DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
PHONE: (808) 768-8000 • FAX: (808) 768-6041
DEPT. WEB SITE: www.honoluludpp.org • CITY WEB SITE: www.honolulu.gov

MUFI HANNEMANN
MAYOR

DAVID K. TANOUE
DIRECTOR

ROBERT M. SUMITOMO
DEPUTY DIRECTOR

JUN 23

2005/ED-22(AA)

June 5, 2009

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

Dear Ms. Kealoha:

Subject: Chapter 343, Hawaii Revised Statutes
Environmental Assessment (EA)/Determination
Finding of No Significant Impact

Landowner/Applicant:	George T. Murakami Trust and Alan H. Kodama Trust
Agent:	Analytical Planning Consultants, Inc.
Location:	68-681 Farrington Highway - Mokuleia
Tax Map Key:	6-8-10: 18
Request:	Shoreline Setback Variance
Proposal:	To retain a concrete masonry unit (CMU) seawall and other structures within the shoreline setback.
Determination:	A Finding of No Significant Impact is Issued

Attached and incorporated by reference is the Final EA prepared by the applicant for the project. Based on the significance criteria outlined in Title 11, Chapter 200, Hawaii Administrative Rules, we have determined that preparation of an Environmental Impact Statement is not required.

We have enclosed a completed OEQC Bulletin Publication Form and two copies of the Final EA. If you have any questions, please contact Ann Asaumi of our staff at 768-8020.

Very truly yours,

David K. Tanoue, Director
Department of Planning and Permitting

DKT:cs
Encls.

g:posseworkingdirectory\ann\2005ed22oeqcfonsi.doc

FINAL ENVIRONMENTAL ASSESSMENT

SHORELINE SETBACK VARIANCE

TMK: 6-8-10: 018
68-681 Farrington Highway
Mokuleia, Oahu, Hawaii

ACCEPTING AUTHORITY:

City and County of Honolulu
Department of Planning and Permitting

PREPARED BY:

Analytical Planning Consultants, Inc.

July 2008

FINAL ENVIRONMENTAL ASSESSMENT

SHORELINE SETBACK VARIANCE

TMK: 6-8-10: 018
68-681 Farrington Highway
Mokuleia, Oahu, Hawaii

APPLICANT AND OWNER:

George Murakami
Alan Kodama

ACCEPTING AUTHORITY:

City and County of Honolulu
Department of Planning and Permitting

PREPARED BY:

Analytical Planning Consultants Inc.
Honolulu, Hawaii

July 2008

OEQC BULLETIN PUBLICATION FORM

(Follow instructions on other side)

1. Project Name: Shoreline Setback Variance

Type of Document *(circle one)*: **Draft EA**, (Final EA), EIS prep notice, draft EIS, final EIS, NEPA

check if applicable: _____revised document _____ supplemental document

Legal Authority: Chapter 343 HRS

Agency determination: Anticipated FONSI

Applicable sections:

___ Use of state or county lands or funds
___ Use of conservation district lands
_X_ Use of shoreline area
___ Use of historic site or district
___ Use of land in the Waikiki district
___ Amendment to county general plan
___ Reclassification of conservation lands
___ Construction or modification of helicopter facilities

2. Island: Oahu
Judicial District: Honolulu
Tax Map Key Number: (1) 6-8-10: 018

3. Applicant or applicant agency:
Mr. George Murakami
Address: 1585 Kapiolani Blvd, #1100
Honolulu, HI 96814
Contact: George Murakami Phone: (808) 952-1222

Note for EAs: When the applicant is a state or county agency, the applicant agency and approving agency are the same.

4. Approving Agency (EAs) or Accepting Authority (EISs):
City and County of Honolulu, Department of Planning and Permitting
Address: 650 South King Street
Honolulu, Hawaii 96813
Contact: Henry Eng, FAICP, Director Phone: 808-523-4432

5. Consultant: Analytical Planning Consultants, Inc.
Address: 928 Nuuanu Avenue Suite 502
Honolulu, Hawaii 96817
Contact: Don Clegg, President Phone: 808-536-5695

6. Public Comment Deadline: _____

7. Permits required prior to implementation: Shoreline Setback Variance, Building Permits
Zoning Adjustment/Height Waiver

8. Project Summary (name of file): Murakami Shoreline Setback Variance

9. Public Library Copy: _____(not required for final EAs)

10. This form was prepared by: Lauri Clegg Phone: 808-536-5695

Table of Contents

Table of Contents (continued)

List of Figures

Appendices

1. GENERAL INFORMATION

After-the-fact approval is being sought for construction of a modified vertical seawall structure that was constructed across the shoreline frontage of the subject property around 1969 and other miscellaneous structures located within the shoreline setback area. The structures were built without City approvals, including a Shoreline Setback Variance (ROH 1992 Chapter 23) and a Building Permit (ROH 1990 Chapter 18). Pursuant to the Revised Ordinances of Honolulu Chapter 23, Shoreline Setbacks, a Shoreline Setback Variance will be required and will be submitted pending issuance of a Finding of No Significant Impact (FONSI). The EA has been prepared incompliance with the Environmental Impact Statement (EIS) regulations of Chapter 343, Hawaii Revised Statutes.

A. Project: Shoreline Setback Variance

B. Owner/Applicant:
Mailing address:
Mr. George Murakami
1585 Kapiolani Boulevard, #1100
Honolulu, HI 96814

C. Accepting Agency:
City and County of Honolulu
Department of Planning and Permitting

D. Agent:
Analytical Planning Consultants Inc
Mr. Donald Clegg, President
928 Nuuanu Avenue
Honolulu, HI 96817
Phone: 536-5695 Fax: 599-1553

E. Property Profile:

Location:	68-681 Farrington Highway
TMK:	6-8-10: 018
Land Area:	Total 11,358 SF
	Erosion 2,751 SF
	Net 8,607 SF
Present Use:	Single Family Residential
State Land Use District:	Urban
Zoning:	R-5 Residential
Sustainable Communities Plan	North Shore/Rural Residential
Special District:	No
Special Management Area:	Yes
Flood Zone:	FIRM Zone AE

F. Agencies Consulted:

- City and County of Honolulu, Department of Planning and Permitting
- State Bureau of Conveyances
- State Department of Accounting & General Services (Survey Division)
- State Department of Land and Natural Resources
- State Office of Environmental Quality Control
- Office of Hawaiian Affaird
- Oahu Civil Defense

G. Anticipated Determination Finding of No Significant Impact (FONSI)

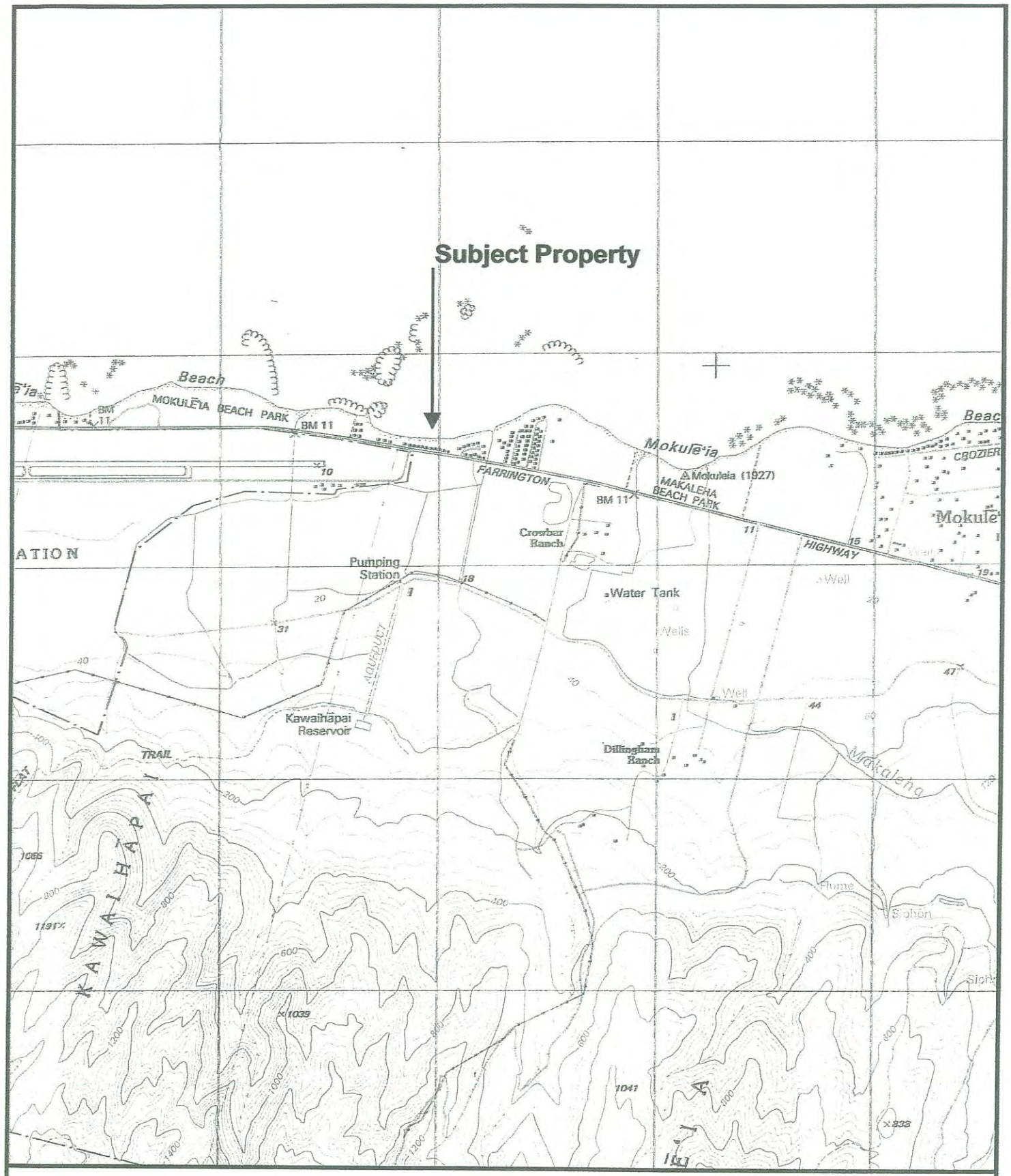
2. LOCATION AND GENERAL DESCRIPTION OF THE SUBJECT PROPERTY

2.1 Site Description and Background

The subject property, TMK 6-8-10: 018, is located at 68-681 Farrington Highway on the northwest coast of Oahu. The subject property is located between two single family residences on either side. The makai side of the highway along this stretch of Mokuleia is almost completely developed with single-family houses. A general location map for the subject property is shown in **Figure 1** and a Tax Key Map identifying the property is shown in **Figure 2.**

The subject property is located near the middle of an embayment that stretches between Mokuleia Beach Colony to the east and the Episcopal Church Camp to the west. The beach varies in width and is composed primarily of fine calcareous sand. The subject property is located near the middle of an embayment that stretches between Mokuleia Beach Colony to the east and the Episcopal Church Camp to the west. The project site faces north and is subject to seasonal storm damage associated with large winter surf. Based on historical aerial photos of the Mokuleia coastline taken between 1949-1996, there has been a loss of shoreline due to erosion activity since the lots were first subdivided in 1960. Erosion of the lot area was noted by the City and County of Honolulu Real Property Tax Office as of the mid 1960's. The 1989 report *Oahu Shoreline Study – Data on Beach Changes* prepared by Sea Engineering, Inc. for the City and County of Honolulu's Department of Land Utilization documents a landward recession of the vegetation line since 1949 for the area immediately in the vicinity of the subject property. The landward recession totaled between 10 to 18 feet over the 39 year study period. Since the late 1960's a variety of shoreline structures have been constructed along the ocean frontage of the adjoining properties to the east and west to help stabilize the retreating shoreline.

The subject property was purchased in 1999 by Mr. George Murakami and Mr. Alan Kodama. Each party owns a fifty percent share of the property. The recorded lot area to which the owners hold title is 11,358 square feet. After subtracting the eroded seaward portion of 2,751 square feet, the net area of the lot is 8,607 square feet. Vegetation on the site consists of yard grass and various residential landscaping materials. The topography of the lot is flat as is evident in the site photos in **Figure 3A.**



Source USGS 1998

NORTH

0 1000 2000

SCALE IN FEET

Figure 1
LOCATION MAP

Murakami, 68-681 Farrington Highway, Mokuleia, Oahu, Hawaii

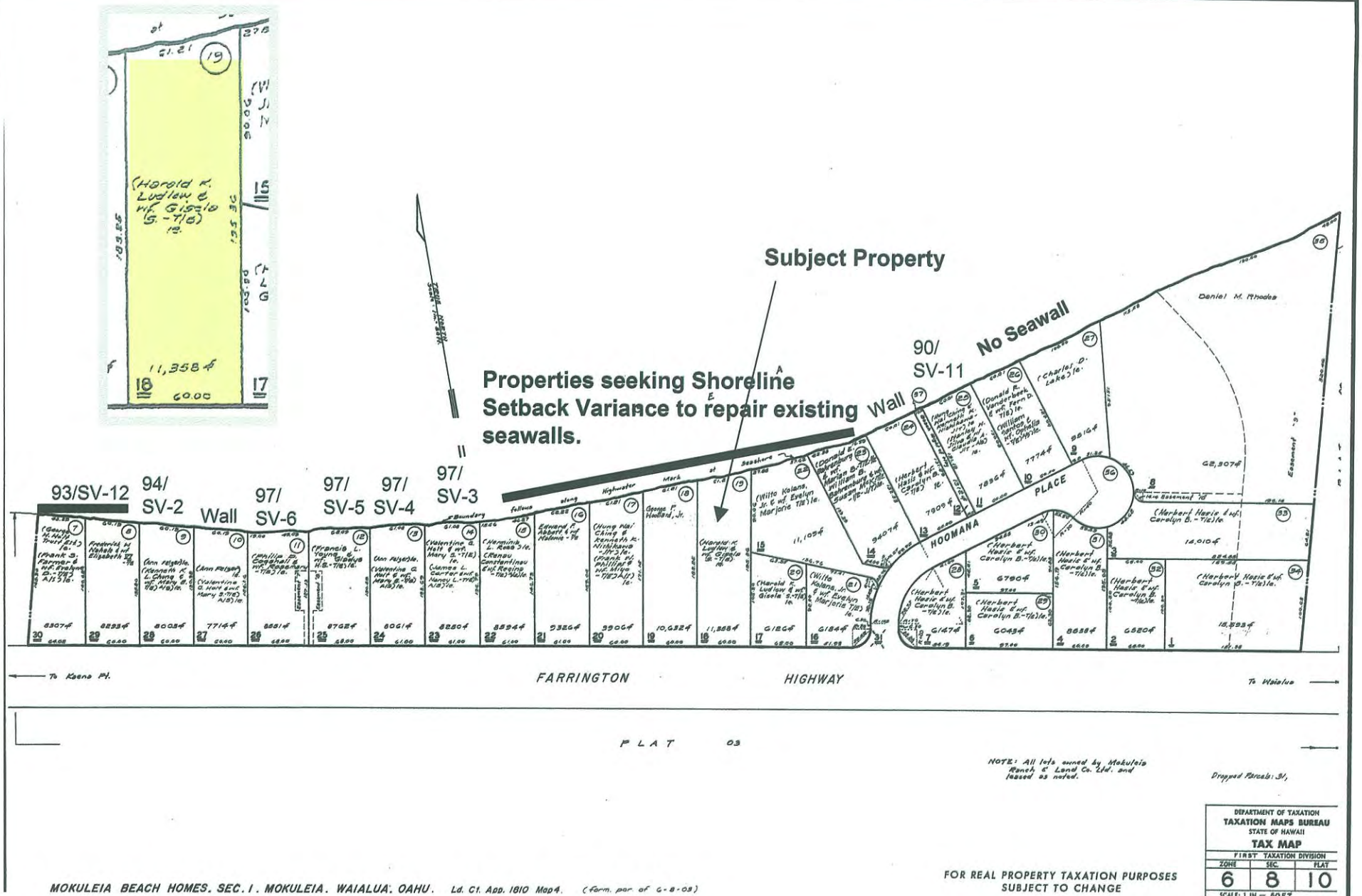


Figure 2

PROJECT VICINITY TMK MAP

68-681 Farrington Highway, Mokuleia, Oahu, Hawaii

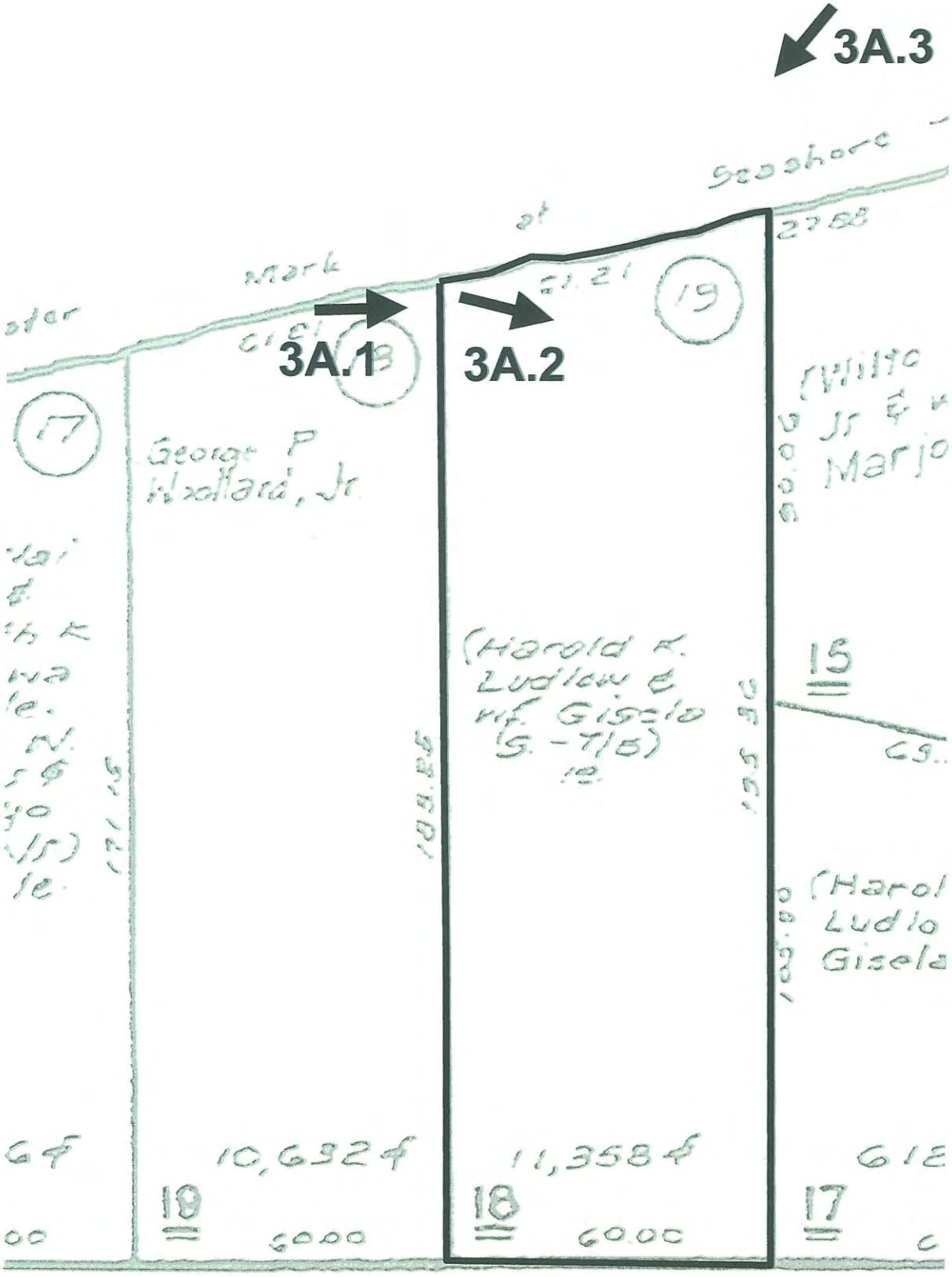
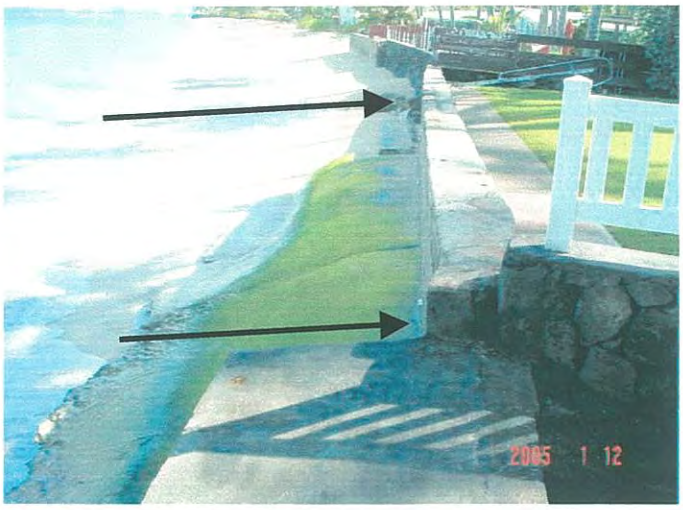


Figure 3

PHOTO KEY MAP

68-681 Farrington Highway, Mokuleia, Oahu, Hawaii



3A.1

3A.2

Mokuleia
TMK: 6-8-10:18
Photo date 01-12-05
By Hida, Okamoto & Assoc.

