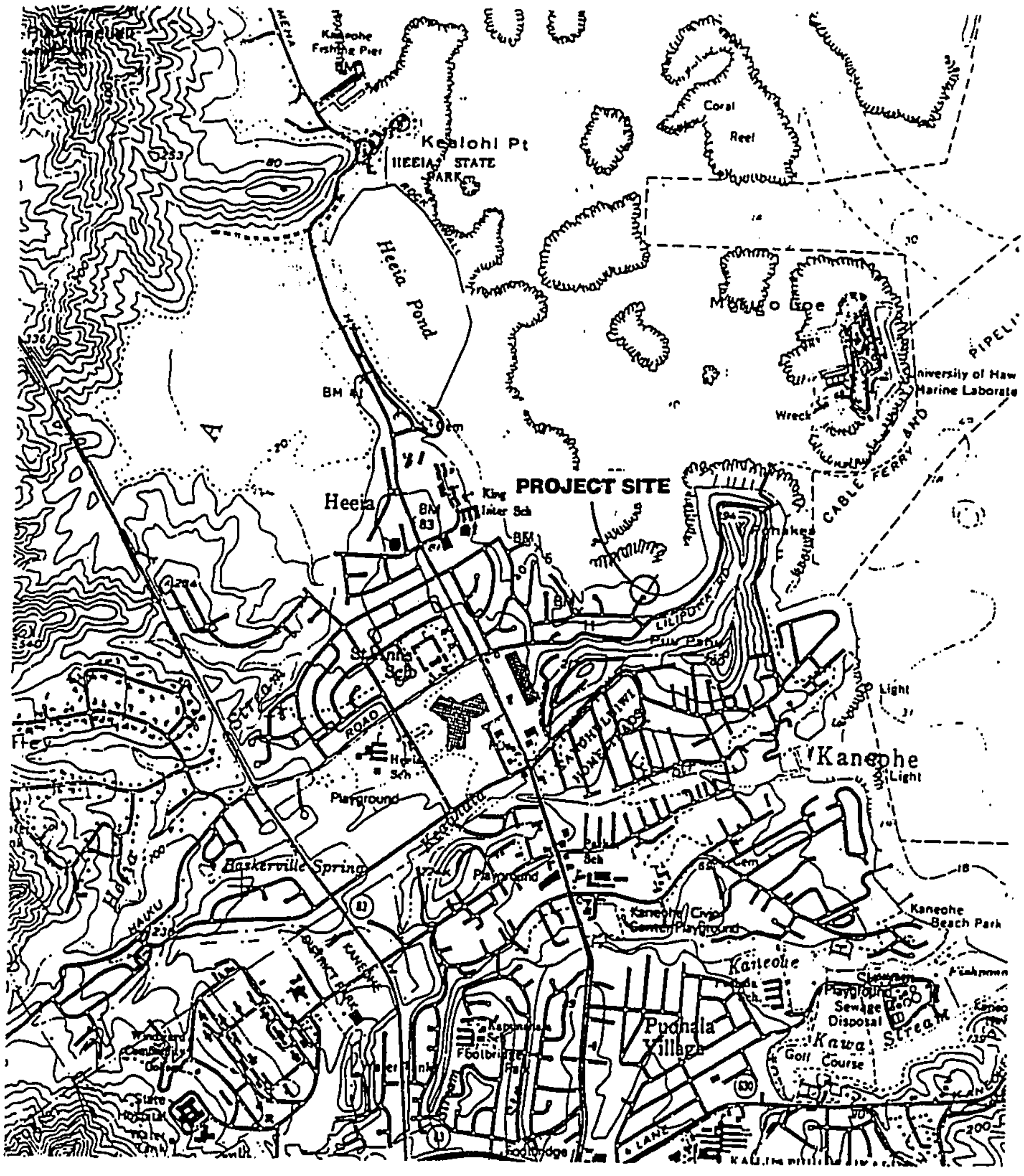


Figure 2
SITE MAP

Erosion Protection Wall at Keoe Way
Kaneohe, Oahu, Hawaii

Not to Scale

R. M. TOWILL CORPORATION

APRIL 1994

of the time. Assuming constant depth across the bay and sustained wind speeds (both conservative assumptions), a 27-knot north wind would generate a 2.4 foot wave along the ocean side of the reef margin. The wave height reaching the shoreline would be reduced by the shallow water and the bottom roughness. This is probably a conservative estimate of the highest annual wave height at the site.