3A.3

Mokuleia
TMK: 6-8-10:18
Photo date 04-02-05
Time 2:00 pm
By EKNA Services
Tide approx. 0.1' MLLW

Figure 3A
SUBJECT SEAWALL TMK: 6-8-10: 018
68-681 Farrington Highway, Mokuleia, Oahu, Hawaii

DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813 • (808) 523-4432

FRANK F. FASI
MAYOR

JOHN P. WHITE
DIRECTOR

86/SI-3 (PR)

May 12, 1986

Mr. Gary N. Pardy
68-683 Farrington Highway
Waialua, Hawaii 96791

Dear Mr. Pardy:

Shoreline Setback Determination

Thank you for your letter of April 25, 1986 requesting a determination as to whether a 40-foot or a 20-foot shoreline setback applies to your property (Tax Map Key 6-8-10: 19).

The attachments you provided with your letter have established that nearly 3000 square feet (SF) of land was eroded from your property and a seawall built prior to the adoption of the Shoreline Setback Rules of the City and County of Honolulu in 1971.

Upon further review of the information you provided, we have determined that when the 40-foot shoreline setback and all other required setbacks are applied to your lot, the buildable area of the parcel is reduced to less than 50 percent of the lot area.

Therefore, we find that, as stated in Rule 9 of the Shoreline Setback Rules and Regulations of the City and County of Honolulu, a 20-foot shoreline setback applies to your parcel.

In addition, we are waiving the need for an instrument survey under the provisions of Rule 10 of the Shoreline Setback Rules and Regulations. As shown on your plan, the fence extension is 30 feet from the shoreline and therefore clearly outside the shoreline setback. Our field measurements verify the dimensions shown on your plan.

Figure 5

1986 CITY DEPT OF LAND UTILIZATION LETTER – PARCEL 19 SHORELINE SETBACK DETERMINATION

68-681 Farrington Highway, Mokuleia, Oahu, Hawaii

FIGURE 1

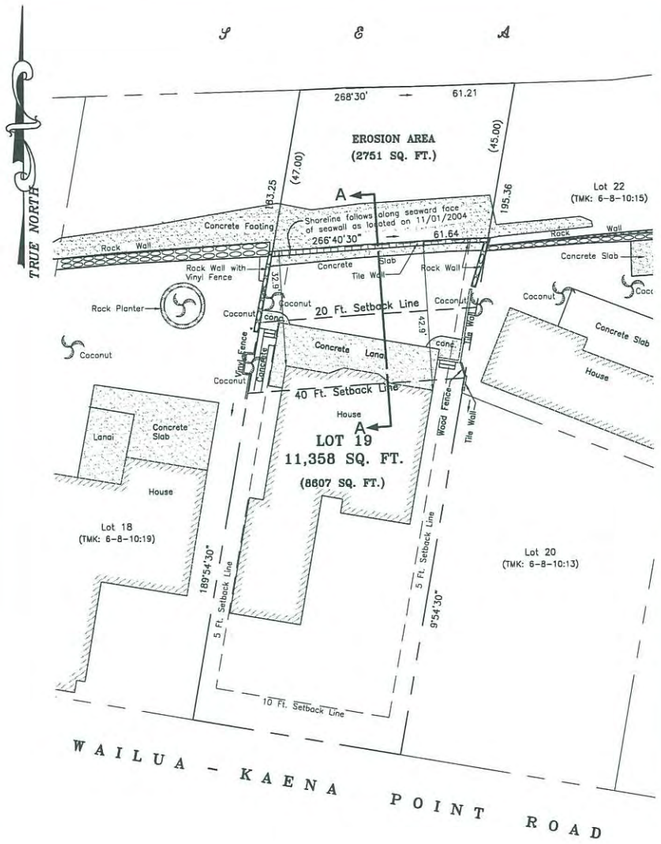
The existing house, carport and ocean-side lanai were constructed in 1967 per Building Permit No. 45477 dated October 6, 1967 (**Appendix A**). The dimensions of the house, carport and ocean-side lanai as shown on the December 27, 1967 Real Property Tax Record Card (**Appendix B**) match the current footprint of the house, carport and ocean-side lanai, with the addition in 1985 via a building permit for a small greenhouse on the Farrington Highway-side of the house. The house, carport and ocean-side concrete slab lanai, which are permitted existing non-conforming structures, are set back at least 20 feet from the face of the existing seawall (**Fig. 4**) There also exists on the property other minor structures, walkways, walls and fences located within the 40-foot setback. As there are no building permits nor evidence to collaborate that these structures were constructed legally and placed prior to 1992, the structures do not have nonconforming status and may require a Shoreline Setback Variance or Minor Shoreline Structures permit in order to be retained.

The tax map shows that the makai boundary of all the properties in this embayment is in line with each other on a gently curing arc. Similarly, from the photographic evidence available, the original seawalls were constructed using very large concrete blocks for foundation along this line/arc. In 1991, some of the walls collapsed from the continuous pounding of the ocean and it appears that, over time, these seawalls have been replaced and/or repaired and strengthened and the original foundations left to support the walls. The walls that were repaired and strengthened remained on the original foundations. In these cases, the original foundations remain. This is the case with the subject property.

There is historic evidence – shoreline surveys and City communications – that documents seawalls along this embayment since the early 1970's following a significant period of erosion in 1970. In 1986 the owner of Parcel 19, adjacent to the subject property, received written confirmation from the City's Department of Land Utilization that the seawall on Parcel 19 was "built prior to the adoption of the Shoreline Setback Rules of the City and County of Honolulu in 1971" (**Figure 5**). Although, Mr. Murakami does not know the exact date of construction of the seawall since he has owned the property for only 9 years, it is extremely likely that the seawall on the subject property was built very near the same time as the seawalls in the immediate vicinity. Otherwise, an unprotected property would suffer immediate and severe erosion. –such as the subject property – if it were located adjacent to a +10-foot high vertical seawall such as on Parcel 19. Therefore, it is extremely likely that the seawall on the subject property was also built prior to 1971, similar to the seawall built on Parcel 19.

As further evidence, the face of the subject seawall is concrete tile block, which is the material that was originally used when the 15 or so property owners along this embayment had seawalls constructed in the late 1960's and early 1970's. The exposed concrete tile block seawall is the only one of its kind along this area; it has not been totally resurfaced with other materials like concrete rubble masonry or gunnite. However, the east corner of the existing seawall appears to have been impacted when the concrete rubble masonry seawall was built in 1998 on the adjacent Parcel 15.

Additional Background Information: The Findings of Fact for the after-the-fact Shoreline Setback Variance for parcels 27-30 (93/SV-12), located north of the subject parcel, references an aerial photograph of the area dated April 22, 1967 on file at the City which shows no shore protection structures and the vegetation line ranging from 0-20 feet away from the dwellings. Seawalls appear to have been built along this embayment some time after 1967. Records at the Real Property Tax Office reference damage to existing walls and dwellings along the embayment during high surf in 1970. It is speculated that the construction of seawalls along the shoreline took place after this damage. The 1993 report also references Department slides and photographs of the area, taken from 1982 through 1991 which display walls in the sand area along the shoreline for 16 residential lots east of the Episcopal Church Camp, including the subject lot. No building permits are on file for construction of these seawalls; however, after-the-fact Shoreline Setback Variances and building permits have been issued for 9 of the properties since 1990. The Mokuleia Beach Colony (TMK 6-8-09: 001) has an approximately 350-foot long seawall, with an approved shoreline setback variance. The historical photos on file at the DPP also indicate that over the years walls have been destroyed by storm waves and reconstructed at increasing heights. The applicant is seeking after-the-fact approval of a Shoreline Setback Variance for the structures located within the shoreline setback as has been done for the other 9 properties along this portion of Mokuleia Beach.



SITE PLAN

SCALE: 1" = 20'

CONSTRUCTION NOTES

1. All applicable construction work shall be done in accordance with the Standard Specifications for Public Works Construction, September 1986 and Standard Details for Public Works Construction, September 1984, as amended, of the Department of Public Works, City and County of Honolulu and the Counties of Kauai, Maui, and Hawaii.

2. The underground pipes, cables or ductlines known to exist by the engineer from his search of records are indicated on the plans. The Contractor shall verify the locations and depths of the facilities and exercise proper care in excavating in the area. Wherever connections of new utilities to existing utilities are shown on the plans, the Contractor shall expose the existing lines at the proposed connections to verify their locations and depths prior to excavation for the new lines.

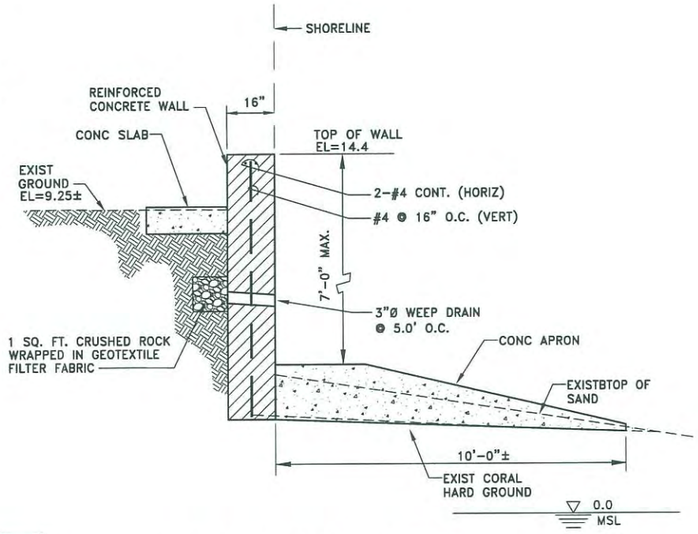
3. No Contractor shall perform any construction operation so as to cause falling rocks, soil or debris in any form to fall, slide or flow into existing City drainage systems, or adjoining properties, streets or natural watercourses. Should such violations occur, the Contractor may be cited and the Contractor shall immediately make all remedial actions necessary.

4. The Contractor shall be responsible for conformance with the applicable provisions of the water quality and water pollution control standards contained in Hawaii Administrative Rules, Title 11, Chapter 54, "Water Quality Standards", and Title 11, Chapter 55, "Water Pollution Control", as well as Chapter 14 of the Revised Ordinances of Honolulu, as amended. Best Management Practices shall be employed at all times during construction.

5. Pursuant to Chapter 6E, HRS, in the event any artifacts or human remains are uncovered during construction operations, the Contractor shall immediately suspend work and notify the Honolulu Police Department, the State Department of Land and Natural Resources-Historic Preservation Division (692-8015). In addition, for non-City projects, the Contractor shall inform the Civil Engineering Branch, Department of Planning and Permitting (523-4881); and for City projects, notify the responsible City agency.

6. For Bench Mark, see sheet C-1.

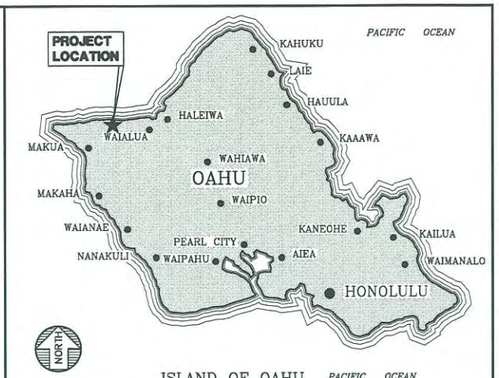
7. Assumed Life expectency for Seawall is 30 years.



NOTE: BACKFILL UTILIZED : 28 Cu. Yd.

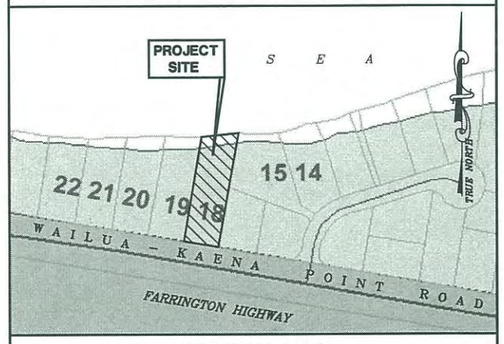
TYPICAL WALL DETAIL

SCALE: 1/2"=1'-0"



VICINITY MAP

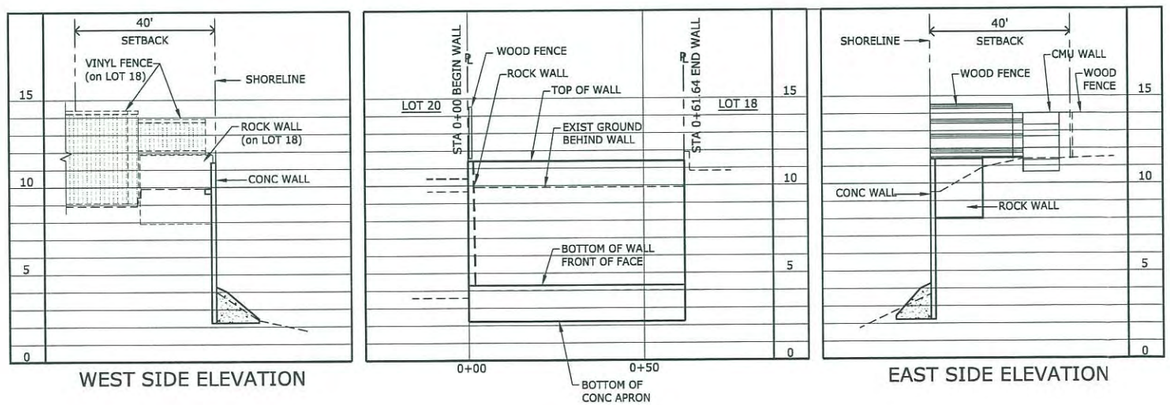
NO SCALE



LOCATION MAP

NO SCALE

TAX MAP KEY: 6-8-10:18

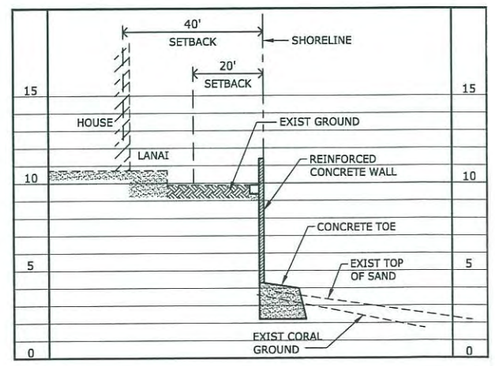


WEST SIDE ELEVATION

EAST SIDE ELEVATION

ELEVATION

SCALES: HORIZ 1" = 20'
VERT 1" = 4'



SECTION A-A

SCALES: HORIZ 1" = 20'
VERT 1" = 4'

GRAPHIC SCALES

2 0 1 2 4 8
1/2" = 1' - 0"

20 0 10 20 40 80
1" = 20'

5 0 5 10 15
1" = 4'

HARVEY K. HIDA LICENSED PROFESSIONAL ENGINEER No. 4363-C HAWAII, U.S.A.

LICENSE EXP. APR. 30, 2010

This work prepared by me or under my supervision and construction of this project will be under my observation. (Observation of construction as defined in Section 16-115-2 of the Rules of the Board of professional Engineers, Architects and Surveyors of the State of Hawaii).

By: _____

Date: _____

Revision	Date	Brief	Made by	Approved

HIDA, OKAMOTO & ASSOCIATES, INC.
CONSULTING ENGINEERS
1440 KAPIOLANI BOULEVARD, SUITE 1120, HONOLULU, HAWAII 96814
TELEPHONE (808) 942-0066

SEA WALL AFTER-THE-FACT
Makuleia, Waialua, Oahu
Tax Map Key: 6-8-10:18

VICINITY MAP, LOCATION MAP, SITE PLAN, ELEVATION, SECTION, AND NOTES

Figure 7

Des. HKH Dr. RH Ck.

C-1

SHT 1 of 1

FILE:1822-10T9.DWG

2.2 Proposed Action

The applicant received a Notice of Violation in July 2004 for the existing seawall's "concrete footing located within the shoreline setback area". The applicant now wishes to seek approval for an after-the-fact Shoreline Setback Variance, and if approved, an after-the-fact building permit for:

1. The seawall including the concrete cap behind the lip of the seawall and the concrete footing;
2. The return wall portion of the seawall and wooden fence along the east side yard.

The applicant is requesting that these additional non-permitted structures located within the 40-foot shoreline setback be included in the variance or that these structures be approved as "minor structures" under Chapter 23 section 15-1(b)(8):

1. Concrete lanai and wooden porch adjacent to the dwelling;
2. Concrete walkways and stairs along both the east and west sides of the dwelling;
3. Concrete tile fencing within the east side yard.

The applicant will apply for a zoning adjustment to permit the wall to exceed the maximum permitted height for safety and topological reasons or a height variance. This will be determined during processing of the Shoreline Setback Variance.

Without the seawall, erosion would immediately and significantly impact the shoreline frontage thereby threatening the existing residential structure. As noted earlier, this embayment along the Mokuleia coastline has a history of documented chronic erosion. **Appendix C** contains a full size copy of the shoreline survey/site plan.

There is no record of any previous certified shoreline issued for the subject parcel. Prior to obtaining after-the-fact building permits for the structures located within the shoreline setback area, the applicant will be required to obtain a certified shoreline from the State of Hawaii Department of Land and Natural Resources. As per Section 13-222-7(a)(14) Hawaii Administrative Rules, an application for shoreline certification cannot be accepted by the State of Hawaii Department of Land and Natural Resources until the illegal shoreline protection structure has been approved by the appropriate governmental agencies, i.e. by obtaining a Shoreline Setback Variance. This Environmental Assessment is the first step in obtaining this approval. The Department of Accounting and General Services Survey Division in their review of the shoreline survey will determine whether the certified shoreline will be placed at the base of the previous footings or at the face of the wall and any encroachments will be determined at that time.

2.3 Technical Characteristics

The existing seawall is a concrete tile block wall with a top elevation of about +10'MSL (see Figure 7). The seawall, which spans a width of 61.64 feet across the makai side of the property (see Figure 4), has a return wall along the east side of the property line to stabilize and likely help to anchor the seawall into the interior of the property; not just a freestanding face that could fall over. The original concrete tile blocks are visible as the face of the seawall (see Figure 3A.3). The concrete slab that is level with the rear yard behind the lip of the seawall is structurally part of the seawall; it is the concrete cap over the material that comprises the backfill behind the seawall (see Figure 3A.1 and 3A.2).

Figure 7 is the as-built plan prepared by Hida Okamoto & Associates, Inc. and includes a site plan, elevation, section and typical wall detail drawings. The seawall is comprised of 8-inch wide concrete block with an exposed face of approximately 5 feet in height. Built into the wall are 3-inch weep drains set in crushed rock wrapped in filter fabric set five feet off center. Backfill is estimated at 28 cubic yards. . Life expectancy for the wall is estimated at 30 years.

According to the as-built survey, the base of the wall is protected by a poured-in-place concrete apron extending from elevation +3'M to the top-of-beach elevation of about +1'MSL (+2'MLLW). It is not known when the concrete slope was constructed, but it appears to have been placed sometime after the wall was constructed, likely to stabilize the wall after erosion had lowered the elevation of the fronting beach. The base of the wall is subject to wave runup depending upon ocean conditions.

Granting of the Shoreline Setback Variance will allow the property owner to maintain and repair the seawall as needed, otherwise overtime, portions of the wall could collapse should the footings be undermined by wave action. Any mitigation would involve securing the footings to prevent undermining by wave action. The seawall ties into seawalls on both the east and west sides of the subject property. The owners of parcel 19 and 15 are in the process of obtaining an after-the-fact shoreline setback variance.

2.4 Economic and Social Characteristics

No new construction is proposed, therefore no economic or social impacts are anticipated.

2.5 Cultural and Historic Characteristics

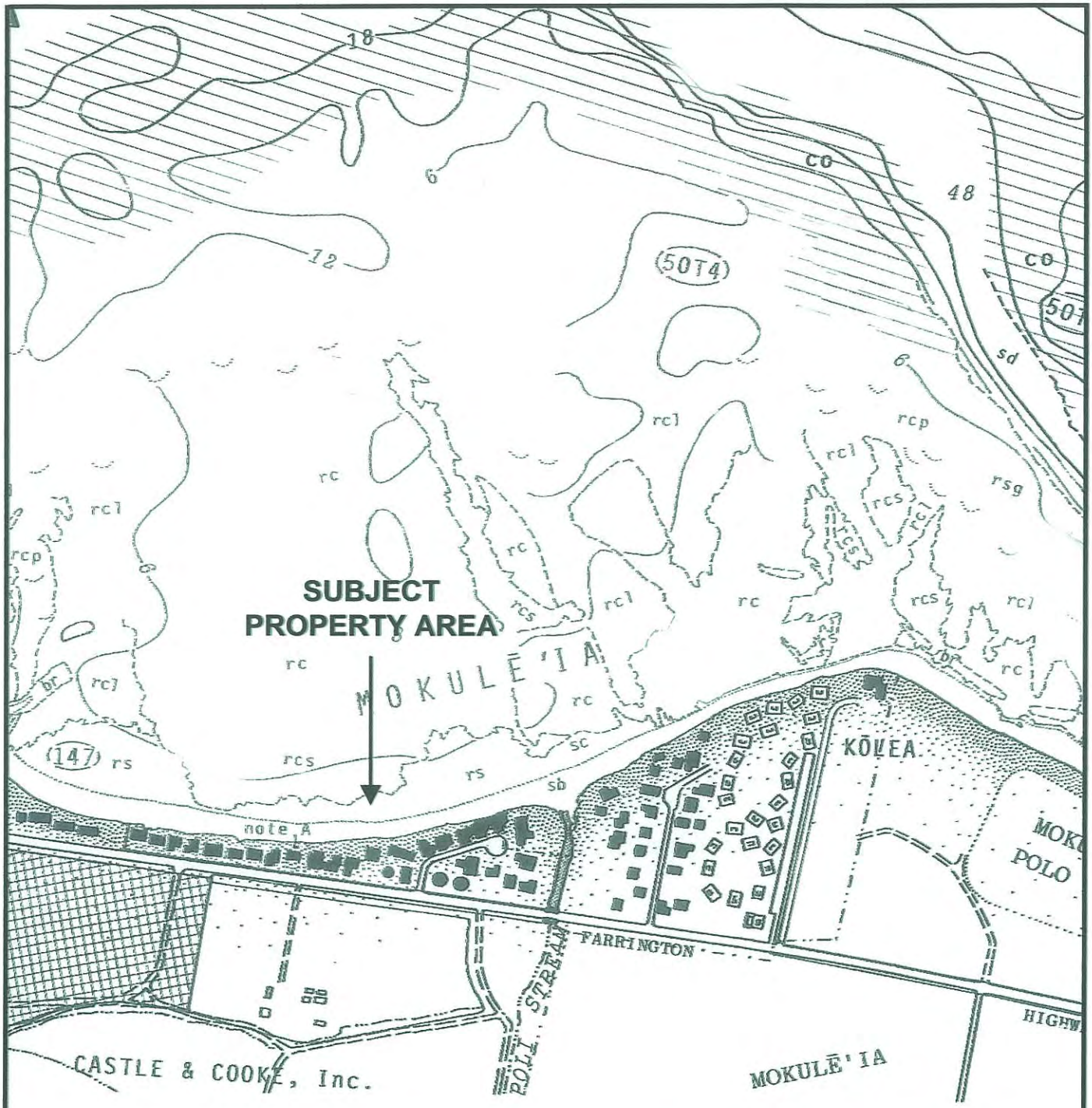
The property has been disturbed since 1960 when the single family residence and related improvements were initially constructed. No new construction is proposed, therefore no disturbance to the property is proposed. The Mokuleia shoreline is very active with Native Hawaiians and the general public accessing the beach for recreation and traditional gathering, Public access to the shoreline is located about 500 feet east of the subject property via a City-owned public right-of-way TMK: 6-8-10: 012 and minimal lateral access is available depending on the tides.

As Mokuleia Beach has a long history of chronic erosion, no new construction is proposed, the existing seawall has been in place for at least 30 years, and there are seawalls on either side of the existing wall the State Office of Hawaiian Affairs OHA did not have any comments on the project.

2.6 Environmental Characteristics

The subject property is located near the middle of an embayment that stretches between Mokuleia Beach Colony to the east and the Episcopal Church Camp to the west. The project site faces north and is subject to seasonal storm damage associated with large winter surf. In the 1960's and 70's there was sand mining along this stretch of the bay; and, according to official reports, major erosion occurred during 1967 to 1971 from significant storm wave damage, which is the time frame in which the owner/applicant had the seawall constructed. Many of the seawalls along this embayment were built in response to the 1967/1971 period of storm wave damage and chronic erosion and there has been a seawall along the shoreline of this property for over 30 years. The subject seawall ties into seawalls on both sides of the subject property. Please see Section 4 and the Coastal Engineering Assessment in **Appendix D** for a more detailed discussion of environmental characteristics.

The subject property does not contain unique or endangered plant or animal species



LEGEND	
br	beachrock
rbs	hard bottom with sand pockets
rcl, rcp	consolidated limestone bottom
rc, rcs	complex reef (sand, rubble, hard & soft)
rs	hard bottom with sand pockets
rsg	consolidated grooved limestone with sand
sb	sand beach
sc, sd	sand bottom or patch; also in depths > 30 feet

Figure 8

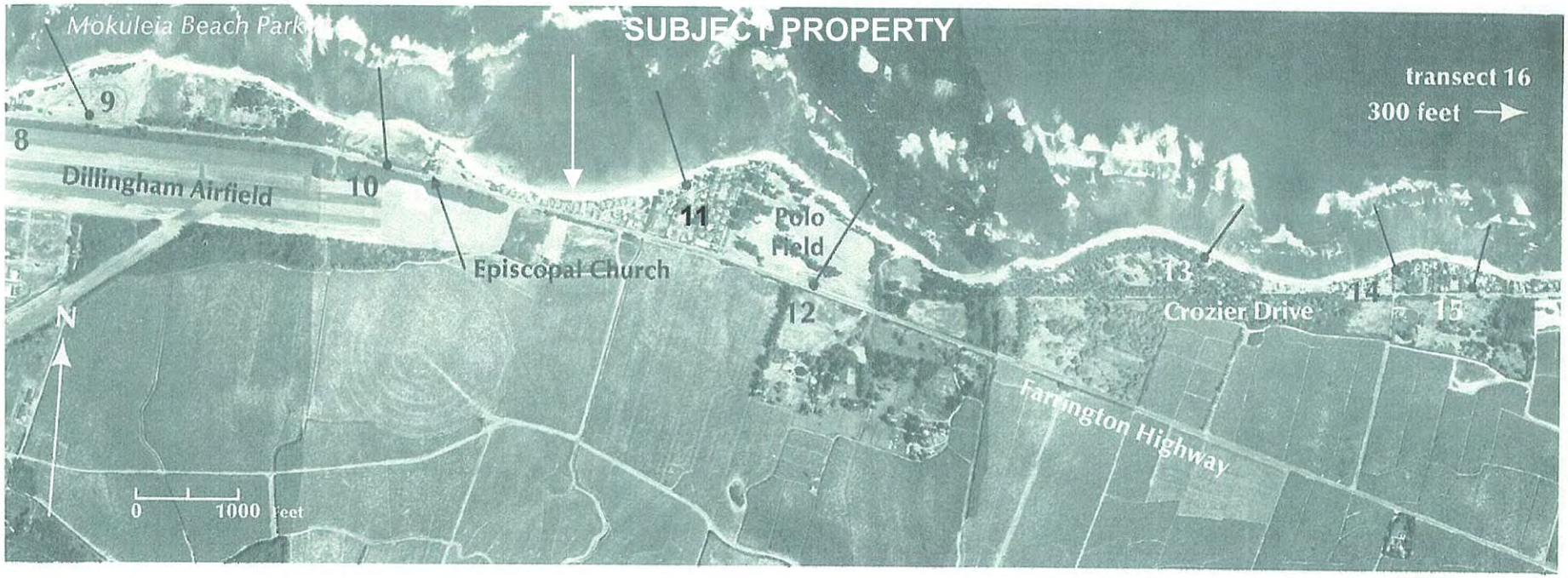
SHORE AND NEARSHORE CHARACTERISTICS

68-681 Farrington Highway, Mokuleia, Oahu, Hawaii

Figure 9

EXISTING CONTINUOUS SEAWALLS ALONG EMBAYMENT

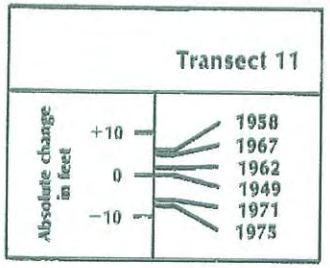
Taken from TMK: 6-8-10: 014, Mokuleia, Oahu, Hawaii



Photomap 2. Mokuleia Beach (Middle Section)

Photographs by Air Survey Hawaii: March 1971

Absolute change is the change in the position of the vegetation line compared to the earliest or base year.



SOURCE: *Beach Changes on Oahu as Revealed by Aerial Photographs*, 1981, Dennis Hwang

Figure 10

MOKULEIA BEACH LOSS AS REVEALED BY HISTORIC AERIAL PHOTOGRAPH

68-681 Farrington Highway, Mokuleia, Oahu, Hawaii

Table 2 - Central Mokuleia Beach. Changes in the Vegetation Line in Feet.

Observation Period	Transect Number								
	8	9	10	11	12	13	14	15	16
Sep 28, 1949 - Nov 01, 1958	*	-6	4	6	-4	*	1	-15	-4
Nov 01, 1958 - Aug 22, 1962	*	-1	-5	-4	3	-6[2]	7	28	20
Aug 22, 1962 - Apr 22, 1967	*	8	7	3	-3	-7	-2	-8	-9
Apr 22, 1967 - Mar 17, 1971	-2	-3	-8	-12	-5	-2	7	-1	*
Mar 17, 1971 - Apr 11, 1975	-1	-2	-8	-1[1]	-7	2	-3	5	2[3]
Apr 11, 1975 - Aug 06, 1979	12	9	-1	*	8	1	-4	-8	1
Aug 06, 1979 - Feb 03, 1988	-22	-26	-7	*	-7	-4	-5	20	-1
Net Change - Vegetation Line	-13	-21	-18	-8	-15	-16	1	21	9
Range - Vegetation Line	22	26	24	14	16	16	13	36	20

** No Data*
[1] To Seawall
[2] Change from 1949 to 1962
[3] Change from 1967 to 1975
Net change is the total change in the position of a beach index line between the earliest and most recent observation year.
Range is the difference between the observed extremes in the position of a beach index line.
Transect locations and historical data from Hwang, Table 2.

Figure 11
MOKULEIA BEACH - CHANGES IN VEGETATION LINE
68-681 Farrington Highway, Mokuleia, Oahu, Hawaii

3. ENVIRONMENTAL SETTING

3.1 General Description

The project area is a developed residential strip fronting the ocean with single-family homes along the shore. Many of these houses were constructed in the early 1960's. The State's Land Use designation is Urban and the City and County of Honolulu's zoning is R-5 Residential. All of the shoreline lots in the vicinity of the subject property have existing seawalls or revetments to provide shoreline erosion protection.

3.2 Soils

The soils for the subject property are of the Jaucas sand series. Slopes range from 0 to 25 percent and the permeability is moderate to rapid. Runoff is considered to be very slow to medium and the erosion hazard is slight to moderate. (U.S. Department of Agriculture, 1972).

3.3 Flood Characteristics

The Federal Emergency Management Agency (FEMA), Flood Insurance Rate Maps (FIRM), labels the shoreline in the project area as Zone AE with a regulatory flood elevation of +12 feet MSL. The Zone AE designation indicates that the site is not subject to high velocity tsunami flow. Because the height of the seawall is lower than the base flood elevation of 12 feet, the seawall will have little or no effect on the flood characteristics. The project site is also located within the tsunami evacuation zone as determined by the Oahu Civil Defense.

3.4 Marine Flora and Fauna

There are no known endangered species either land or aquatic flora or fauna, in the vicinity of the subject property. The following information about the marine flora and fauna in the vicinity of the project area is taken from the *Hawaii Coral Reef Inventory, Island of Oahu* (AECOS, 1979): "Off the east end of Dillingham Air Field, Montipora flabellata is very abundant, with Porites lobata and Pocillopora meandrina are common. Turbinaria ornata and Asparagopsis taxiformis are the most abundant algae, with Galaxaura less common. Schools of Heniochus diphreutes, Chromis verator, Decapterus macarellus, and Acanthurus dussumieri are abundant in the vicinity of sand channels crossing the limestone bottom, the margins of which provide vertical relief. Green sea turtles (Chelonia mydas) are present."

3.5 Water Quality

Nearshore waters are classified as "A" by the Department of Health. No major point sources discharge into these waters, but coastal waters are subject to turbidity following periods of heavy rain when sediments are washed from the land. These effects become less more westward of Kaiaka Bay.

3.6 Public Access, Coastal Use and Recreational Resources

A public right-of-way (TMK: 6-8-10: 012) owned by the City and County of Honolulu is located just three parcels east of the subject property. Mokuleia Beach Park, about 4,000 feet west of the subject property, also provides public access to Mokuleia Beach.

The shoreline along Mokuleia Beach is light to moderately used by fisherman typically where there is a broader sandy beach and mostly commonly pole fishing is used to catch ulua, papio, oio, goatfish, and other reef species. Some throw-netting also occurs and some people have been observed walking out on the shallow reef headland, presumably fishing. There is a more limited amount of spear-fishing and trapping. There is no "dry beach" fronting the subject property and the sandy beach is relatively narrow, especially depending on the tidal and wave conditions. The area is also used by some for recreational diving, but more in the vicinity of Kaiahulu Bay.

The City's Mokuleia Beach Park provides camp sites for those who obtain permits. Swimming along Mokuleia Beach is relatively safe during calm seas, but dangerous currents can develop especially during heavy surf. In some areas, swimming is not very good because of the rocky bottom and the usually turbid waters.

At the time that the individual lots were created in 1960, there was no publicly mandated requirement for lateral access along the shoreline and the property boundaries were formed at the highwater mark. Due to the natural process of erosion along this embayment, approximately 25% of the lot area has eroded and a portion of the property is underwater. As such, any previously existing public lateral access, which would have been beyond the property boundary is no longer available. This natural process has limited the amount of sandy beach fronting the property and during high tide there is no beach area. Recreational resources are available depending on seasonal tides.

3.7 Archaeological and Cultural Resources

The project site is located in the Mokuleia ahupuaa. The Hawaiian land division, known as an ahupuaa, generally runs from the top of the mountains to the edge of the coral reef in the sea. The Kolea fishing shrine, now destroyed, is documented in the *Sites of Oahu* as being located far east of the project site, in the vicinity of the Mokuleia Polo field. (Sterling, Bishop Museum Press) The subject property has been previously disturbed by the construction of the seawall and single family dwelling improvements. The subject property does not contain any known archaeological or historic sites. No new construction is proposed.

The proposed action will have no effect on traditional cultural practices. On-shore and off-shore fishing along the embayment occurs now and will continue to take place if the proposed action is approved.

If additional construction or renovation plans should be considered in the future and should significant archaeological features be uncovered, the applicant will be responsible for contacting the Department of Land and Natural Resources, State Historic Preservation Division in accordance with applicable regulations.

3.8 Applicable Land Use Considerations

Chapter 205, Hawaii Revised Statutes (HRS) promulgates the State Land Use Law. The State of Hawaii Land Use Commission (LUC) classifies all land into four districts: Urban, conservation, Agriculture, and Rural. The fast portion of the subject parcel is within the State Urban District; and, the approximately 2,518 square feet of the land, which has eroded and is currently submerged, is located within the State Land Use Conservation District pursuant to HAR 15-15-20(6). Section 13-227(a)(141) of the HawaiiAdministrative Rules (HAR) requires government approval where the shoreline is located at the base of a manmade structure. Prior to obtaining after-the-fact building permits for the structures located within the shoreline setback area, the applicant is required to obtain a certified shoreline from the State of Hawaii Department of Land and Natural Resources. The Department of Accounting and General Services Survey Division in their review of the Shoreline survey will locate placement of the certified shoreline and any foundation encroachments will be determined by the DLNR Office of Conservation and Coastal Lands in their review of the project. There is no record of any previous certified shorelines I ssued for the subject parcel.

The Coastal Zone Management (CZM) Program is promulgated by Chapter 205A, HRS. Through the CZM Program, each county is required to establish Special Management Areas (Chapter 25) and Shoreline Setbacks (Chapter 23). The affected property lies within the SMA. The application for an after-the-fact variance for the existing seawall involves no new construction; therefore, no Special Management Area Use Permit is required.

Chapter 23 has as its purpose to protect and preserve the natural shoreline; public pedestrian access laterally along the shoreline; and open space along the shoreline. Reduction of beach area has been an ongoing problem since the residential subdivision was created in 1960. Prior to construction of the seawall, the property lost 25% of its lot area to erosion from wave action along the shore as the natural shoreline changed. Depending on the seasonal tides people can transit the area fronting the wall for recreational purposes and approval of the shoreline setback variance will not diminish any existing lateral access. Scenic vistas and view planes from and along the Mokuleia coastline and from the near-shore waters are enjoyed by residents. All of the residential properties along this area have similar shoreline protection structures in place and the subject seawall maintains a consistent appearance. The seawalls are located on private property and no public open space or scenic views are impacted.

Provisions of the Land Use Ordinance of the City and County of Honolulu regulate the utilization of land in a manner intended to encourage orderly development in accordance with adopted land use policies. The project site is located in Mokuleia, Waialua within a rural residential designated area on the North Shore Sustainable Communities Plan (SCP) Land Use Map. (This designation is not a site-specific designation but is illustrative of land use policies stated in the text of the SCP.) Section 3.1 which discusses open space and the natural environment notes that open space preservation, which includes shoreline areas, is a key element for the North Shore and promotes effective management of these resources and deter land-based activities which contribute to their degradation. Section 3.1.32 contains guidelines pertaining to shoreline areas including:

- Protect nearshore coral reefs from damaging activities such as soil erosion.
- Discourage development or activities which result in beach loss.
- Maintain and expand public beach access to the shoreline and lateral shoreline access along the coast, especially in areas with high recreational or scenic value, including the shoreline along Sunset and Kawailoa where access to popular sandy beaches and surf spots are in demand.

Comment: According to the Coastal Engineering Report done by EKNA Services, the existing seawalls do not alter seasonal erosion/accretion patterns. The entire coastal reach has been experiencing net long-term erosion over the past 50 years. The area is not specifically noted as an area of high recreational or scenic value. In any case, the seawalls, which are on private property are not a barrier to lateral access along the beach.