The shoreline and offshore areas are comprised of a complex reef bottom consisting of dredged channels, hard reef bottom and sand pockets. Details of the bay bottom are shown in the Oahu Coastal Zone Atlas (AECOS, 1981).

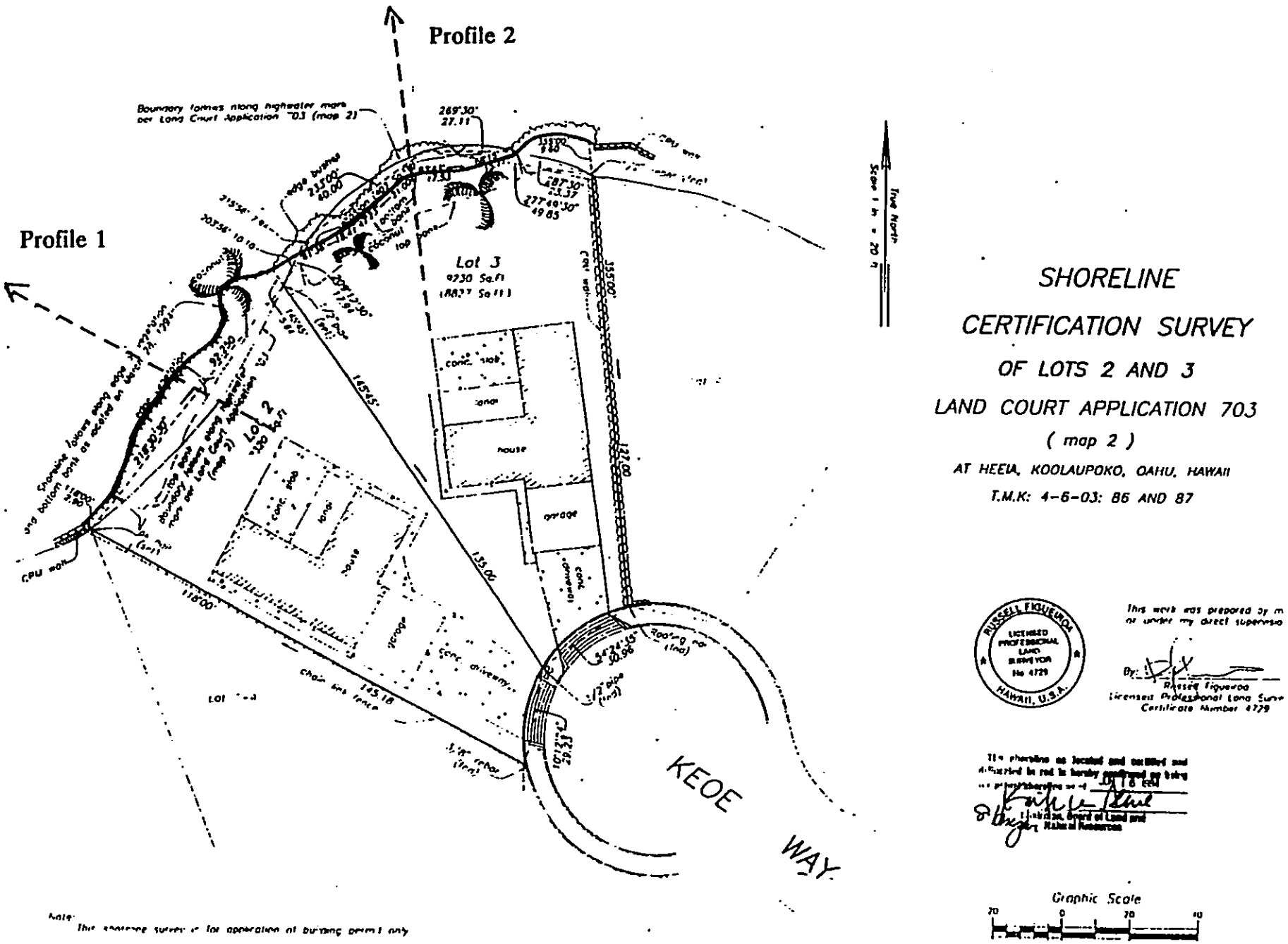
The tidal currents and prevailing low wave energy limit the littoral transport. Offshore areas adjacent to existing seawalls show no sign of toe scour or alteration in the foreshore slopes, which would be typical in areas of littoral transport.