4. COASTAL SETTING

4.1 General Description

The Mokuleia coastline stretches between Kaena Point to Kaiaka Bay at Haleiwa town on the northwest coast of Oahu. This area is characterized by low-lying platforms of fossil reef-rock that are elevated 3 to 6 feet above mean sea level (MSL). These platforms have been subjected to broad inter-tidal and sub-tidal wave abrasion which has carved into the Waimanalo-age limestone. The coastline contains isolated sandy beaches between breaks in the rocky bench. These beaches widen towards Mokuleia and connect with small offshore sand fields. The wave energy and bioerosion are high at the shoreline in this area as is evidenced by the modern intertidal cuts into the elevated limestone. (Fletcher, 2002)

4.2 Shoreline Characteristics

EKNA Services, Inc. was contracted to prepare a Coastal Engineering Assessment of the potential impact of the subject seawall on existing coastal processes along this Mokuleia shoreline area. EKNA Services, Inc. also prepared in 2004 a Coastal Engineering Assessment of two existing seawalls (TMK: 6-8-9: 010 and 011) for two properties located along the same embayment about 1,300 feet east of the subject property. The 2004 Assessment Report contains a large amount of information that is relevant to the subject property, i.e. information about coastal processes, alternative shore protection measures, and potential littoral impacts. As recommended by EKNA Services, Inc., the entire 2004 Assessment Report is in **Appendix D** to provide costal engineering information in support of the shoreline setback variance for the subject property. In addition to the 2004 Assessment Report, EKNA Services, Inc. prepared on April 5, 2005 a letter report (**Appendix D**) to provide additional information specific to the subject parcel.

The following information is taken from the EKNA Services, Inc. 2004 and 2005 Coastal Engineering Assessment (**Appendix D**). The subject property lies on the Mokuleia coast, characterized as an undulating coastal reach containing numerous embayed coral sand beach systems. The subject property is almost in the middle of one such embayment located near the east end of Dillingham Airfield. This particular embayment is formed between two prominent reef "headleads", which are shallow reef formations that protrude seaward from shore. The reef headland which bound the eastern end of this embayment fronts the Mokuleia Beach Colony, just west of the Mokuleia Polo Grounds. The subject property is also west side of the Mokuleia Beach Colony. **Figure 8** shows the general shoreline and nearshore physical characteristics.

The shoreline fronting this area is a narrow beach underlain with reef limestone that extends seaward as a variable depth reef platform. This area is exposed to winter North Pacific swell and the predominant tradewind waves. Shallow fringing reefs protect the shoreline from moderate tradewind wave energy. However, during large winter swell conditions and high water levels, erosion of the narrow beach and wave runup and overtopping of the beach cause erosion damage and flooding to unprotected backshore areas and dwellings. Numerous property owners along this coastal reach have constructed shore protection to prevent further storm wave runup damage to their dwellings. The subject property owner wants to retain the exiting seawall and related improvements to prevent future erosion and wave runup damage to the dwelling and property.

During an April 2004 site visit to the east end of the embayment by EKNA Services, Inc., reef headlands were not bared, but were noticeably shallower than the reef fronting the central portion of the embayment. Breaking wave activity was evident across the entire bay-front. While not observable from shore, a review of aerial photos shows calm areas between breaker zones that indicate the deeper "channels" through the reefs fronting the embayment.

A site visit to the subject property was conducted on April 2, 2005 during low tide (0.1'MLLW), moderate North Pacific swell conditions (3 to 5 foot surf) and strong tradewinds. The base of the wall was subject to wave runup at the time of the site visit. Breaking wave activity was evident across the entire bay-front.

The subject seawall ties into concrete seawalls on both sides of the subject property. A public right-of-way (ROW) is located 500 feet to the east of the subject property. Properties further eastward of the ROW to the Poli Stream mouth are protected with structures, and properties westward of the ROW within the embayment are protected by seawall – about 1,000 linear feet or so. There is no "dry beach" fronting the seawalls extending westward within the embayment. **Figure 3A** depicts the condition of the shoreline in the vicinity of the subject property. The slope at the base of the seawall appears to have been placed to protect the foundation of the seawall from scouring as the elevation of the fronting beach was lowered over an approximately 30 year period by continuing erosion. Some of the seawalls along this reach show similar measures to protect their footings from becoming undermined.

Note: It appears that, over time, seawalls in the area have been replaced and/or repaired and strengthened and the original foundations left to support the walls. The walls that were repaired and strengthened remained on the original foundations. In these cases, the original foundations remain. This is the case with the subject property.

4.3 Existing Shoreline Structures

All of the residential lots on both sides of the subject property along this embayment have existing seawalls or revetments to provide shoreline erosion protection **(Figure 9)**. Many of these shoreline protection structures were likely built in the 1970's and 1980's due to chronic erosion. As further evidence of the longstanding seawalls along this embayment, in 1986 the owner of Parcel 19 received written confirmation from the City's Department of Land Utilization that the seawall on Parcel 19 (the adjacent parcel west of the subject property) was "built prior to the adoption of the Shoreline Setback Rules of the City and County of Honolulu in 1971" **(Figure 5)**. While almost all of the shoreline protection structures that were built over 20 to 30 years ago were built without building permits, many have subsequently obtained after-the-fact Shoreline Setback Variances and building permits from the City and County of Honolulu. The seawall five lots to the west of the subject property, which fronts four contiguous parcels, was built in 1998 under the approval of a shoreline setback variance to replace old seawalls. The four adjacent seawalls to the west and the adjacent seawalls to the east of the subject property are in the process of submitting shoreline setback variance applications to the City.

4.4 Shoreline History

Historical aerial photographs depict the significant loss of shoreline along the Mokuleia coast. The subject property has lost to erosion approximately 2,751 square feet or almost 25 percent of the property's total 11,358 square feet. An area about 45 linear feet deep is now located seaward of the 2004 shoreline survey.

The report *Beach Changes on Oahu as Revealed by Aerial Photographs* (Hwang, 1981), documents the characteristics of the "middle section" of Mokuleia Beach, which includes the subject property. Hwang (1981) used historical aerial photograph analysis to assess shoreline changes on Oahu, based on movement of the vegetation line. **Figure 10** shows the location of transects where data were collected as shown in **Figure 11**. The subject property is located between Transect 10 and 11. During the 25-year period between 1949 and 1975 the subject embayment area experienced an erosion loss of between 10 to 8 feet (Transect 10 and 11 respectively). According to Hwang's report, major erosion occurred during 1967 to 1971 due to significant storm wave damage – this time frame is consistent with residents' testimony regarding when all of the seawalls along this embayment were originally built. Many of the homes along this stretch of coastline are less than 20 feet from the edge of the vegetation line or an existing seawall. These homes, like the project site, would be impacted by any erosion that would reduce the natural buffer zone significantly.

In 1989, Sea Engineering Inc. prepared for the City's Department of Land Utilization (DLU) the *Oahu Shoreline Study – Data on Beach Changes*, which was similar to and an extension of the 1981 Hwang study. The report concluded that landward recession of the vegetation line since 1949 has continued. Data were collected only for Transect 10 which showed an additional erosion loss of 8 more feet. The total loss at Transect 10 between 1949 and 1988 totaled 18 feet. As such, a number of vertical seawall structures have developed along the 3,000 foot long embayment between the Episcopal Camp and the Mokuleia Beach Colony. The following are excerpts taken from the 1989 Oahu Shoreline Study which relate to this embayment.

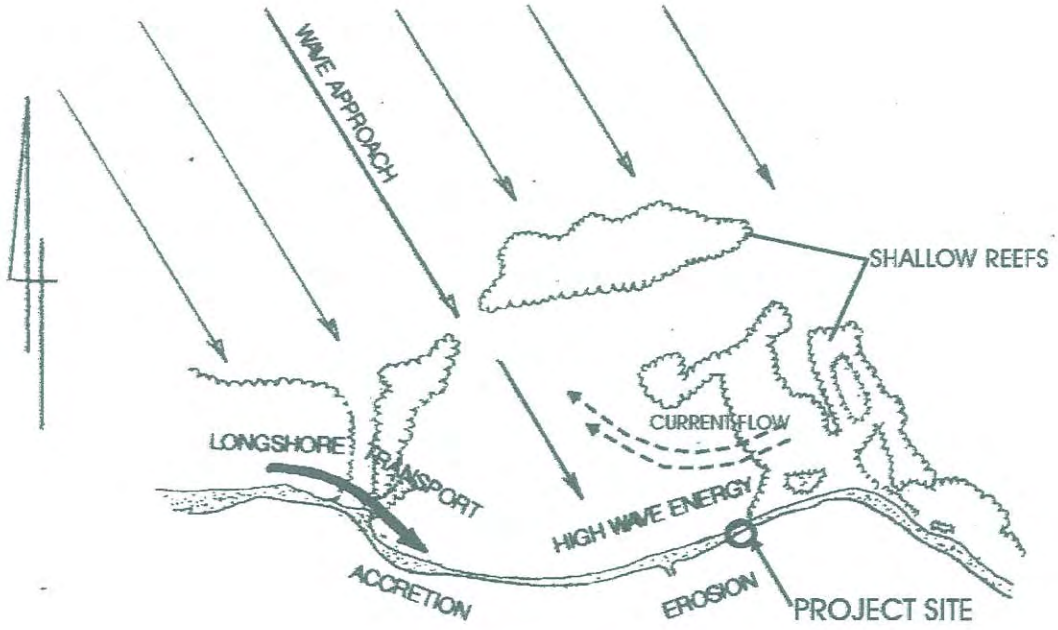
The following are excerpts taken from the 1989 *Oahu Shoreline Study* completed for the City's Department of Land Utilization which relate to this embayment.

> *This is a small embayment, 3,000 feet long, that is completely developed. Polipoli Stream discharges in the center of embayment. The shoreline from the Episcopal Camp to the stream is lined with shore protection structures, except for the four lots just west of the stream. The unprotected houses have only a few feet of vegetation between them and the beach.*
>
> *The structures are generally vertical seawalls of varying heights and types. At the west end, particularly, the walls protrude varying distances out onto the beach.*
>
> *Given the extent of the existing seawalls and the proximity of the unprotected houses to the waterline, shore protection should be allowed throughout this area.* ***The shore protection structure of choice will probably be a vertical seawall, since there is little room for sloping revetments.*** *The DLU should ensure that the design is adequate and that the alignment matches the surrounding areas.*
>
> *At present, there is lateral access along this beach, at least during some seasons, but if erosion continues, this will be lost.*

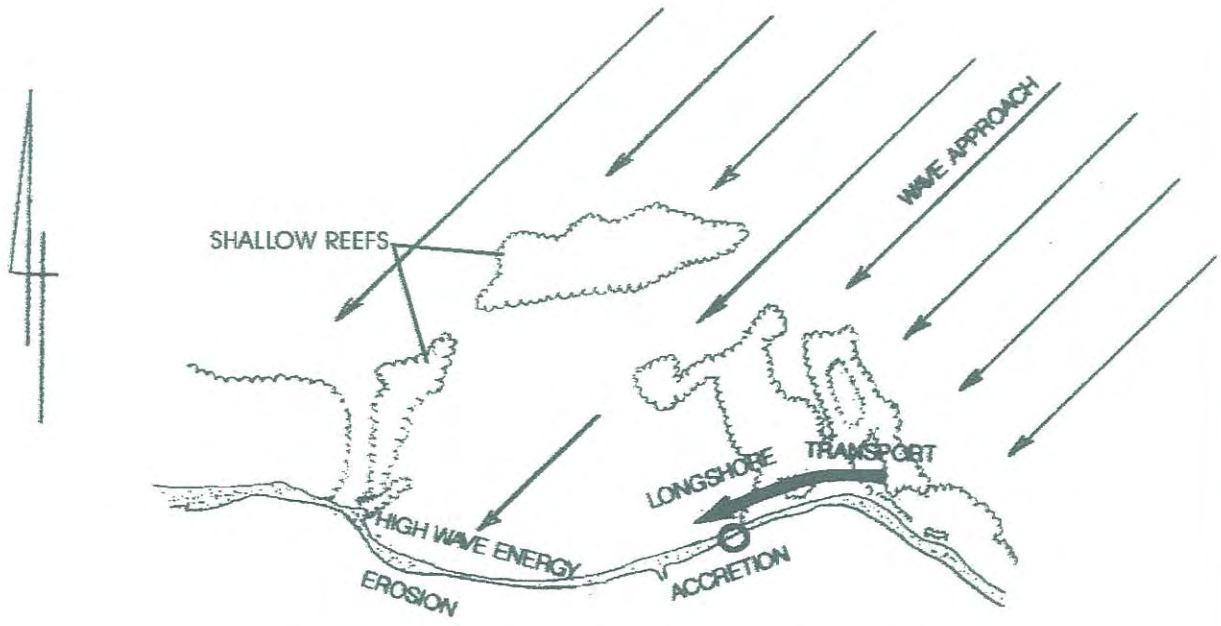
The above description and management recommendations are consistent with the findings of the EKNA engineering assessment for the subject property. Given the established pattern of shoreline protection, an individual lot owner has no choice but to protect his property with a vertical seawall structure similar to the existing seawall structure along the ocean frontage of the subject property.

4.5 Coastal Processes and Sand Transport

The following information is taken from the EKNA Services, Inc. 2004 and 2005 Coastal Engineering Assessment (**Appendix D**). It is apparent that during high tide, wave runup reaches the base of the existing seawall. During storms and large winter swell conditions, wave runup and overtopping of the beach likely causes flooding and sand transport into the properties that are not protect by seawalls. The owner of the subject property has also experienced sand deposited into the rear yard and significant amount of wave runup and water have overtopped the wall and ocean water is deposited in the rear yard.



WINTER NORTHWEST SWELL CONDITIONS



SUMMER NORTHEAST TRADEWIND CONDITIONS

Source: EKNA Services, Inc.

Figure 12

SAND TRANSPORT FIGURES

68-681 Farrington Highway, Mokuleia, Oahu, Hawaii

This coastal reach is exposed to winter North Pacific swell and predominant tradewind generated waves. It is apparent that during high tide, wave uprush reaches the base of the existing seawall. During storms and large winter swell conditions, wave runup and overtopping of the beach likely causes flooding and sand transport into properties that are not protected by seawalls.

According to the 2005 EKNA Services assessment, the erosion that is occurring along this span of costal reach can be described as "passive" erosion (in contrast to "active" erosion which induced or accelerated by shore protection structures). Passive erosion proceeds independent of the type of shore protection constructed.

The subject property is sheltered from deepwater wave energy due to the shallow reefs that surround the embayment. These reefs dissipate nearly all wave energy during typical tradewind generated wave conditions. The wave energy that can reach the shoreline is limited by the water depths over the reefs and the channels through the reef. During large swell activity, waves breaking over the reefs can cause a rise in water level known as wave setup. The increased water levels allow more wave energy to be transmitted over the reef. Thus, wave activity at the shoreline is greatest during large swell or storm wave conditions and during high tides. The conditions that promote wave overtopping problems for unprotected parcels – those without seawalls – occur during large winter swell activity. Typical tradewind waves are not capable of causing appreciable wave setup and very little tradewind-generated wave energy reaches this shoreline reach.

Normally along an exposed coastal reach, wave energy is the primary factor that drives nearshore currents in the surf zone. Waves approaching the shore at an angle will induce longshore currents and transport of beach material alongshore in the direction of breaking waves. However, the shallow reefs surrounding the site considerably alter the deepwater wave characteristics within this embayment, resulting in possibly complex patterns of waves approaching along this shoreline.

According to a prior report by EKNA Services for the Mokuleia area, residents have noted that shoreline currents within this embayment flow towards the west during high winter swell activity, which may be hydraulically driven due to the bathymetric contours within the embayment rather than wave-driven. Water that accumulates within this embayment during large swell or storm wave activity seeks to flow towards the deeper water depth areas on the west side of the embayment, or areas of hydraulically least resistance. Thus, the water drains towards deeper areas within the embayment and those deeper water depths exist on the west side of the embayment.

The shallow reef structure offshore of the eastern headland – closer to the Mokuleia Beach Colony – is broader and extends furthers in the embayment than the shallow reef structure offshore of the western headland. The configuration of the shallow reef structure and the presence of an apparent "channel" through the offshore reef near the western end of the embayment, along with hydraulically-driven circulation, are probably the basis for the westerly-flowing shoreline current that residents have noted.

If the shoreline flows are strong, they have the potential to carry wave-suspended shoreline sediments offshore into the deeper reaches of the embayment and seaward of the surrounding reef as the shore-parallel flows are diverted seaward through openings in the shallow reef. These sediments may be deposited in water depths too deep for normal wave activity to return it to the beach. This means that the history of long-term erosion of this coastline is evidence that such permanent loss of beach material occurs.

While net long-term erosion is evident, residents also indicated that seasonal fluctuation of beach width occurs. There is a pattern of erosion along the eastern part of the embayment during the winter and restoration of the beach width during the summer. The opposite occurs for the western shoreline where there is a pattern of erosion during the summer and restoration during the winter. **Figure 12** depicts the probable seasonal transport processes. Because water depths in the central part of the embayment are too deep for sediments to move back to shore, the seasonal fluctuation of beach width is presumably due to longshore transport of sediments from the shoreline and shallow nearshore areas around the headlands.

For this coastal area, and for most coastal areas in the state, the general trend is toward continued long-term erosion. There is no evidence that the long-term erosion trend along this coastal reach will reverse in the future.

4.6 Potential Littoral Impacts

The following information is taken from the EKNA Services 2005 letter reports for the subject properties, which states the existing seawall and others along this coastal reach, have no effect on the existing littoral processes at this site. The subject seawall is functionally consistent with existing seawalls along this coastal reach. This entire coastal reach has been experiencing net long-term erosion over the past 50 years. There is a continuing high risk of erosion and flooding damage due to overtopping waves to unprotected properties.

While the subject seawall does not affect longshore sediment transport processes, there may be some concern that cross-shore transport may be affected because of wave reflection from the near-vertical impermeable face of the seawall. It has been a generally held presumption that the

more reflective the structure, the greater the potential for adverse impacts by discouraging sand accumulation in front of the structure.

However, given the fact that beach and shoreline erosion is continuing to occur along this coastline and elsewhere along this coastline where there are no shore protection structures, it can be concluded that the long-term erosion trend is a natural process that will certainly not be reversed simply by constructing sloping porous-surfaced shore protection structures. According to the EKNA 2004 Report, in fact, studies sponsored by the U.S. Army Corps of Engineers have found no significant difference in impact to the beach fronting a sloping rip-rap revetment and an adjacent vertical concrete seawall. EKNA Services, Inc. has conducted field studies on Kauai that showed seasonal beach accretion – increase in beach width – occurred in front of a near-vertical seawall as well as on an adjacent unprotected beach.

The erosion that is occurring along the Mokuleia shoreline can be described as "passive" erosion. It is not "active" erosion, which is induced or accelerated by shore protection structures. Passive erosion designates the process that occurs when a protective structure is built along an already eroding shoreline and erosion continues to occur. Passive erosion proceeds independent of the type of shore protection constructed. The unprotected shoreline adjacent to a protective structure will continue to erode and will eventually migrate landward beyond the protection structure. This is the most common result of shoreline hardening in Hawaii, and is the probable long-term consequence of the existing seawalls at Mokuleia.

4.7 Coastal Hazards

The *Atlas of Natural Hazards in the Hawaiian Coastal Zone (2002)* rates the "overall hazard assessment" along the Kaena Point coast from "moderate (4) at Kaena point to high (6) along the low-lying sandy beaches of Camp Erdman and Mokuleia Beach, where the coastal slope is lowest and chronic erosion is diminishing Mokuleia's sandy beach". Tsunami and stream flooding are other concerns in this area. They are ranked high along the lower slopes between Camp Erdman and Mokuleia.

The hazards of high wave action throughout this region of the North Shore is rated as high. This northwestern tip of Oahu is also subject to Kona storms, high tradewinds and hurricanes. The storm hazard is ranked moderate for the eastern portion of this coast (including the vicinity of the project area) where it become a bit more sheltered from hurricane and Kona storm energy, as compared to the western portion towards Kaena Point. The *Atlas*, rates the erosion hazard as high along the isolated sandy beaches of Camp Erdman and Mokuleia, whereas erosion hazard becomes more moderate along Kaena Point's hard limestone shoreline where it is rocky.

5. ALTERNATIVES CONSIDERED

The EKNA April 2005 letter report for the subject property states that EKNA's prior April 2004 report for two other properties that are also located along Mokuleia Bay should be referenced in its entirety. The 2004 report is contained in **Appendix D.** The 2004 EKNA report discusses in detail various alternatives to after-the-fact approval of an existing seawall at Mokuleia Bay.

The EKNA April 2005 letter report specifically for the subject property appears at the front of **Appendix D.** It states that removal of the existing seawall and replacing it with a different type of shore protection measure does not provide any significant benefit. Seawalls exist on both sides of the subject property. Also, removing the seawall without constructing replacement shore protection would result in the immediate loss of least 50 feet of property as the shoreline attempts to achieve a stable slope. The adjacent properties would also be impacted as their existing seawalls become flanked.

5.1 Sloping Revetment

Replacing the seawall with a sloping revetment structure is not a viable option because of the extremely limited land area – approximately 30 feet - between the house and the existing seawall. There is insufficient space on the property to construct a sloping revetment. Since the revetment toe would be in line with the existing adjacent seawalls, the top of the revetment slope would be located about 20 feet landward of the adjacent seawalls, and could not be constructed without removing or relocating the dwelling and constructing flank walls to protect the adjacent properties. It would also be significantly visually incompatible with the adjacent vertical seawalls. Additionally, replacing the seawall with a sloping revetment structure will not improve the existing shoreline access and will not halt the ongoing erosion along this coast.

5.2 Sand Bags

While large geotextile sand bags have been used as temporary erosion control in several areas, including Lankikai, use of the bags has drawbacks. The bags are prone to damage from storm wave attack and vandalism, require frequent and continual maintenance, and cannot be considered a permanent protection measure. The large sand bags are solid, hard building materials when fully filled, and a sand bag revetment structure is more reflective than a rock revetment. Another potential concern is that bags that are under water become very slippery due to algal growth, and therefore pose a safety problem in terms of people walking across them.

5.3 Beach Restoration

The State of Hawaii Department of Land and Natural Resources (DLNR) Office of Conservation and Coastal Lands (OCCL) is developing a comprehensive coastal lands policy that strives to mitigate negative impacts to the coastal system from shore protection structures by encouraging alternatives to the construction of seawalls and revetments. In the foreseeable future, the DLNR will implement new, proactive and sustainable shoreline management practices in accordance with the objectives and policies that pertain to Hawaii's beaches, which are a State public resource protected by the State Constitution and Haw3aii Revised Statute 205A and 183C. Policies for the protection and preservation of Oahu's natural shoreline and sandy beaches are further promulgated by the Revised Ordinances of Honolulu Chapter 23.

Beach and dune restoration with sand nourishment can slow coastal erosion and restore lost beah areas. The recent Kuhio Beach restoration project involved the replacement of 10,000 cubic yards of reclaimed sand from nearshore deposits. The project, which was executed between November 27, 2006 and January 6, 2007,cost approximately $475,000 and was funded by the DLNR – Land Development Fund (DLNR, 2007). In March 2000, approximately 10,000 to 12,000 cubic yards of dredged sand from Kaelupulu Stream in Kailua was used in a demonstration project to renourish south Lanikai Beach (Shapiro 2000). A news release pertaining to the project indicated that it "provided about half of the total amount that will be needed to more fully nourish south Lanikai Beach" (DLNR 2000). It is not know when another beach nourishment project would be accomplished for south Lanikai Beach since adequate funds and sources of sand would first need to be secured.

Soft shore protection measures are not feasible from the perspective of a single landowner because they require resources and coordination on a large-scale. Beach restoration must occur along numerous residential properties in order to be effective. In addition to the challenges of finding suitable sand and navigating the permitting process, a successful beach nourishment project may require coordination and cooperation among a group of homeowners who maintain a long-term commitment to undertake sand replenishment on a periodic basis. It is likely that a groin or offshore breakwater structure would also need to be constructed to prevent sand from being quickly redistributed by wave energy. Due to intense storm wave activity on the north shore these solutions do not appear to be practical. Beach replenishment may be the best long-term solution, but these measures are beyond the capacity of the applicant who is simply trying to permit a seawall that has been in existence for more than 30 years in order to protect his property from further damage.

5.4 No Action

This alternative is not viable because it implies that no action would be taken to resolve the illegal seawall. The applicant would incur continuous civil fees owned to the City and County of Honolulu for the shoreline setback violation. The engineer has estimated that the existing seawall could last as long as 30 years but at the same time it is not possible to predict storm wave action for the north shore of Oahu. Granting of the Shoreline Setback Variance is the means for legalizing the existing seawall under ROH Chapter 23 and would provide a means for the owner to legally repair the wall but it is no guarantee that the structure will be permanent. However, in general, a legal structures is more likely to be repaired in accordance with building code regulations than an illegal structure.

5.5 Removal of the Existing Seawall.

Removal of the existing seawall, which is functioning as a retaining wall, is not a viable alternative because it would result in immediate loss of at least 50 feet of property as the shoreline attempts to achieve a stable slope. With the house only 30 feet away from the existing wall, the house would be destroyed if the seawall was removed. removal of the existing seawall along 61 feet of coastline would not release enough sand to restore a beach in an area where the entire shoreline has been armored and would hasten erosion of the applicant's parcel. Areas behind existing shoreline structures on adjacent properties may eventually erode if the applicant's seawall are removed.

6. PROJECT IMPACTS

Potential impacts are addressed in terms of how proposed action relates to the thirteen criteria below. Chapter 200 of Title 11, Administrative Rules of the State Department of Health establishes criteria for determining whether an action may have a significant impact on the environment (11-220-12).

1. Involves an irrevocable commitment to loss or destruction of any natural or cultural resource;

The subject property lies along an eroded sandy shoreline. No new construction is proposed. The subject property does not contain any significant flora or fauna. No known cultural resources are located on the property. No impacts to natural or cultural resources are anticipated due to the proposed action. The application is for an after-the-fact shoreline setback variance which involves no construction activities and no irrevocable commitment, loss or destruction of resources.

2. Curtails the range of beneficial uses of the environment;

There is no impact on public access to the shoreline. A City-owned public right-of-way (TMK: 6-8-10: 012) is located three parcels east of the subject property. There will be no impacts on fishing or ocean use due to the proposed action. The existing seawall configuration and related improvements do not curtail the beneficial use of the environment. The property is zoned residential and is committed to private residential use. The existing seawall and others along this coastal reach have no effect on the existing littoral processes at this site. However, when a protective structure is built along an eroding shoreline and erosion continues, the result will be loss of beach fronting the wall and is the probable long-term consequence of the existing seawalls at Mokuleia. Loss of beach could impact shoreline recreational activities including on and off-shore fishing. On the other hand, removal of the seawall would result in immediate loss of at least 50 feet of property as the shoreline attempts to achieve a stable slope (EKNA 2006). The existing seawall protects the property from further erosion and maintains the owner's beneficial use of the property.

3. Conflicts with the state's long-term environmental policies or goals and guidelines as expressed in chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders;

Chapter 343, HRS requires environmental assessment for any use within a shoreline area as defined in section 205A-41. It is the policy of Chapter 205A to discourage all shoreline hardening that may affect access to, or the configuration of our island beaches. However, the existing seawall is consistent with the longstanding history of government decisions that approved shore protection structure along this stretch of the Mokuleia coastline in order to protect the rights of homeowners. The eight (8) adjacent properties to the west of the applicant's property have all received shoreline setback variance approvals and building permits (1993/1997) for their respective seawalls. These issues have been discussed at length with the DLNR and there is no simple answer or statewide policy that has been implemented.

4. **Substantially affects the economic welfare, social welfare, and cultural practices of the community or State;**

The economic and social welfare, and cultural practices of the community or State are not affected by the existing seawall and related improvements or the proposed action to seek after-the-fact approval. No new construction is proposed.

5. **Substantially affects public health;**

There are no public health concerns relating to the existing seawall and related improvements. No new construction is proposed.

6. **Involves substantial secondary impacts, such as population changes or effects on public facilities;**

There are no anticipated secondary impacts to population or public facilities. No new construction is proposed. The proposed action does not impact public services or facilities.

7. **Involves a substantial degradation of environmental quality;**

The existing seawall prevents further erosion of the applicant's property and therefore minimizes the potential for runoff entering the ocean. The subject seawall ties into concrete seawalls on both sides of the subject property. Historical aerial photographs and studies depict the significant loss of shoreline along the Mokuleia coast since 1949. The subject property has lost to erosion approximately 25 percent of the property's total area. The majority of homes have vertical seawalls or some form of shore protection along this embayment.

8. **Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions;**

No new construction is proposed. The adjacent properties are developed as residential properties. All the residential properties along this embayment experienced loss of 25-30 % of property lot area due to wave action and erosion prior to construction of the seawalls between 1967-70. Nine of the properties have undergone environmental review in order to obtain after-the-fact shoreline setback variances to legalize the existing seawalls. There has been no determination of significant cumulative impact by the approving government agency. The process of obtaining the after-the-fact shoreline setback variance for the subject property will not result in any significant cumulative impact and does not involve a commitment for larger actions. As such, a Finding Of No Significant Impact is being requested. There is no commitment for a larger action; the subject property will remain single family residential.

9. **Substantially affects a rare, threatened, or endangered species, or its habitat;**

The project site has been previously disturbed and developed when the single family residence and improvements were constructed. There are no known endangered, threatened, or rare plants or animal species at or near the subject property.

10. **Detrimentally affects air or water quality or ambient noise levels;**

No new construction is proposed. The existing seawall and related improvements do not detrimentally affect air or water quality or ambient noise levels.

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 property is located in Flood Hazard Zone AE with a base flood elevation of twelve feet, and the tsunami evacuation zone. The seawall and the concrete slab adjacent to the seawall protect the property from further erosion and protect the house structure from wave energy, wave run-up and overtopping. The existing seawall is not expected to increase the flood hazard for the surrounding properties or the subject property. Because the height of the seawall is lower than the base flood elevation of 12 feet, the seawall will have little or no effect on the flood characteristics. Any tsunami which would breach the wall would most likely cause damage to both the wall and property.

12. Substantially affects scenic vistas and view planes identified in county or state plans or studies; or

The 1987 Coastal View Study designates Mokuleia Beach Park as a "significant stationary view". The project site is located over 4,000 feet east of Mokuleia Beach Park. The Study also designates Farrington Highway as a "coastal roadway with intermittent coastal views". Views of the shoreline and subject property's rear yard are not possible from Farrington Highway due to the existing private residential structures, garages, fences and hedges lining the Highway. Scenic vistas and view plans from and along the coastline and from the near-shore waters are enjoyed by residents. All of the residential properties along this area have similar shoreline protection structures in place and the subject seawall maintains a consistent appearance. No scenic views are impacted.

13. Requires substantial energy consumption.

Not applicable.

6.1 Summary of Unavoidable Adverse Environmental Impacts

Construction of the original seawalls in the late 60's or early 1970's may have prevented the erosion of coastal land behind the shoreline structures but, combined with other factors such as sea-level rise, may have refocused erosion that can contribute to beach loss. Allowing the applicant's seawall to remain in place prevents property losses due to erosion and wave damage, however, the structures may be impounding a substrate beach quality sand that would naturally nourish a healthy beach. Efforts to restore the beach in southern Lanikai where, as is the case along this shoreline, the entire shoreline has been armored for many years, the sand supply has decreased, and the State public resource has been severely compromised for several decades would require the removal of many contiguous armaments along the affected coastline. Removal of the existing seawall along 61 feet of coastline would not release enough sand to restore a beach in an area where the entire shoreline has been armored and would hasten erosion of the applicant's parcel. Areas behind existing shoreline structures on adjacent properties may eventually erode if the applicant's seawall is removed. Maintaining status quo by allowing the applicant's existing shoreline protection structure to remain in place is not expected to create any new significant adverse impact on littoral processes along the shoreline.

6.2 Finding and Reasons Supporting Anticipated Determination

The significance criteria of Title 11 Chapter 200-12 HAR have been applied and it is proposed that the proposed action to approve the after-the-fact shoreline setback variance for the existing seawall and related improvements will not have a significant effect on the immediate or surrounding environment and that an Environmental Impact Statement will not be required. Based upon this Environmental Assessment document and the evaluation of the determination, it is recommended that a Finding of No Significant Impact (FONSI) be issued for the proposed action.

7. MITIGATION MEASURES

As indicated in Section 6.0 Project Impacts, the proposed action would cause no significant short-term or long-term impacts to recreational, biological or scenic resources. The Coastal Engineering Assessment states that the existing seawall has no effect on the existing littoral processes at this site, it does not alter seasonal erosion/accretion patterns, and does not affect lateral access along the beach. No mitigation measures are proposed.

8. REQUIRED APPROVALS, AGENCY AND PUBLIC CONSULTATION AND REVIEW

8.1 Required Approvals

The project will require the following:

- Shoreline Setback Variance pursuant to Chapter 23, Revised Ordinances of Honolulu
- After-the-fact Building Permit from the City and County of Honolulu
- Height waiver for the existing seawall

8.2 Shoreline Setback Variance

The applicant will need to submit an application for an after-the-fact Shoreline Setback Variance for the following primary structures.

1. The seawall including the concrete cap behind the lip of the seawall and the concrete footing;
2. The return wall portion of the seawall and wooden fence along the east side yard.

The applicant is requesting that these additional non-permitted structures located within the 40-foot shoreline setback be included in the variance or that these structures be approved as "minor structures" under Chapter 23 section 15-1(b)(8):

1. Concrete lanai and wooden porch adjacent to the dwelling;
2. Concrete walkways and stairs along both the east and west sides of the dwelling;
3. Concrete tile fencing within the east side yard.

As set forth in the Revised Ordinances of Honolulu (ROH) Section 23-1.8(b)(3), the variance application will contain the three tests of hardship that the landowner will incur if he is not allowed to retain the structures

(1) The applicant will be deprived of reasonable use of the land.

All 16 residential properties along this coastline are protected with similar structures to prevent the effects of shoreline erosion and wave damage that would otherwise occur due to North Pacific swell events. Previous erosion from wave action had already substantially diminished the property area prior to construction of the shoreline protection structure. It is reasonable to assume that property losses will occur if the applicant is required to remove the illegal seawall structures that have been in place since 1969. Granting of the Shoreline Setback Variance is the means for legalizing the existing seawall under ROH Chapter 23 and would provide a means for the owner to legally repair the wall should a severe storm event undermine and collapse an unconsolidated shoreline, thereby creating a public hazard on the beach. Any other action would deprive the applicant of reasonable use of his property.

(2) The applicant's proposal is due to unique circumstances and does not draw into question the reasonableness of ROH Chapter 23 and the shoreline setback rules.

The beach fronting the property began to be narrowed since the original subdivision in 1960. The original seawall was constructed without building permits prior to the implementation of the shoreline setback rules and subsequently repaired in response to wave damage. Chapter 23 allows shoreline protection structures that have received a shoreline setback variance on the basis that the structure does not adversely affect beach processes, public access along the shoreline or shoreline open space. Retreat of the shoreline along this stretch of coast has been in existence prior to the building of the first seawall; and, would most likely continue without the shoreline protection structure. People can transit the area fronting the walls for recreational purposes at low tide and the open space and view planes are not impacted by the existence of the seawall. It is also a policy of Chapter 23 to reduce hazards to property from coastal flooding and retreat of

the shoreline; and, as the wall has been in existence for almost 40 years and is connected to a series of seawalls protecting the residential properties along the embayment, it is reasonable to allow the wall to remain and to allow it to be repaired as needed in accordance with government regulations

(3) The proposal is the practical alternative which conforms to the purpose of the shoreline setback regulations

The applicant concurs that while the preferable alternatives would be to redesign the wall to include a sloped revetment and/or engage in a program of beach restoration, the proposal to retain the existing seawall is the only practical solution. To demolish and reconstruct the wall would unduly impact beach processes and beach restoration is beyond the scope of a single landowner. Legalization of the existing shoreline protection structure, so that it can be repaired as necessary, is the best alternative given the history of erosion and wave action for this portion of the north shore of Oahu.

These criteria and any specific engineering solutions will be expanded on in the application for the Shoreline Setback Variance and will include a request and justification to retain other minor structures.

8.3 Preparation of the Final Environmental Assessment

The following agencies were consulted during the preparation of the Draft Environmental Assessment (DEA):

- City and County of Honolulu, Department of Planning and Permitting
- State Bureau of Conveyances
- State Department of Accounting & General Services (Survey Division)
- State Department of Land and Natural Resources
- State Office of Environmental Quality Control
- Office of Hawaiian Affairs
- Oahu Civil Defense

8.4 Comments and Responses on the Draft Environmental Assessment

The Final EA contains the following comment and response letters on the Draft Environmental Assessment.

2 4/17

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

April 13, 2006

Mr. Henry Eng
Mr. James Morisato
Department of Planning and Permitting
City and County of Honolulu
650 S. King Street, 7th Floor
Honolulu, HI 96813

Mr. George Murakami
1585 Kapiolani Boulevard, Suite 1100
Honolulu, HI 96814

Mr. Donald Clegg
Analytical Planning Consultants, Inc.
928 Nu'uanu Avenue, Suite 502
Honolulu, HI 96814

Dear Messrs. Eng, Morisato, Murakami, and Clegg:

Having reviewed the draft environmental assessment for the Murakami/Kodama After-the-Fact Seawall situated at Mokuleia in the judicial district of Waialua, Tax Map Key (1st) 6-1-10, parcel 18, the Office of Environmental Quality Control offers the following comments for your review and response.

1. ***Early Assessment and Consultation***: Section 11-200-9(b)(1), Hawai'i Administrative Rules requires the approving agency to require the applicant to seek the advice and input of the lead county agency responsible for implementing the county's general plan in which the proposed action is to occur, and to consult with other agencies having jurisdiction or expertise as well as citizen groups and individuals which the approving agencies reasonably believes to be affected. Section 11-200-10 (3) notes that the environmental assessment must identify agencies, citizen groups, and individuals consulted. Please describe the early assessment and consultation process and identify those parties contacted prior to the preparation of the environmental assessment document.
2. ***After the Fact Projects***: After-the-fact projects should be discontinued.
3. ***Cultural and Historic Characteristics***: On page 15, the draft environmental assessment notes that "[t]he single family residential property is not used for cultural practices." The statutory requirement (Chapter 343, HRS) to address cultural impacts necessitates that you examine the direct, indirect and cumulative impacts the proposed action described in the environmental assessment with have on cultural resources and practices and historic artifacts in the locale where the action has been undertaken (i.e., Mokuleia and environs). Please disclose what cultural resources (i.e., surfing sites, fishing sites, religious sites, native medicinal herbs, etc.) and contemporary cultural practices (i.e., gathering, surfing, fishing, etc.) are present in the environmental setting. After doing so, please assess what direct, indirect and cumulative impacts the proposed action will have on those resources and practices and artifacts.

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

Sincerely,

Genevieve Salmonson

GENEVIEVE SALMONSON
Director

PHONE (BUS): (808) 536-5695
FAX: (808) 599-1553

apc
ANALYTICAL PLANNING CONSULTANTS, INC.
928 NUUANU AVENUE, SUITE 502 • HONOLULU, HI 96817

June 3, 2008

Ms. Katherine Puana Kealoha, Director
State of Hawaii Office of Environmental Quality Control (OEQC)
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Subject: Draft Environmental Assessment (DEA)
Shoreline Setback Variance for Existing Seawall - Murakami
68-681 Farrington Highway – Mokuleia
Tax Map Key 6-8-010:018

Dear Ms. Kealoha:

Thank you for your comment letter dated April 13, 2006 addressed to Mr. Henry Eng of the Department of Planning and Permitting. We respectfully offer the following responses:

1. Agencies contacted during pre-consultation and during EA review are noted in both the draft and Final Environmental Assessment. The Department of Planning and Permitting is the approving agency. Section 8.2 of the FEA has been expanded to describe this process more completely.

2. It is believed that the seawall was constructed prior to adoption of the Shoreline Setback Rules of the City and County of Honolulu. The applicant is seeking an after-the-fact building permit.