EXISTING SHORELINE

The existing shoreline, certified June 16, 1994, is shown in Figure 3. Figures 4 and 5 show cross-section profiles measured on August 9, 1994. The elevations and distances are approximate, and were measured to determine the general offshore conditions.

The shoreline and nearshore area, in front of the two properties and the surrounding properties, has been extensively modified by past dredging. At present, there is a small dredged channel paralleling the shoreline. The channel is 8 to 9 feet deep and 60 feet wide, and provides navigation for small boats only. Seaward of the channel is the reef flat, which extends for several hundred feet at depths of 1 to 2 feet before dropping off into the deeper bay waters.

The foreshore of the project area is composed of mixed mud, and basalt cobbles up to 6 inches in diameter, averaging 1 inch in diameter. This mud and rubble shore is 10 to 15 feet wide at low tide; high tide waters reach the base of an approximately 8-foot high erosion scarp (Figures 4 and 5). There is evidence of significant active erosion along this shoreline. A coconut tree between the two properties is undercut and has its roots exposed. The erosion scarp on either side of the tree has retreated landward, indicating erosion of approximately 6 to 10 feet. Other evidence of shoreline erosion includes the following: a PVC drain pipe exposed in the scarp; areas where the bank is undercut up to 3 feet and the vegetated lawn has slumped down onto the shoreface; and tension cracks in the lawn at the top of the bank where blocks of earth are slumping towards the shore.



Note:
This shoreline survey is for application of building permit only

FIGURE 3.