3. Sections 2.5 and 3.7, which address cultural and historic characteristics and resources, have been expanded in the FEA.

Thank you again for your comments on the DEA. If you have any questions or require further clarification, please contact myself or Lauri Clegg at 536-5695.

Sincerely,

Donald Clegg
President

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

HRD06/2278

March 31, 2006

Henry Eng, FAICP
Director
Department of Planning and Permitting
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, HI 96813

ATTN: James Morisato

RE: Request for comments on the Draft Environmental Assessment and Application for an after-the-fact Shoreline Setback Variance for 68-681 Farrington Highway; Wailua, O'ahu; TMK: 6-8-010:018

Dear Henry Eng,

The Office of Hawaiian Affairs (OHA) is in receipt of your February 16, 2006, request for comments on the above project, which would allow George Murakami and Alan Kodama to receive an a variance for their existing seawall, concrete cap behind the lip of the seawall, the return wall portion of the seawall along the east side yard, and the concrete footing, with a height waiver. This variance would answer a July 2004 Notice of Violation for the seawall's concrete footing being located within the shoreline setback area.

Because Mokuleia Beach has a long history of chronic erosion, no new construction is proposed, the existing seawall has been in place for at least 30 years, and there are seawalls on either side of the existing seawall – both of which are within the same plane as the applicants' seawall, OHA does not have any comments at this time.

Thank you, however, for the opportunity to comment. If you have any further questions or concerns please contact Heidi Guth at 594-1962 or e-mail her at heidig@oha.org.

Sincerely,

Clyde W. Nāmu'o
Administrator

CC: Analytical Planning Consultants Inc.
Mr. Donald Clegg, President
928 Nuuanu Avenue
Honolulu, HI 96817

PHONE (BUS): (808) 536-5695
FAX: (808) 599-1553

apc
ANALYTICAL PLANNING CONSULTANTS, INC.
928 NUUANU AVENUE, SUITE 502 • HONOLULU, HI 96817

June 3, 2008

Mr. Clyde W. Namu'o
State of Hawaii Office of Hawaiian Affairs
711 Kapiolani Blvd, Suite 500
Honolulu, HI 96813

Subject: Draft Environmental Assessment (DEA)
Shoreline Setback Variance for Existing Seawall - Murakami
68-681 Farrington Highway – Mokuleia
Tax Map Key 6-8-010:018

Dear Mr. Namu'o:

Thank you for the comment letter dated March 31, 2006 addressed to Mr. Henry Eng of the Department of Planning and Permitting. We acknowledge that as Mokuleia Beach has a long history of chronic erosion, no new construction is proposed, the existing seawall has been in place for at least 30 years, and there are seawalls on either side of the existing wall that OHA does not have any comments at this time. This has been noted in the Final Environmental Assessment.

Thank you again for your consideration and review of the Draft Environmental Assessment. We appreciate the time you have given to determining the scope of the project and are requesting the Department of Planning and Permitting to issue a Finding of No Significant Impact (FONSI). If you have any questions or require additional information, please contact myself or Lauri Clegg at 536-5695.

Sincerely,

Donald Clegg
President

9. REFERENCES

AECOS, Inc. 1979. *Oahu Coral Reef Inventory.* Prepared for the U.S. Army Corps of Engineers, Pacific Ocean Division, Fort Shafter, Hawaii.

AECOS, Inc. 1981. *Oahu Costal Zone Atlas – Representing the Hawaii Coral Reef Inventory, Island of Oahu.* Prepared for the Harbors Division, Department of Transportation, Honolulu, Hawaii.

Bathen, Karl. 1978. *Circulation Atlas for Oahu, Hawaii.* Sponsored by the University of Hawaii Sea Grant College Program.

Chu, Michael S., and Robert B. Jones for the City and County of Honolulu, Department of Land Utilization, *Coastal View Study*, 1987.

City and County of Honolulu, Department of Planning & Permitting, Geographic Information Systems on-line database at http://.gis.hicentral.com

EKNA Services, Inc. April 2004. *Coastal Engineering Assessment of Existing Seawalls at Mokuleia, Oahu, Hawaii, TMK: 6-8-9:010 and 011.*

Fletcher, Charles. 2002. *Atlas of Natural Hazards in the Hawaiian Coastal Zone.* Prepared in cooperation with the University of Hawaii, State of Hawaii Office of Planning and the National Oceanic and Atmospheric Administration.

Hwang, Dennis. 1980. *A Method for Using Aerial Photos in Delineating Historic Patterns of Beach Accretion and Retreat.* Prepared for the State of Hawaii Department of Planning and Economic Development by the Urban and Regional Planning Program and the Hawaii Institute of Geophysics, University of Hawaii.

Hwang, Dennis. 1981. *Beach Changes on Oahu as Revealed by Aerial Photographs.* Prepared for the State of Hawaii Department of Planning and Economic Development by the Urban and Regional Planning Program and the Hawaii Institute of Geophysics, University of Hawaii.

Sea Engineering, Inc. 1989. *Oahu Shoreline Study. Part 1 – Data on Beach Changes and Part 2 – Management Strategies.* Prepared for the Department of Land Utilization, City and County of Honolulu.

Sterling, Elspeth and Catherine Summers. *Sites of Oahu.* Bishop Museum Press, Honolulu, Hawaii.

U.S. Army Corps of Engineers, Pacific Ocean Division. June 1979. *Help Yourself – A Shore Protection Guide for Hawaii.*

U.S. Department of Agriculture, Soil Conservation Service in cooperation with the University of Hawaii Agriculture Experiment Station. *Soil Survey of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii.* August 1972.

APPENDIX A

BUILDING DEPARTMENT
CITY AND COUNTY OF HONOLULU

BUILDING PERMIT APPLICATION

PERMIT NO. 45477

APPLICANT FILL INSIDE HEAVY LINES ONLY

OWNER H.K. LUDLOW
ADDRESS 68-681 FARRINGTON Hwy
PLAN MAKER R Pang
ADDRESS
OF. G. NO. 268 TEL. NO. 7
CONTRACTOR THRIFTY BUILDERS
ADDRESS
STATE LIC. NO. TEL. NO. BC3818
JOB ADDRESS 68-681 FARRINGTON Hwy.
WORK TO BE DONE New dwlg & carport

ESTIMATED VALUE $ 28000

- [x] NEW BLDG.
- [ ] FOUNDATION ONLY
- [ ] SHELL ONLY
- [ ] FENCE WALL
- [x] RETAINING WALL
- [ ] OTHER

- [ ] ADD
- [ ] ALTER
- [ ] REPAIR
- [ ] DEMOLISH
- [ ] RECONSTRUCTION
- [x] ELECTRICAL LATER
- [x] PLUMBING LATER

METHOD OF SEWAGE DISPOSAL
- [ ] SEWER CONNECTION
- [x] AEROBIC UNIT
- [ ] CESSPOOL
- [ ] _____

PROPOSED USE

I hereby acknowledge that I have read this application and state that the above is correct and agree to comply with all City and County ordinances and State laws regulating building construction.

SIGNATURE (OWNER OR AGENT) A.L. Griffin DATE

ZONE	SEC	PLAT	PARCEL	LOT NO.	LOT AREA	SQ. FT.
6	8	10	18	13	11,341	

DISTRICT Waialua

ACCEPTED VALUE $ PERMIT FEE

TYPE OF CONSTRUCTION		NO. OF STORIES	FIRE ZONE
MINIMUM	ACTUAL		
VN	VN	1	

OCCUPANCY GROUP I Dwlg

FLOOR AREA (SQ. FT.)

EXISTING NEW 2888 TOTAL

REMARKS

APPROVAL OF OTHER AGENCIES (ROUTE AS INDICATED)

V	AGENCY	SIGNATURE	DATE
	CITY AND COUNTY		
✓	PLANNING DEPT.		
	ZONE (USE DIST.)	C.P. Pang	10/2/67
	SET BACK		
✓	DIV. OF ENGINEERING		
	DRIVEWAY & LOT GRADING	Wm	7-31-67
	HIGHWAY		
	DRAINAGE		
✓	DIVISION OF SEWERS		7/31/67
	FIRE DEPT.		
	HON. REDEV. AGENCY		
✓	Elec		7-31-67
✓			
	STATE OF HAWAII		
	HEALTH DEPT.		
	FIRE MARSHAL		
✓	LAND & NATURAL RESOURCES		
	HIGHWAYS DIVISION		
	DIV. OF INDUSTRIAL SAFETY		
✓	Plumbing	Guy Eaton	9/18/67
✓	LAND USE	" "	10/6/67

Permission is hereby given to do above work according to conditions hereon and according to approved plans and specifications pertaining thereto, subject to compliance with ordinances and laws of City and County of Honolulu and State of Hawaii.

FOR BUILDING SUPERINTENDENT 10/6/67 DATE

NOTES TO APPLICANT:

Post permit placard on site of work.

This permit expires if work is not started within 90 days of date of issuance or if work is suspended or abandoned for 90 days. Violating any of the provisions of building code is punishable by fine of $300.00 and/or 90 day imprisonment.

Separate permits must be obtained for signs, electrical, plumbing, and gas.

- [ ] **This building shall not be occupied until a certificate of occupancy has been issued.**

OFFICE INDEX COPY

FORM BSD-45 (4/67)

APPENDIX B

DESCRIPTION OF IMPROVEMENTS

CARD 1 OF 1 CARDS

ZONE	SEC.	PLAT	PARCEL
6	8	10	18

SURVEY BY C.Y.

DATE 12/27/67

9. USE TYPE & OCC.

	RENT.	HOME
1-FAM.	☐	☑
2-FAM.	☐	☐
APART.	☐	☐
MULTI.	☐	☐

10. UNITS & ROOMS

LIV. UNITS 1

ROOMS 4

STORIES 1

BASEMENT

11. FOUND. & STEPS

	FD.	ST.
CONC.	☐	☐
H.T.	☐	☐
STONE	☐	☐
WD. P.	☑	☑
H.O.G.		

12. FRAME

WD-SW ☐ SWDB ☐ DW ☑

MASONRY ☐

STEEL ☐

REIN. CONC. ☐

13. EXTERIOR WALLS

T & G

B & B

RUSTIC ✓

BRICK

STONE/ROCK

HT.

14. ROOF DESIGN

GABLE ☐ HIP ☐

FLAT ☐ GAMB ☐

15. ROOF STRUCT.

WOOD ✓ (SHEATHING PLYBOARD)

STEEL

CONC.

16. ROOFING

COMP.

BLT/UP ✓

SHING.

SHAKES

METAL

TILE

RAIN GUTTERS ☐

17. FLR STRUCT.

WOOD JOISTS ☑

CONC. " ☐

STEEL " ☐

CONC. SLAB ☐

18. FLOORING

	LIV.	B/R	BTH	KIT.	OTHER
PINE					
HDWD					
CEM					
TILE RUBBED			/	/	
PLYBOARD	/	/	-	-	

19. ELECTRICAL

FIXT. CH ☐ M ☐ GD ☐

OUTL. S/ST ☐ / ST ☐ VG ☐

20. INTER. WALLS

TYPE P/W

MAT. PLAS. BD. & MICARTA

21. CEILING

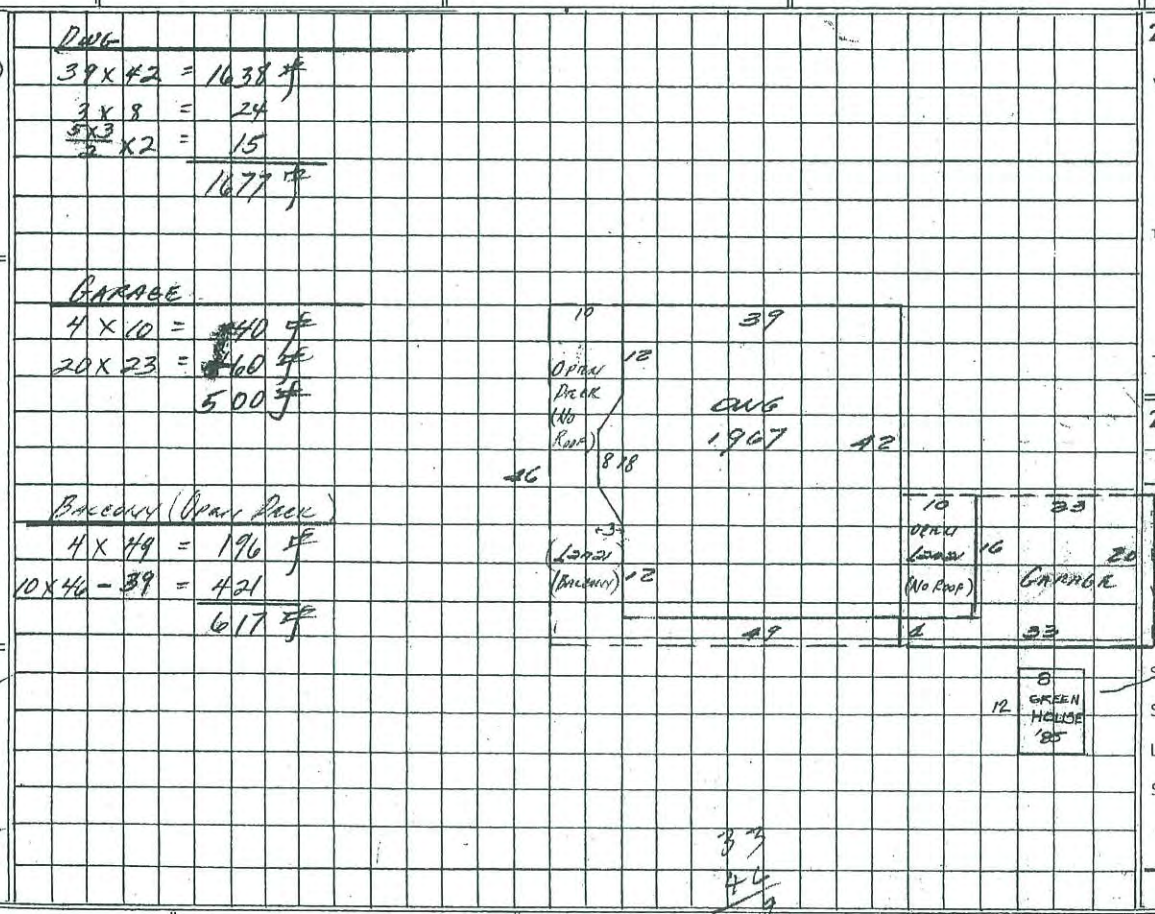
CANEC ☐ PLAS ☑

PINE ☐ PLY ☐

PORTION EXPOSED

22. BATHROOMS

1	☐	1½	☐
2	☑	2½	☐
3	☐		



23. MILLWORK

WINDOWS-D/H		DOORS-PANEL	✓
SL. CS.		SOLID 2 (GLASS) SLID'G	✓
PICTURE	✓		
JALOUSIE	✓	CUSTOM	
TRIM-PINE		CABINETS	
HARDWD		SHELVES	
METAL		VANITY (NO)	

24. PLUMBING

ITEM	CH	MED	GD	VAL.
5-UNIT				
BATH TUB		1		186
W.C.		1		266
BASIN	1	1		278
SH. STALL		1		210
SINK		1		140
LAUND				
SUN HT.				
SUB TOTAL—PLUMBING				1080

27. ADD'L FLOOR DET.

2ND ☐ 3RD ☐ 4TH ☐

28. CONDITION

BETTER THAN EVER ____%

AVERAGE (NOR. DEP) ☑

BELOW AVER ____%

26. REMARKS 1

25. ADD'L IMPVT DETAILS

ITEM	RF	WL	FL	AREA	CF	VAL.
GARAGE	BLT UP	H.T.	CON	500	3.59	1795
BALCONY (OPEN DECK)	-	OPEN	WOOD	617	(20%) 1.81	1117
BLT-IN APPL.						507
FIREPL (ONE STORY)				15 HEARTH		280

parcel 18

1st DIVISION

ZONE	SEC.	PLAT.	PARCEL
6	8	10	18

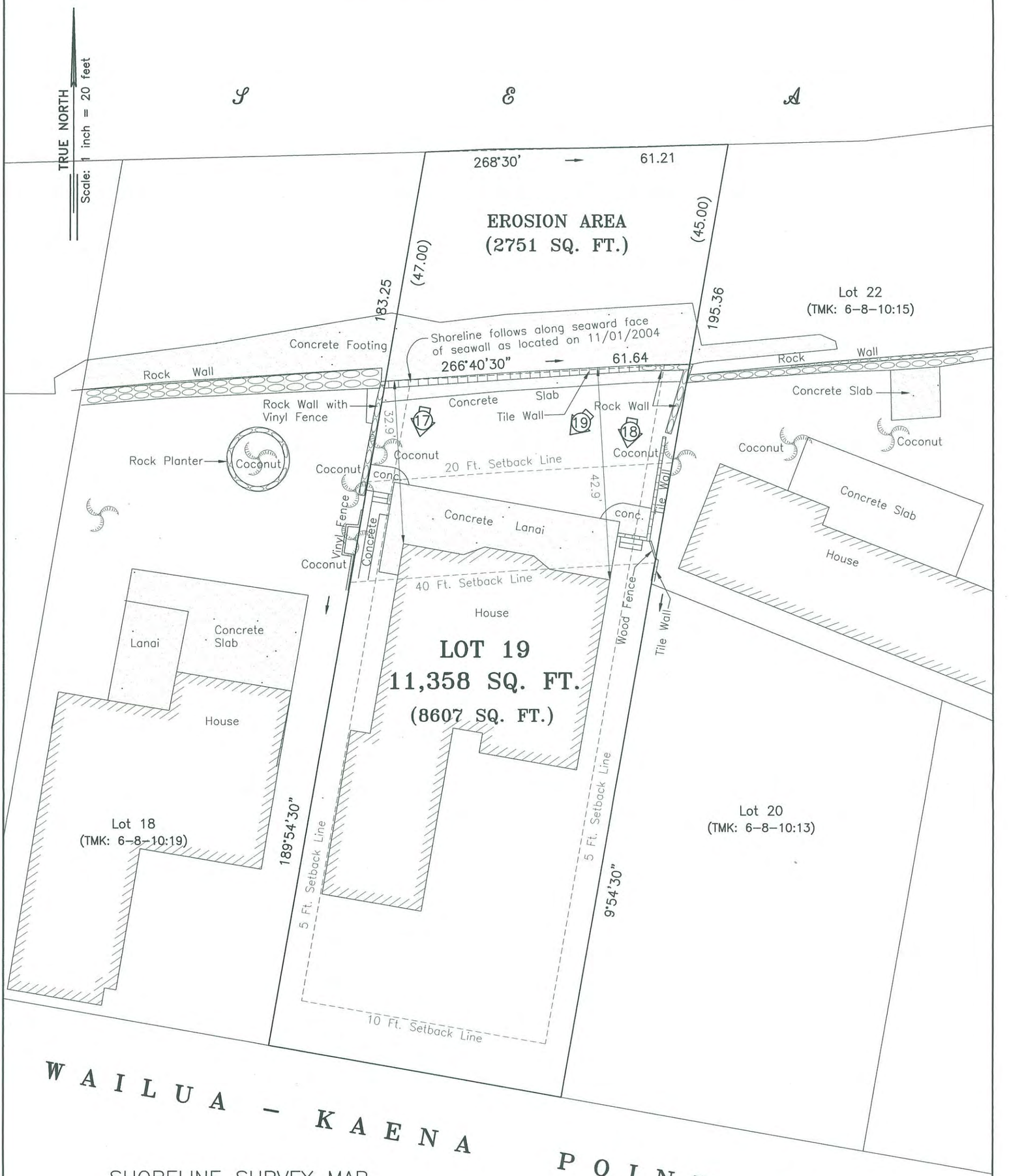
P/S 1969 Appeal - Beach frontage. No curbs or gutters - Level - Usable area O.K. 4-16-69 WA-HCW
4/5 for wave damage; wooden wall destroyed, 600# of sand washed away (already assessed @ $1), water & debris damage to landscape. 4/30/70 RH & M.D.