Figure 4. Profile 1

46–082 Keoe Way, Kaneohe, Oahu

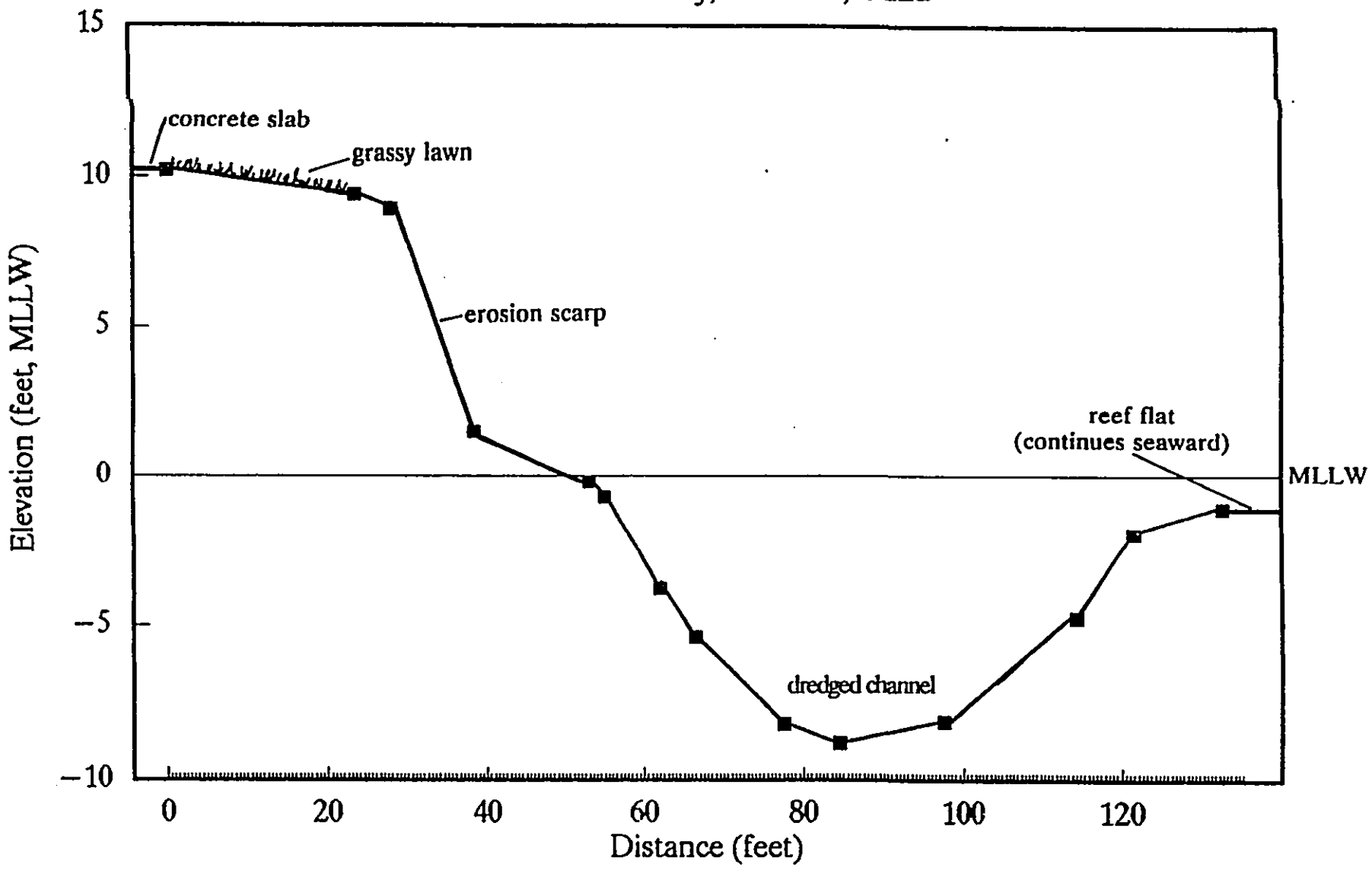
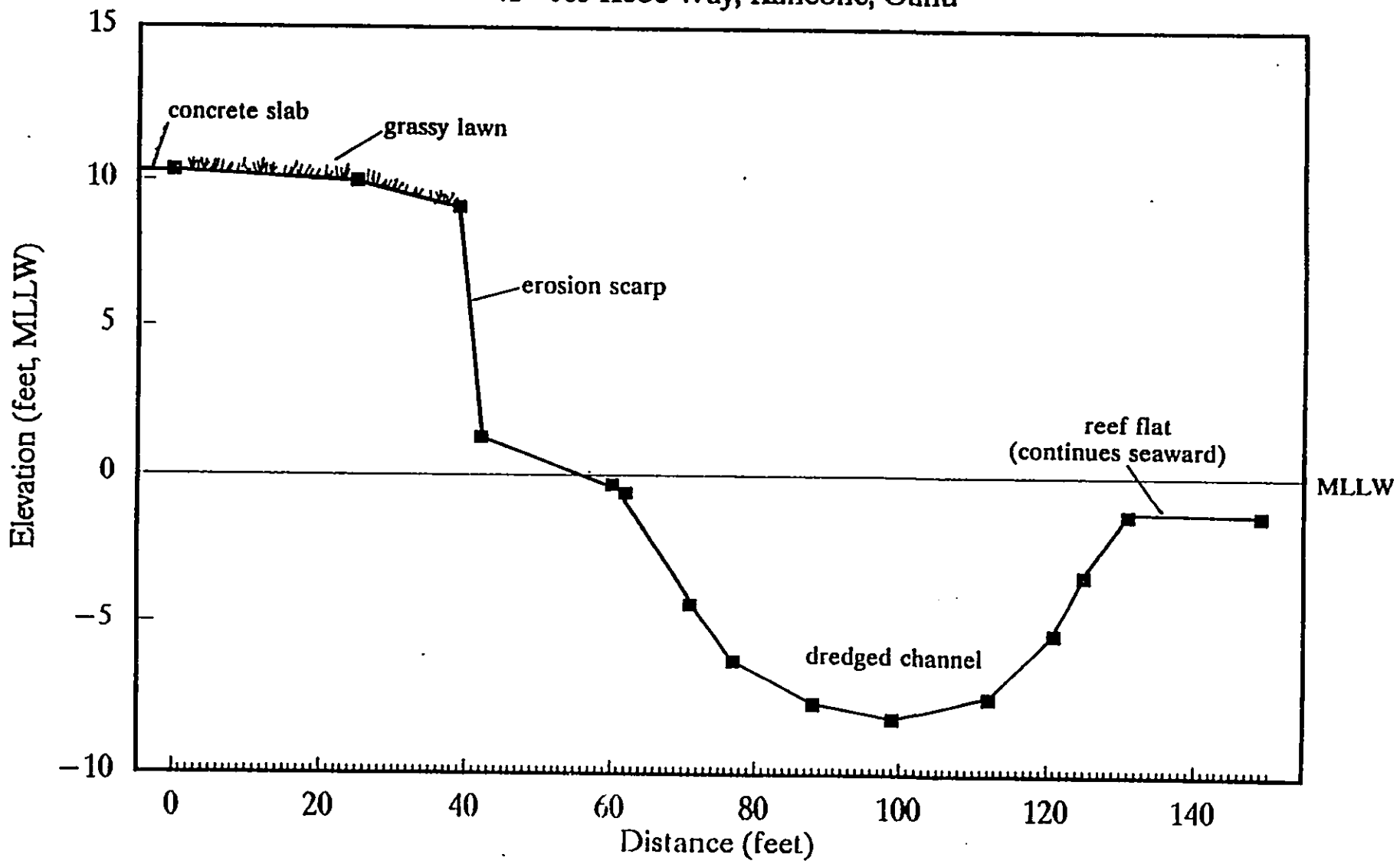