NO.	SYMBOL	FRONT	RATIO	DEPTH	LOT	AREA	U.F.V.	1961 VAL	U.F.V.	1965 VAL	U.F.V.	VAL	U.F.V.	VAL
1			9200	190		11341#	575	4882	875	8137				
2								1966						
3			9200	Ave 142'		8520#	875	6859						
4				OCEAN		2821#		1						
5						11341#		6860						
6								1969						
7			9200	140'		8520#	210	16461						
8				OCEAN		2838#		1						
9						11358#		16462						
10														
11								1971						
12						5000	2625	13125						
13						3520	1313	4622						
14				OCEAN		2838		1						
15						11358#		17748						
16														
17														
18														

YEAR	1961	YR.	1962	YR.		YR.		YR.		YR.		YR.		YR.		YR.	
AREA	11341#	AR.	11341#	AR.		AR.		AR.		AR.		AR.		AR.		AR.	
LAND VALUE	4882	L.	4882	L.		L.		L.		L.		L.		L.		L.	
IMPROVEMENT		I.		I.		I.		I.		I.		I.		I.		I.	
TOTAL	4882	T.	4882	T.		T.		T.		T.		T.		T.		T.	
LESS EX.		EX.		EX.		EX.		EX.		EX.		EX.		EX.		EX.	
NET TAX VALUE	4882	N.T.	4882	N.T.		N.T.		N.T.		N.T.		N.T.		N.T.		N.T.	
TAXES	67.81		67.81														

YEAR		YR.		YR.		YR.		YR.		YR.		YR.		YR.		YR.	
AREA		AR.		AR.		AR		AR.		AR		AR.		AR.		AR.	
LAND VALUE		L.		L.		L.		L.		L.		L.		L.		L.	
IMPROVEMENT		I.		I.		I.		I.		I.		I.		I.		I.	
TOTAL		T.		T.		T.		T.		T.		T.		T.		T.	
LESS EX.		EX.		.X		EX.		EX.		EX.		EX.		EX.		EX.	
NET TAX VALUE		N.T.		N.T.		N.T.		N.T.		N.T.		N.T.		N.T.		N.T	
TAXES																	

APPENDIX C



SHORELINE SURVEY MAP

LOT 19

as shown on Map 4
of Land Court Application 1810
Mokuleia, Waialua, Oahu, Hawaii
Tax Map Key: 6-8-10:18
Scale: 1 inch = 20 feet
Date: November 1, 2004
Revised: June 9, 2008

Owner: Mr. George Murakami
Mailing Address: 3941 Lanipili Place
Honolulu, HI 96816

GRAPHIC SCALE

10 0 10 20 40 80

(IN FEET)

1 inch = 20 feet

JAIME F. ALIMBOYOGUEN
LICENSED PROFESSIONAL LAND SURVEYOR
No. 8216
HAWAII, U.S.A.

exp. 4/30/10

This work was prepared by me or under my direct supervision.

NOTES:

1. Only improvements shown were located.
2. Denotes number and direction of photographs.

APPENDIX D

EKNA Services, Inc.

Engineers
and
Environmental
Consultants

Engineering
Planning
Surveys
Computer
Modeling

615 Piikoi Street
Suite 300
Honolulu, Hawaii
96814-3139

Telephone
(808) 591-8553
Facsimile
(808) 593-8551

CN 2474-00F# August 25, 2005

Mr. Donald Clegg
Analytical Planning Consultants, Inc.
928 Nuuanu Avenue, Suite 502
Honolulu, Hawaii 96817

Subject: SSV for Existing Seawall
68-681 Farrington Highway, Mokuleia, Oahu
TMK: 6-8-10:18

Dear Mr. Clegg:

This letter provides a Coastal Engineering Assessment of the potential impact of the subject seawall on existing coastal processes along this Mokuleia shoreline area. EKNA Services, Inc. prepared a Coastal Engineering Assessment of Existing Seawalls (TMK:6-8-9:010 and 011) in April 2004, for two properties located about 1100 feet east of the subject parcel. This prior report contains a large amount of information that is relevant to the subject property - i.e., information about coastal processes, alternative shore protection measures, and potential littoral impacts. The purpose of this letter is to provide additional information specific to the subject parcel. I recommend that our prior report be included in entirety as an Appendix in the Environmental Assessment for the subject seawall to provide the required coastal engineering information to support the SSV application.

Existing Seawall

The existing seawall is a reinforced concrete wall with top elevation of about +10' Mean Sea Level (MSL). According to the as-built survey by Hida, Okamoto & Associates, Inc., the base of the wall is protected by a poured-in-place concrete slope extending from elevation +3' MSL to the top-of-beach elevation of about +1' MSL (+2' Mean Lower Low Water (MLLW)). A site visit was conducted on April 2, 2005 during low tide (+0.1' MLLW), moderate North Pacific swell conditions (3-5 foot surf), and strong tradewinds. The base of the wall was subject to wave runup at the time of the site visit. Breaking wave activity was evident across the entire bayfront.

The subject seawall ties into a CRM seawall on the east side of the property, and a CRM seawall on the west side of the property. A public right-of-way (ROW) is situated three parcels to the east of the subject parcel. Properties eastward of the ROW to the stream mouth are protected with structures, and properties westward of the ROW within the embayment are protected by seawalls (about 1000 feet or so). There is no "dry beach" fronting the seawalls extending westward within the embayment. The attached photos depict the condition of the

shoreline in the vicinity of the subject property. It appears that the poured concrete slope at the base of the seawall was placed sometime after the wall was constructed, likely to stabilize the wall after erosion had lowered the elevation of the fronting beach.

Potential Littoral Impacts

The erosion that is occurring along this coastal reach can be described as "passive" erosion (in contrast to "active" erosion which is induced or accelerated by shore protection structures). The existing seawall and others along this coastal reach have no effect on the existing littoral processes at this site. However, when a protective structure is built along an eroding shoreline and erosion continues to occur, the result will be loss of beach in front of the shore protection structure as the water deepens and the shoreface profile migrates landward. This process is designated as passive erosion and is the result of fixing the position of the shoreline on an otherwise eroding stretch of coast. Passive erosion proceeds independent of the type of shore protection constructed. This is the most common result of shoreline hardening in Hawaii, and is the probable long-term consequence of the existing seawalls at Mokuleia.

Consideration of Alternatives

Removing the seawall (which is functioning as a retaining wall), without constructing replacement shore protection, would result in immediate loss of at least 50 feet of property as the shoreline attempts to achieve a stable slope. The adjacent properties would be impacted as their existing seawalls become flanked.

Removal of the existing seawall and replacing it with a different type of shore protection measure does not provide any significant benefit. Seawalls exist on both sides of the subject property. There is insufficient space on the property to construct a sloping revetment, as the dwelling is situated about 30 feet landward from the top of the seawall. Since the revetment toe would be in line with the existing adjacent seawalls, the top of the revetment slope would be located about 20 feet landward of the adjacent seawalls, and could not be constructed without removing or relocating the dwelling and constructing flank walls to protect the adjacent properties. Replacing the seawall with a sloping revetment structure will not improve the existing shoreline access and will not halt the ongoing erosion along this coast.

I trust that this letter addresses the coastal engineering issues concerning the subject seawall.

Very truly yours,

Elaine E. Tamaye
President

attachment

Coastal Engineering Assessment of Existing Seawalls at Mokuleia Oahu, Hawaii

TMK: 6-8-9:010 and 011

Prepared for:

Bruce Clements
68-003 Laau Paina Place
Waialua, Hawaii 96791

and

Michael Ells
68-001 Laau Paina Place
Waialua, Hawaii 96791

Prepared by:

EKNA Services, Inc.
615 Piikoi Street, Suite 300
Honolulu, Hawaii 96814
(EKNA Control No. 2439-00R#)

April 2004

Coastal Engineering Assessment
of Existing Seawalls at Mokuleia
TMK: 6-8-9:010 and 011

1. LOCATION AND PROBLEM IDENTIFICATION

The project site is located along two (2) contiguous parcel shorefronts at Mokuleia, at 68-001 and 68-003 Laau Paina Place (TMK: 6-8-09:010 and 011). Figure 1 shows the general site location and Figure 2 provides the Tax Map Key.

Both properties are protected by existing seawalls, that were constructed because of ongoing long-term erosion along this shorefront. The seawalls were constructed without obtaining a building permit and Shoreline Setback Variance. In accordance with Ordinance No. 92-34 and the Shoreline Setback Rules and Regulations of the City and County of Honolulu, this coastal engineering assessment is prepared in support of an application for a Shoreline Setback Variance for the existing seawalls at the two subject parcels.

The shoreline fronting this site is a narrow beach underlain with reef limestone that extends seaward as a variable depth reef platform. The site is exposed to winter North Pacific swell and the predominant tradewind waves. Shallow fringing reefs protect the shoreline from moderate tradewind wave energy. However, during large winter swell conditions and high water levels, erosion of the narrow beach and wave runup and overtopping of the beach cause erosion damage and flooding to unprotected backshore areas and dwellings. Numerous property owners along this coastal reach have constructed shore protection to prevent further storm wave runup damage to their dwellings. The subject property owners desire to retain the seawalls to prevent future erosion and wave runup damage to their dwellings.

2. SHORELINE CHARACTERISTICS AND COASTAL PROCESSES

The project site lies on the Mokuleia coast, characterized as an undulating coastal reach containing numerous embayed coral sand beach systems. The project site is situated in one such embayment near the east end of the Dillingham Airfield. This particular embayment is formed between two prominent reef "headlands", which are shallow reef formations that protrude seaward from shore. The reef headland which bounds the eastern end of this embayment fronts the Mokuleia Beach Colony, just to the west of the Mokuleia Polo Grounds. The two subject parcels are on the west side of the Mokuleia Beach Colony.

A site visit was conducted on April 9, 2004 during a low tide (0.0 MLLW[1]), moderate North Pacific swell conditions (3-5 foot surf), and strong tradewinds. The reef headlands were not bared, but were noticeably shallower than the reef fronting the central portion of the embayment. Breaking wave activity was evident across the entire bayfront. While not observable from shore, a review of aerial photos shows calm areas between breaker zones that indicate the deeper "channels" through the reefs fronting the embayment.

Photo page-1 shows the approximately 350-foot long seawall fronting the Mokuleia Beach Colony on the east side of the project site. The narrow and steep beach fronting this parcel is a "wet" beach, meaning that during high tide, the wave uprush reaches the seawall. Photo page-2 shows the subject Parcel 10 curvilinear seawall that ties into the Mokuleia Beach Colony's seawall. Photo page-3 shows the subject Parcel 11 seawall that is largely obscured from sight by the naupaka vegetation. This seawall ties into Parcel 10's seawall on the east side, and extends landward along the western boundary of the parcel for about 20 feet. Debris fronting the subject Parcel 11 shorefront indicates that wave uprush during high tide frequently reaches the existing wall. A privately-owned right-of-way is adjacent to subject Parcel 11 (the right-of-way is jointly owned by the property owners on Laau Paina Place and is not open to the public).

Photo page-4 shows the parcels westward to the stream. The parcel on the west side of the right-of-way (Parcel 12) is obscured by naupaka vegetation, and the adjacent parcel (Parcel 13) is fronted by a CMU wall. The large parcel on the east side of the stream (Parcel 20) is unprotected. Photo page-5 shows the stream and adjacent shoreline reach to the west. The parcel on the west side of the stream mouth shows obvious erosion damage, and a nearly continuous line of seawalls protect the remaining shoreline within the embayment.

A 1995 shoreline survey[2] indicates that the top-of-wall elevation on Parcel 11 is about +10' MSL and the base of the wall (top of beach) is about +6.0 to +6.5' MSL. The adjacent Parcel 10 top-of-wall elevation is the same, however, the base of the wall is ½ to 1 foot lower (because of the narrower beach front). The top-of-beach elevation fronting the adjacent three parcels to the west is probably on the order of +8' to +9' MSL.

---

[1]Honolulu low tide was at noon at -0.2' MLLW, and high tide was at 8:07 pm at +2' MLLW. Based on corrections for Waialua Bay, low tide was estimated to occur at 10 am at the site. The site visit was conducted 09:00 - 09:30 am.

[2]Survey by DJNS Surveying & Mapping, Inc., performed January 18, 1995 and submitted for shoreline certification.

It is apparent that during high tide, wave uprush reaches the base of the existing seawalls. During storms and large winter swell conditions, wave runup and overtopping of the beach likely causes flooding and sand transport into the properties that are not protected by seawalls. There is no evidence that the existing seawalls are accelerating erosion problems at the site. There is no indication of excessive escarpment or landward retreat of the unprotected shoreline directly adjacent to the Parcel 11 seawall. The beach profile is uniform along this entire shoreline reach. These factors indicate that the existing seawalls have had no adverse effects on existing beach processes.

This coastal reach is exposed to winter North Pacific swell and predominant tradewind-generated waves. The shallow reefs which surround the embayment provide much sheltering of the project site from deepwater wave energy. These reefs dissipate nearly all wave energy during typical tradewind-generated wave conditions. During large winter swell activity, waves initially break on the surrounding reefs where most of their energy is spent. What little energy remains propagates to shore as reformed waves which break on the shoreline. The wave energy that can reach the shoreline is limited by the water depths over the reefs and the channels through the reef. Deeper water depths over the reefs allow greater transmission of wave energy. During large swell activity, waves breaking over the reefs can cause a rise in water level known as wave setup. The increased water levels allow more wave energy to be transmitted over the reef. Thus, wave activity at the shoreline is greatest during large swell or storm wave conditions and during high tides.

The super-elevation in water level during large swell activity will allow waves to attack the shoreline at higher elevations on the beach. This is also aggravated during high tide conditions. Thus, the conditions which promote wave overtopping problems for unprotected parcels occur during large winter swell activity, as confirmed by residents. Typical tradewind waves are not capable of causing appreciable wave setup and very little wave energy reaches this shoreline reach.

Normally along an exposed coastal reach, wave energy is the primary factor which drives nearshore currents in the surf zone. Waves approaching the shore at an angle will induce longshore currents and transport of beach material alongshore in the direction of breaking. The large winter North Pacific swell approaches this coastal reach from the northwesterly direction. Therefore, it may be expected that longshore currents and longshore transport during winter swell activity would be towards the easterly direction at the project site. However, the shallow reefs surrounding the site considerably alter the deepwater wave characteristics within the embayment, resulting in possibly complex patterns of wave approach along the shoreline. According to a prior report by the author, residents have noted that shoreline currents within the embayment flow towards the west during high

winter swell activity. This flow may be primarily hydraulically driven due to the bathymetric contours within the embayment rather than wave-driven. The water which accumulates within the embayment during large swell or storm wave activity seeks to flow towards areas of hydraulically least resistance. Thus, the water drains towards deeper areas within the embayment. Deeper water depths exist on the west side of the embayment.

The shallow reef structure offshore the eastern headland (fronting the project site) is broader and extends further into the embayment than the shallow reef structure offshore the western headland. This reef structure offshore the eastern headland appears to gradually deepen towards the stream mouth, at which point the reef structure becomes less distinct and the reef bottom is mottled with sand cover throughout the western half of the embayment. There is an apparent "channel" through the offshore reef near the western end of the embayment. Thus, it is postulated that during large winter swell activity, setup in water level due to breaking waves on the broad shallow reef areas on the eastern end of the embayment induces flows towards the deeper central and west portion of the embayment. The channel through the surrounding reef at the west end of the embayment then allows the water to escape seaward through the opening in the surf zone. This hydraulically-driven circulation is probably the basis for the westerly-flowing shoreline current that residents have noted.

If the shoreline flows are strong, they have the potential to carry wave-suspended shoreline sediments offshore into the deeper reaches of the embayment and seaward of the surrounding reef as the shore-parallel flows are diverted seaward through openings in the shallow reef. Such sediments may be deposited in water depths too deep for normal wave activity to return it to the beach. The history of long-term erosion of this coastline is evidence that such permanent loss of beach material occurs.

While net long-term erosion is evident, residents also indicated that seasonal fluctuation of beach width occurs. According to the residents, there is a pattern of erosion along the eastern part of the embayment during the winter, with restoration of the beach width during the summer. Conversely, for the shoreline reach towards the western part of the embayment, there is a pattern of erosion during the summer and restoration during the winter. Because water depths in the central part of the embayment are too deep for transmitted wave energy to move sediments back to shore, the seasonal fluctuation of beach width is presumably due to longshore transport of sediments from the shoreline and shallow nearshore areas around the headlands. Figure 3 depicts the probable seasonal transport processes.

During high winter northwest swell activity, a depression in the surrounding reef at the

northwestern end of the embayment can permit substantial wave energy to enter the embayment and attack the eastern shoreline reach, while the shallow reefs fronting the western headland shelter the adjacent westerly shoreline reach within the embayment. The direction of wave breaking on the shallow westerly reef, however, can transport sediments from the shallow reef and shoreline areas around the point and into the embayment.

During strong northeasterly tradewind wave conditions which can occur during the summer months, a depression in the surrounding reef at the northeastern end of the embayment can permit substantial wave energy to enter the embayment and attack the western shoreline reach, while the shallow reefs fronting the eastern headland shelter the adjacent easterly shoreline reach within the embayment. The direction of wave breaking on the shallow easterly reef, however, can transport sediments from the shallow reef and shoreline areas around the point and into the embayment.

For this coastal area, and for most coastal areas in the state, the general trend is toward continued long-term erosion. There is no evidence that the long-term erosion trend along this coastal reach will reverse in the future.

3. POTENTIAL LITTORAL IMPACTS

The existing seawalls have no effect on the existing littoral processes at this site. The seawalls are functionally consistent with existing seawalls along this coastal reach. The existing seawalls do not alter seasonal erosion/accretion patterns. There is no evidence that the seawalls have caused aggravated erosion to the adjacent unprotected parcels. This entire coastal reach has been experiencing net long-term erosion over the past 50 years. There is a continuing high risk of erosion and flooding damage due to overtopping waves to unprotected properties.

The seawalls do not affect lateral access along the beach. While the seawalls do not affect longshore sediment transport processes, there may be some concern that cross-shore transport may be affected because of wave reflection from the near-vertical impermeable face of the seawall. It is been a generally held presumption that the more reflective the structure, the greater the potential for adverse impacts by discouraging sand accumulation in front of the structure. However, given the fact that beach and shoreline erosion is continuing to occur along this coastline and elsewhere where there are no shore protection structures, it can be concluded that the long-term erosion trend is a natural process that will certainly not reverse simply by constructing shore protection structures with a sloping porous surface. In fact, long-term field studies by the University of California at Santa

Cruz[3], sponsored by the U.S. Army Corps of Engineers, found no significant difference in impact to the beach fronting a sloping rip-rap revetment and an adjacent vertical concrete seawall. Field studies conducted by EKNA Services, Inc. (formerly Edward K. Noda and Associates, Inc.) at Aliomanu, Kauai, also demonstrated that seasonal cross-shore transport is unaffected by an existing seawall. Monitoring of beach profiles over a four month period (July-October 1996) showed that seasonal beach accretion (increase in beach width) occurred in front of the near-vertical seawall as well as on the adjacent unprotected beach.

The erosion that is occurring along the Mokuleia shoreline can be described as "passive" erosion (in contrast to "active" erosion which is induced or accelerated by shore protection structures). When a protective structure is built along an eroding shoreline and erosion continues to occur, the unprotected shoreline adjacent to the structure will continue to erode and eventually migrate landward beyond the structure. The result will be loss of beach in front of the shore protection structure as the water deepens and the shoreface profile migrates landward. This process is designated as passive erosion and is the result of fixing the position of the shoreline on an otherwise eroding stretch of coast, and is independent of the type of shore protection constructed. This is the most common result of shoreline hardening in Hawaii, and is the probable long-term consequence of the existing seawalls at Mokuleia.

4. CONSIDERATION OF ALTERNATIVES

Removal of the existing seawalls is not a viable alternative, since the improvements presently existing on the parcels would be susceptible to erosion and wave damage. The

---

[3]Because increased development in coastal areas has led to increased "hardening" of shorelines in response to net long-term shoreline erosion, there is an increased concern of coastal planners to the potential impacts of seawalls and/or revetments on beaches and shorelines. Even within the scientific and engineering community, controversy exists on whether seawalls and/or revetments are adverse and promote erosion. Because of the lack of sufficient field data to objectively resolve the controversy, the U.S. Army Corps of Engineers sponsored studies, beginning in the later 1980s, to monitor beach response to seawalls and revetments at several study sites. The following references describe the results of the monitoring:

U.S. Army Engineer Waterways Experiment Station, Coastal Engineering Research Center, Coastal Engineering Technical Note, CETN III-46 (3/92), CETN III-57 (6/95).