Figure 5. Profile 2

41–083 Keoe Way, Kaneohe, Oahu



The existing condition of the shoreline is illustrated by Photos 1 through 7. Photos 1 and 2 show the project shoreline and the seawalls to the east and west respectively along the adjacent lots. The mud and rubble foreshore and steep erosion scarp are shown in Photos 3 and 4.

JUSTIFICATION FOR SHORE PROTECTION

The 8-foot high erosion scarp cut into the backshore, and undercut coconut tree and bank, are indicative of significant ongoing erosion. The continuing erosion and the fact that this is the only unprotected shoreline in the vicinity, justify shore protection to prevent the loss a valuable waterfront land, and possible damage to the adjacent shore protection.

CONSIDERATION OF ALTERNATIVES

Three possibilities exist for the parcel in question:

No Action.

This alternative would result in continued erosion and loss of water front property, and possible damage to the neighboring structure.

Revetment.

This alternative could be constructed along the shoreline to eliminate further erosion. A revetment is a sloping structure with an outer facing of erosion resistant material. Revetments are most commonly constructed of armor stones, sized to resist the design waves, over underlayers of smaller stones and bedding material. Advantages of properly designed revetments are durability, flexibility during settlement, resistance to wave damage, and reduced wave reflection. This last factor is very important when sandy beaches are located seaward of the structure.

The major disadvantage of a revetment is the extent of land used by the structure. For example, for a revetment with a total height of 5 feet and a sloping face of 1 on 3, the total structure width would be at least 15 to 18 feet. Along this shoreline, it would also be difficult to tie-in the revetment with the adjacent vertical seawalls.

Seawalls.

Seawalls are vertical concrete or grouted masonry walls used to protect the land from wave damage, with use as a retaining wall a secondary consideration. Seawalls are proven, long lasting, relatively low maintenance shore protection. They require limited horizontal space along the shoreline, and stairs may be provided for access to the water. Masonry gravity walls are commonly used for shore protection in Hawaii. This type of wall may be constructed of cast-in-place reinforced concrete or of individual rocks grouted in place. A gravity wall is stabilized by its own weight. Weep holes are provided at regular intervals for drainage. The staircase shaped seawall would decrease wave reflection by initiating wave breaking. This decreases toe scour and is an advantage over near vertical seawalls. Ideally the wall should be constructed on solid, non-erodible substrata. Undermining of the toe is one of the most common causes of seawall failure. Seawalls are inflexible structures and failure of one section can often initiate failure of the entire wall.

PROPOSED ALTERNATIVES

Since there are no beaches in the immediate area and wave reflection is not a concern, a seawall is the preferred alternative. The homeowner proposes to use a CRM wall, with a cross section as shown in Figure 6. The wall will follow the existing certified shoreline, as indicated by the bold line in Figure 3.

The wall was not designed by Sea Engineering, Inc. and this report only addresses the justification for, and the coastal impacts of, the wall, and should not be considered a verification of the structural design. However, the wall does appear to meet the general guidelines for seawalls as described above.

POTENTIAL IMPACTS

Given the existing conditions, with seawalls already protecting the neighboring properties, and the nearshore dredged channel, the proposed wall should have no adverse impacts. Positive impacts will include the following:

- protection of valuable waterfront land, and;
- an improvement in the general aesthetics of the area, by substitution of a seawall for a foreshore consisting of rubble and weeds.