Griggs, G.B., J.F. Tait, K. Scott, N. Plant (1991), "The Interaction of Seawalls and Beaches: Four Years of Field Monitoring, Monterey Bay, California", Proceedings Coastal Sediments '91.

Griggs, G.B., J.F. Tait, W. Corona (1994), "The Interaction of Seawalls and Beaches: Seven Years of Monitoring, Monterey Bay, California", Shore and Beach 62:21-28.

houses on both parcels are situated within about 15 feet at their closest point from the top of the seawalls. Replacing the seawalls with a sloping revetment structure is also not a viable option because of the limited land area between the building improvements and the existing seawalls. As well, there is no reason to expect that a revetment would halt the ongoing erosion along this coast.

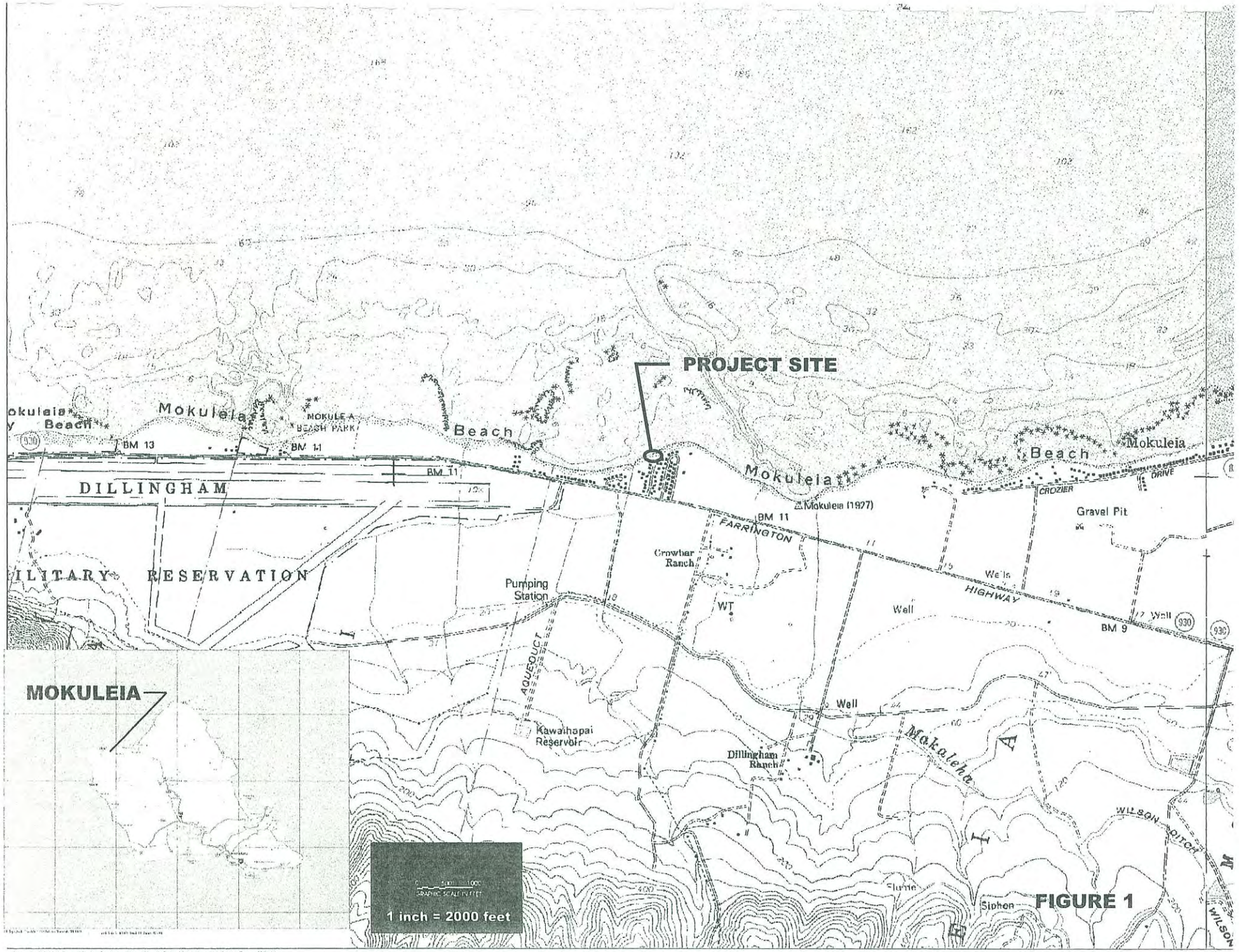
Large geotextile bags filled with sand have been used as temporary erosion control measures at several coastal erosion hot spots over the past years, most notably the Lanikai area. Large bags such as SEAbags[4] have been used for emergency shore protection in Lanikai for the last 10 years. The bags are prone to damage from storm wave attack and vandalism, require frequent and continual maintenance, and cannot be considered a permanent protection measure. Sand bags are considered "environmentally benign" because the color and texture of the fabric blends in with the beach, and they can be easily removed by simply cutting the bags to release the sand contents. However, they are not "soft" structures in their as-built state. In fact, the large sand bags are solid, hard building materials when fully filled, and a sand bag revetment structure is more reflective than a rock revetment. Although the bag material is permeable (meaning that water will pass through the bag material), once the bags are filled and stacked to form a structure, the overall porosity (ratio of void space to hard surface) of the structure is very low on the time scale of wave impact. Therefore, because there are few voids between the stacked bags, wave energy is more readily reflected rather than dissipated within the structure slope as would be for a rock revetment. Another potential concern is that bags that are below the water line or within the tidal/swash zone become very slippery because of algal growth, and pose a safety problem where people can slip and injure themselves. Even newly installed bags with no algal growth can be slippery because of the smooth surface of the bag material.

Beach restoration and nourishment is commonly cited as a preferred alternative to protecting eroding shorelines and beaches. Unfortunately, this alternative is costly (due to lack of suitably large quantities of natural beach sand to serve as a commercial source of material) and not an economically viable alternative for individual residential property owners. Beach nourishment would be required for a long stretch of shoreline reach extending beyond the subject parcels, since wave energy will quickly redistribute small quantities of beach material unless beach containment structures (such as groins) are built to confine the beach fill fronting individual parcels or short stretches of shoreline. If no structural measures are built to stabilize the beach fill, periodic nourishment would likely

[4]Trade name for large sand bags from Bulk Lift International, designed for beach erosion protection.

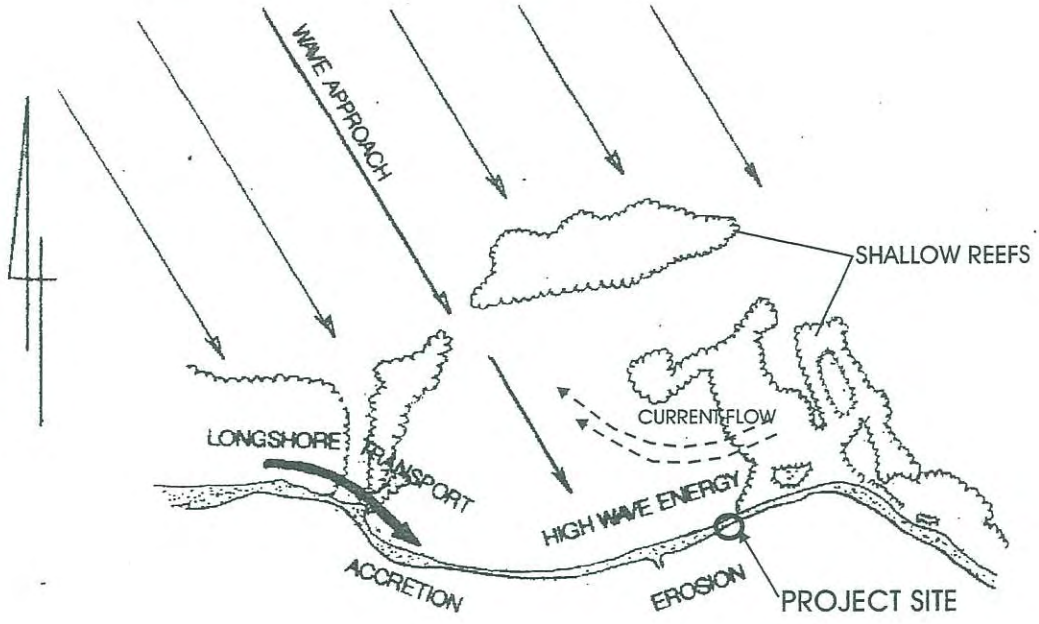
be required. Beach restoration and nourishment, in general, is difficult to design and maintain as a "shore protection" alternative. For the beach to provide adequate protection during storm wave events, it must have adequate beach width, elevation, and length along the entire shoreline reach within the defined littoral cell. The large quantities of suitably coarse natural beach sand required for major beach restoration/nourishment projects are not readily available in Hawaii. As a matter of fact, the government agencies that have responsibility for our recreational beach resources can rarely afford to perform major beach nourishment for public beach parks or publicly accessible beach areas.

While not an erosion control measure, relocating the existing building improvements on the parcels is considered a temporary measure to prevent or mitigate damage to the dwellings. Erosion is expected to continue along this coastline, leading to continued loss of properties that are not protected. While it is not possible to predict the "serviceable" life of any beachfront property, it is a reasonable certainty that properties that are not protected from erosion damage will eventually be lost to the sea.

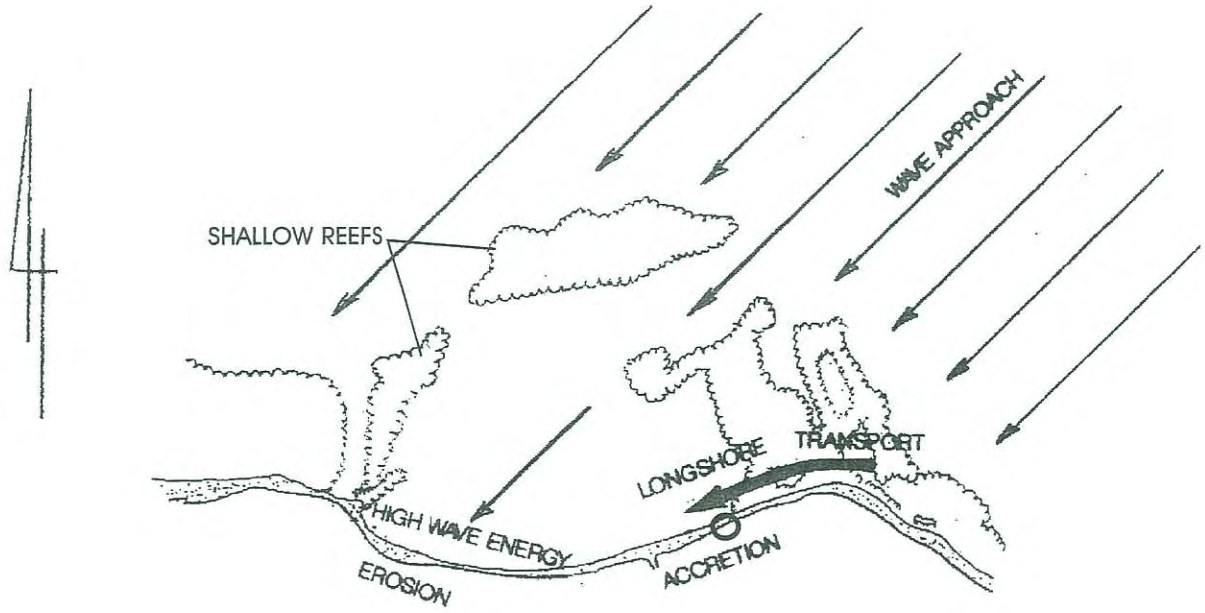

PROJECT SITE
MOKULEIA
1 inch = 2000 feet
Mokuleia Beach
MOKULE A BEACH PARK
BM 13
BM 14
BM 11
DILLINGHAM
MILITARY RESERVATION
Mokuleia
Beach
Mokuleia (1927)
BM 11
FARRINGTON HIGHWAY
CROZIER DRIVE
Gravel Pit
Crowbar Ranch
Pumping Station
WT
Wells
Well
BM 9
AQUEDUCT
Kawaihapai Reservoir
Dillingham Ranch
Makaleha
WILSON DITCH
Flume
Siphon
FIGURE 1

Approx. Scale 1 inch = 100 feet

FIGURE 2



WINTER NORTHWEST SWELL CONDITIONS

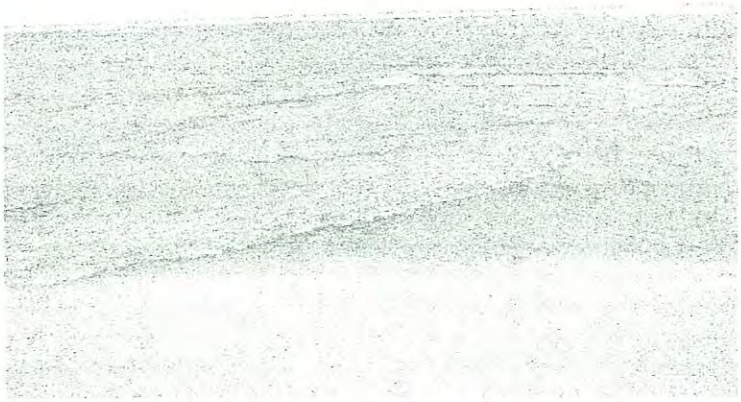


SUMMER NORTHEAST TRADEWIND CONDITIONS

FIGURE 3

View eastward along the top of the seawall fronting the Mokuleia Beach Colony. Note the narrow beach.

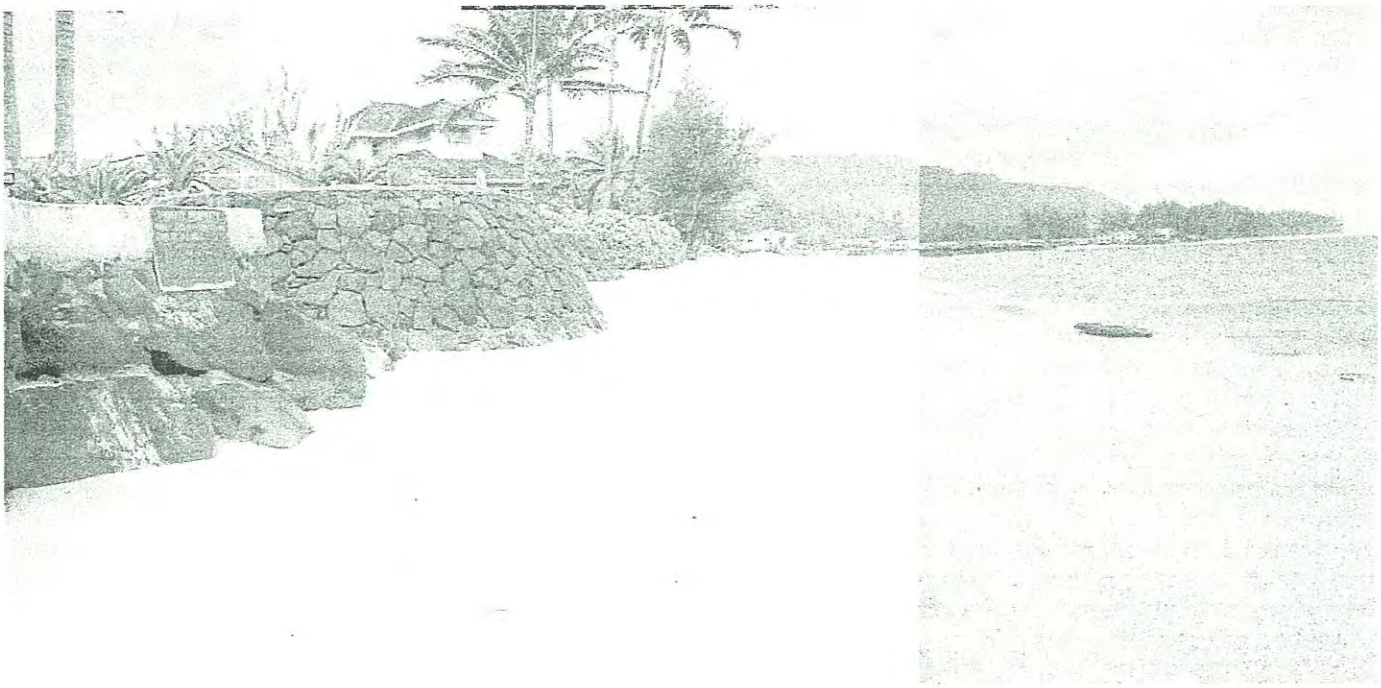
View eastward along the beach fronting the Mokuleia Beach Colony seawall. Note the narrow and steep beach profile.



View offshore Parcel 10. Note the shallow reef and wave angle at the shoreline indicating eastward longshore transport.

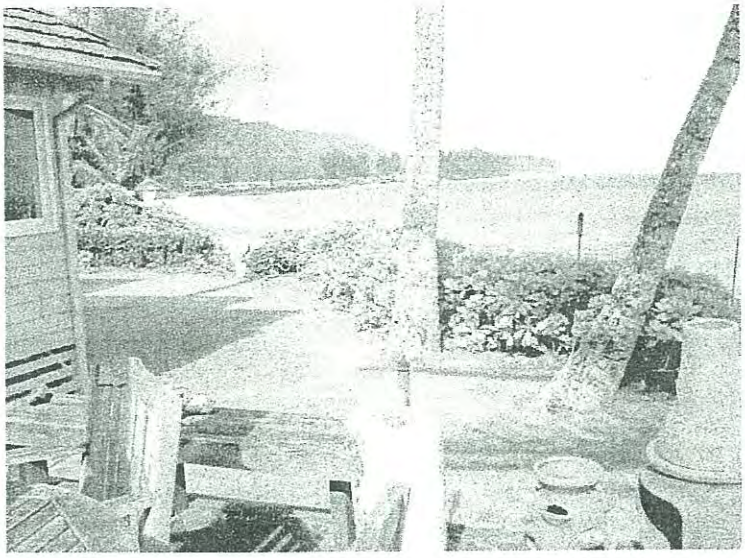
Winter North Pacific swell were causing breaking waves across entire embayment.

MOKULEIA
PHOTO DATE 4-9-04
TIME 09:15 AM
TIDE APPROX. 0.0 MLLW



Views westward from west end of Mokuleia Beach Colony seawall. Parcel 10 is in the foreground. Parcel 11 is next to Parcel 10. (Sign is on the west end of the Mokuleia Beach Colony seawall. The sign permits the public to walk on the top of the seawall.)

MOKULEIA
PHOTO DATE 4-9-04
TIME 09:15 AM
TIDE APPROX. 0.0 MLLW



View westward from porch on Parcel 11.

View offshore from porch on Parcel 11. Steps in seawall lead down to the beach.

View of Parcel 11 seaward frontage. Seawall is hidden by naupaka vegetation. Curved seawall on left fronts Parcel 10.

View mauka along private right-of-way. The CRM wall on left is Parcel 11's return wall.

MOKULEIA
PHOTO DATE 4-9-04
TIME 09:00 AM
TIDE APPROX. 0.0 MLLW

View westward from private right-of-way. Naupaka vegetation fronts Parcel 12.

Naupaka vegetation fronting Parcel 12 on west side of private right-of-way.

CMU wall fronts Parcel 13 .

Shoreline fronting Parcel 20 on east side of stream. Note debris line at edge of vegetation.

MOKULEIA
PHOTO DATE 4-9-04
TIME 09:25 AM
TIDE APPROX. 0.0 MLLW

View westward from stream mouth. Note eroded condition of embankment on west side of the stream. Continuous line of seawalls protect entire central shore frontage within the embayment.

MOKULEIA
PHOTO DATE 4-9-04
TIME 09:30 AM
TIDE APPROX. 0.0 MLLW