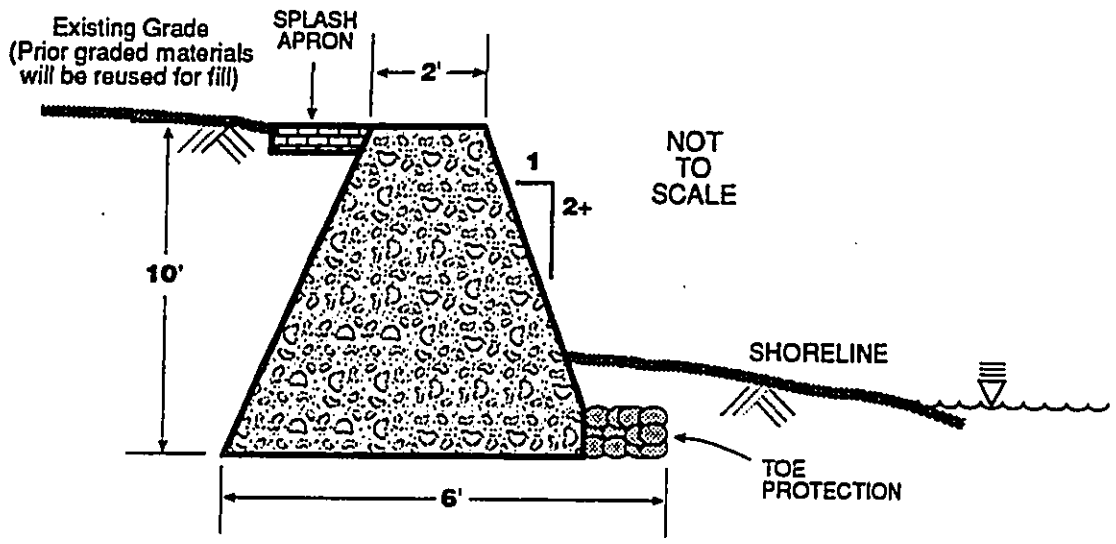

Existing Grade
(Prior graded materials
will be reused for fill)
SPLASH
APRON
2'
1
2+
NOT
TO
SCALE
10'
SHORELINE
TOE
PROTECTION
6'
CONCRETE RUBBLE MASONARY (CRM)
TYPICAL

FIGURE 6.

REFERENCES

AECOS, Inc. 1981. "Oahu Coastal Zone Atlas". Prepared for the State of Hawaii, Department of Transportation, Harbors Division.

Sea Engineering, Inc. 1990. "Windward Oahu Hurricane Vulnerability Study, Determination of Coastal Inundation Limits". Prepared for the State of Hawaii, Department of Defense and the U.S. Army Corps of Engineers, Pacific Ocean Division.

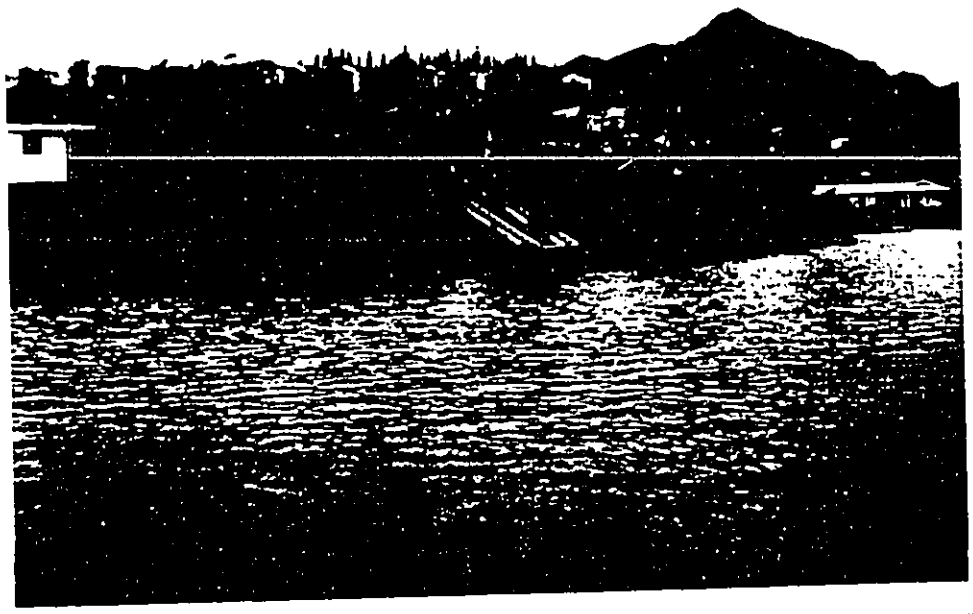


PHOTO 1: UNPROTECTED PROJECT SHORELINE AND SEAWALL PROTECTING THE PROPERTY TO THE EAST

PHOTO 2: UNPROTECTED PROJECT SHORELINE AND SEAWALL PROTECTING THE YACHT CLUB TO THE WEST

PHOTO 3: PROJECT SHORELINE VIEWED FROM YACHT CLUB

PHOTO 4: MUD AND RUBBLE FORESHORE,
AND EROSION SCARP

PHOTO 5: UNDERCUT COCONUT TREE WITH ROOTS EXPOSED, INDICATING ACTIVE EROSION

PHOTO 6: ERODING PROJECT SHORELINE WITH COCONUT TREE SLUMPING ONTO FORESHORE

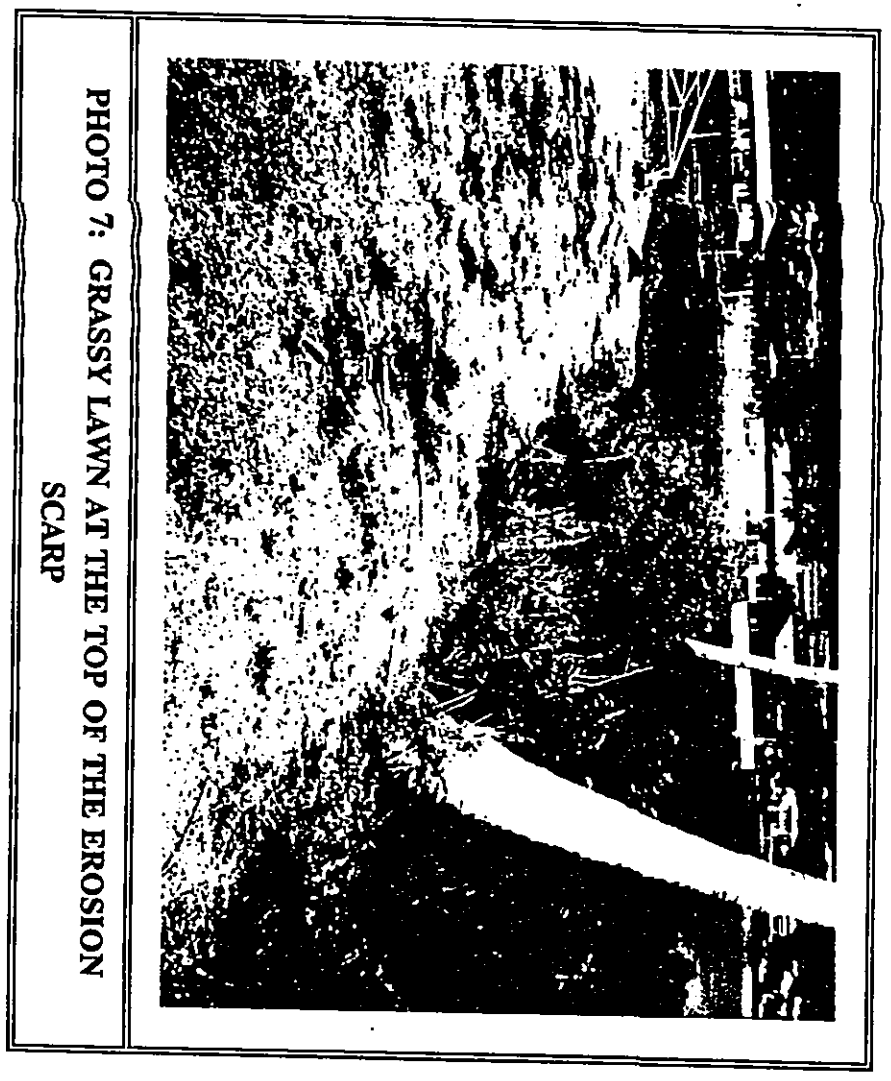


PHOTO 7: GRASSY LAWN AT THE TOP OF THE EROSION SCARP